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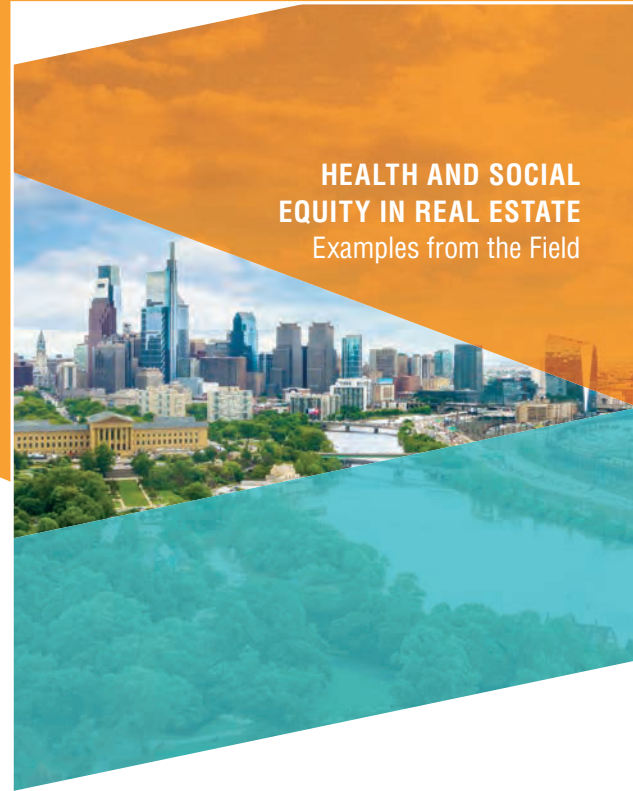
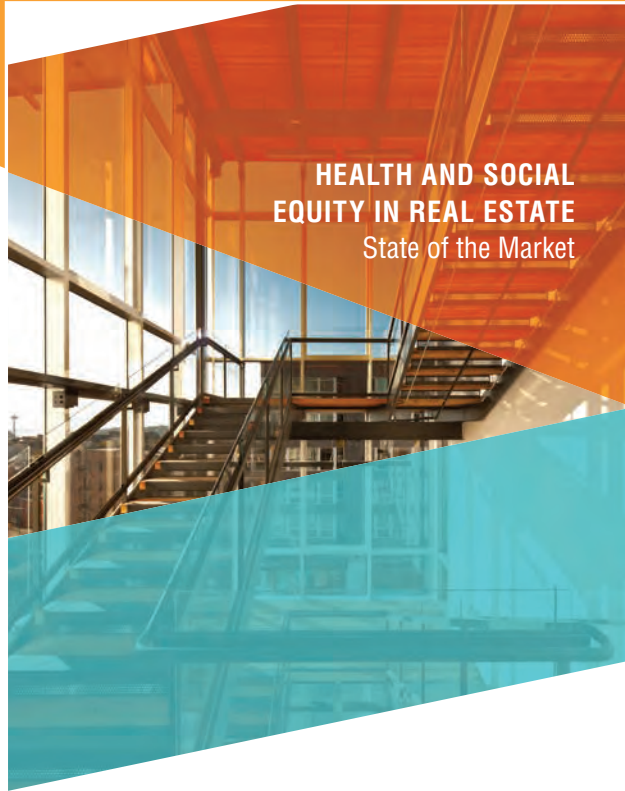
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THE REAL ESTATE INDUSTRY IS RIPE FOR ACCELERATED INVESTMENT IN HEALTH AND SOCIAL EQUITY.



NEW ULI REPORTS ON THE ADVANCEMENT OF HEALTH AND SOCIAL EQUITY IN REAL ESTATE

The year 2020 brought increased attention to health as a result of the COVID-19 pandemic, and to social equity from the racial justice movement across the United States.

In two new timely reports, ULI's Building Healthy Places Initiative and the Greenprint Center for Building Performance analyze the current state of health and social equity in real estate and provide examples from the field to inspire increased action from real estate leaders marketwide.

Health and Social Equity in Real Estate: State of the Market presents a snapshot of real estate professionals' awareness and adoption of practices supporting health and social equity and identifies opportunities for further inclusion of such practices.

Health and Social Equity in Real Estate: Examples from the Field takes an in-depth look at commercial real estate firms successfully integrating health and social equity into assets across the country, and includes the business case for accelerated investment in these projects.

Download both reports at

uli.org/healthandsocialequity



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46 Real Tech

How accelerating developments in technology will aid the return to normalcy



48 Outlook for Technology

How are real estate technologies shaping a world transformed by the coronavirus pandemic?

- 48 Americas
- 52 Europe
- 56 Asia Pacific

60 Healthier by Design

PATRICK J. KIGER
Developers, architects, engineers, and scientists are blending design and technological innovations to transform buildings into enduring lines of defense against disease.

68 A Fact Check of Claims about 5G Wireless Technology

JOSH COHEN
Although it could be three to five years before the promise of 5G internet can be realized in offices and multifamily spaces, the real estate industry is starting to think about what kind of impact 5G will have inside the built environment.

74 Punggol Digital District

YONG SHU CHIANG
Singapore's new university plans for the future of learning.



COVER: A DJI MINI 2 DRONE QUADCOPTER WITH CAMERA
PHOTO: GABE SHAKOUR/SHUTTERSTOCK.COM



81

78 Landwrites

78 How Technology Allowed ULI to Push Forward

ADAM SMOLYAR

Decisions made years ago to invest in new technologies—and to continually upgrade existing platforms—allowed ULI to pivot rapidly to online delivery of vital member services.

81 Electricity Infrastructure, Low-Carbon Real Estate, and Wildfire Resilience

An excerpt from the report *Firebreak: Wildfire Resilience Strategies for Real Estate*, published by the ULI Center for Sustainability and Economic Performance, with support from the Kresge Foundation.

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WeWork	5
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26 Developments

Insights from the McCoy Symposium: Confidence in U.S. Real Estate for 2021

Former ULI Europe Chairman Roger Orf Named Life Trustee

2020 Annual Report: Successfully Navigating a Rapidly Changing World

Three Exemplary Real Estate Projects Win ULI Europe Awards for Excellence

Get Caught Up with *Urban Land* Reading Lists

DEI Roundup: With Record Class Size, ULI/REAP 2020 Fall Academy Builds Connections to Promote Equity

DEI Roundup: Two New ULI Reports Highlight the Need to Promote Health and Social Equity

DEI Roundup: James Lima: On Exploring Issues of Environmental Justice and Land Use

Kansas City, Missouri, Chosen as 2021 ULI Hines Student Competition Study Site

36 Inside the ULI Foundation

Supporting ULI's Diversity, Equity, and Inclusion Initiative through ULIF



40

40 UL10

Extra-Green Buildings

RON NYREN

Ten new buildings exemplify sustainable design creativity.

83 Emerging Trends in Real Estate® 2021 around the World

83 United States

86 Canada

87 Europe

90 Asia Pacific

92 Proactive

92 Solution File

Drones for Development

WILLIAM P. MACHT

The pandemic has accelerated the use of contactless drones for comprehensive applications in real estate development.

100 Back Page

How a Real Estate Portfolio Achieves Net Zero

MARTA SCHANTZ

A mix of technologies helps energy-saving pioneers drive down their carbon profiles.

Departments

16 CEO Perspective

21 ULI Global Chairman Owen Thomas: Introducing Our New Mission Statement

23 This Issue

2021 Special Advertising Supplement: Education Programs

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Easton Urban District, Steiner + Associates, Columbus, OH

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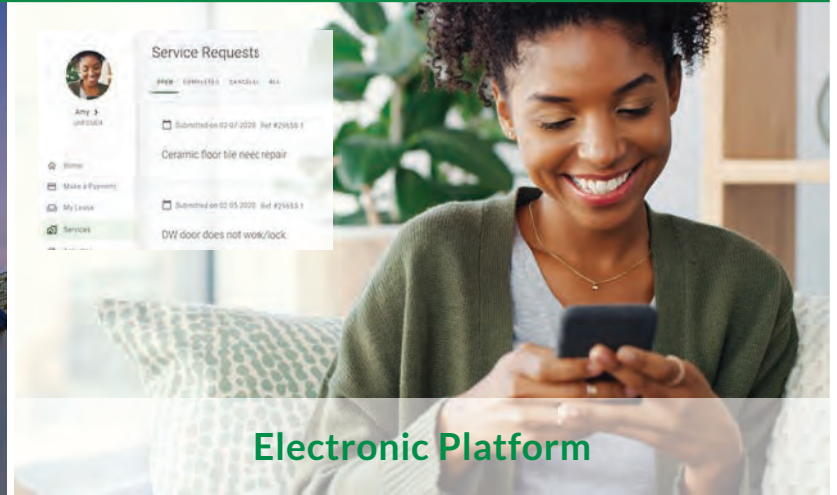


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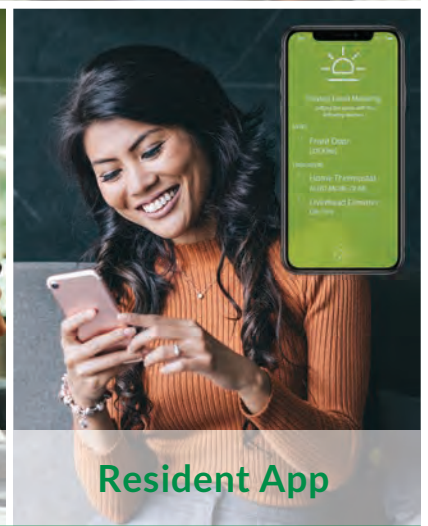
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² As of September 30, 2020; Includes all wholly-owned homes, homes in development, and joint venture homes at 100%.

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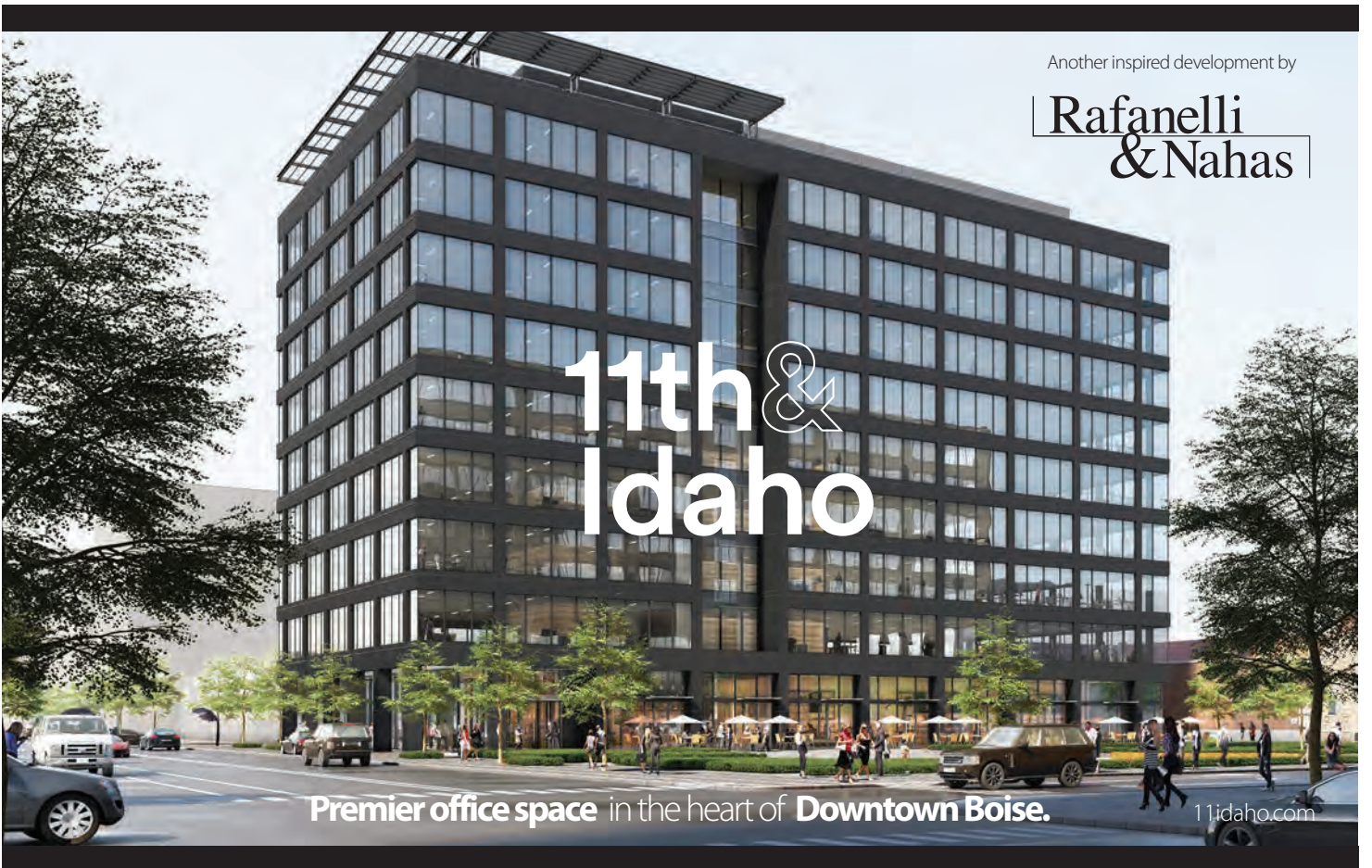


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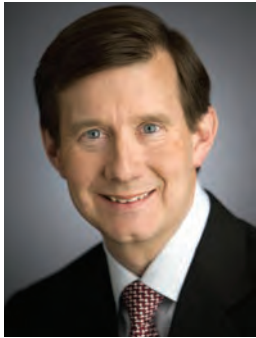
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Here for Our Members



Ed Walter
ULI Global Chief Executive Officer

THIS MONTH MARKS one year since ULI's programs and activities were first disrupted by the outbreak of the COVID-19 pandemic. In that time, we all have been forced to make significant changes to our day-to-day lives and adapt our businesses to face uncertain economic and market conditions. Throughout the pandemic, ULI has

been focused on supporting our members by finding new ways to connect you in a virtual world and by providing timely and applicable insights that can help your business succeed in uncertain times.

At the heart of our offering has been an extensive program of webinars. The Americas, Asia Pacific, and Europe regions all are regularly producing high-quality webinars that showcase ULI's latest research reports or bring together senior leaders to tackle topics that are most relevant to members. These regional webinars have been augmented by extensive local programming at the national and district council levels that has enabled the free flow of knowledge and ideas across our networks. In total, we have hosted well over 1,000 webinars over the past six months, attracting nearly 40,000 attendees, plus an additional 16,000 members choosing to view the programs on demand in Knowledge Finder.

This year we are taking our webinar program a step further with the launch of OnPoint, a live online discussion with expert panelists from across the globe. The discussion is designed to provide insights on the latest developments in geopolitics and the economy before taking a deep dive into a specific industry segment. The first OnPoint took place at the end of January and included a segment on hospitality and enter-

tainment, one of the sectors hardest hit by the pandemic. We hope to grow and expand this program over the next year to be able to share more actionable insights with our members.

Our webinar program has been underpinned by the new insights provided by our centers and initiatives, which continue to regularly publish a variety of research reports. In addition to the *Emerging Trends in Real Estate*® reports that we publish jointly with PwC in all three regions and our own semiannual Real Estate Economic Forecast, we produced a wide range of reports on housing and sustainability over the past six months. Of particular note are the Terwilliger Center for Housing's *Family Renter Housing: A Response to the Changing Growth Dynamics of the Next Decade*, which looks at the need for more family rental housing stock to meet demographic demand, and the Center for Sustainability and Economic Performance's report with Heitman titled *Climate Risk and Real Estate: Emerging Practices for Market Assessment*. We already have a full calendar of new reports planned for 2021 on a broad range of topics.

To better serve our members, ULI Learning has also pivoted to delivering its curriculum online, with a full complement of courses and certificates available. Our Foundations of Real Estate program can be an excellent way to introduce new employees to the real estate sector or can be provided to your favorite university to help attract more talent to our industry.

Our major global convenings—Fall Meeting, Spring Meeting, Asia Pacific Summit, and Europe Conference—are always key components of ULI's program, providing valuable networking opportunities alongside high-quality content. We have successfully pivoted to providing these events online: our Virtual Fall Meeting in October brought together more than 4,000 members. The event allowed members to interact with the

WHO'S WHO AT ULI AND THE ULI FOUNDATION

The Urban Land Institute is a nonprofit education and research organization that was founded in 1936. Its mission is to shape the future of the built environment for transformative impact in communities worldwide.



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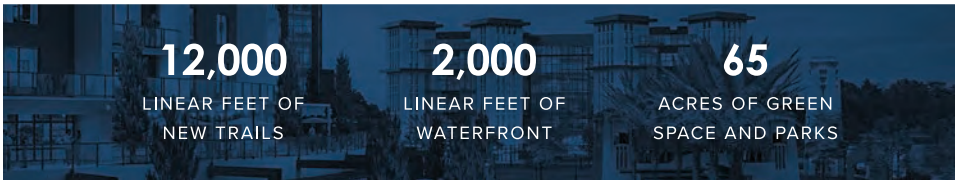
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general and concurrent sessions, as well as participate in 12 on-demand virtual tours. Networking opportunities were also available through the chat function or by attending one of the many round-table discussions.

As we begin 2021, we will be continuing to host our major convenings online. The Europe Conference in early February will offer an experience similar to that of the Fall Meeting and will include live sessions from both London and Paris. Looking ahead, the Spring Meeting in May also will be held virtually, though we are actively exploring how we may be able to host supporting in-person events in the host city of Denver and across the Americas. We are working to structure the Asia Pacific Summit, scheduled for Tokyo in May, as a hybrid meeting that will combine in-person programming with an extensive online program connecting members across the region.

Because of the competing demands on your time, the ability to access content and information quickly and on demand is more important than ever. Knowledge Finder has proved invaluable to many members as a way of accessing our reports, webinar recordings, content from our major meetings, case studies, and so much more. We have recently expanded Knowledge Finder to incorporate virtual tours and information on the courses available through ULI Learning, and plans are to provide access to podcasts and the ability to view or search transcripts of video and webinar content. We also have initiated the process of making the platform multilingual, launching support for Japanese language, with plans to support French, German, Spanish, and Mandarin. Knowledge Finder's personalization feature also enables you to tailor your experience of the platform to more easily see and receive content that matches your specific interests.

We are optimistic that over the course of the year we may slowly return to in-person gatherings, and we hope that the Fall Meeting can be held in person in Chicago. In the meantime, I hope you all remain safe and healthy, and take full advantage of what ULI can offer you and your organization. **ULI**

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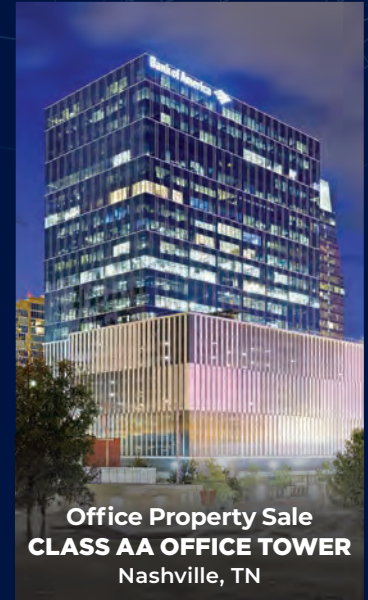
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Owen Thomas: Introducing Our New Mission Statement

ONE ASPECT OF ULI THAT SETS IT APART from other real estate organizations is our mission, the essence of which is our ability to bring members together from across disciplines, sectors, and geographies to make an impact in our communities. As a ULI member for over 30 years, I have had the privilege of seeing firsthand the power of ULI and the difference that our collective knowledge and expertise can make to our industry and our communities.

We live in a rapidly changing world, and it is important that as an Institute we keep pace with the members and communities we serve and convey our purpose in a way that makes us meaningful and relevant.

Following feedback from our members, ULI's Global Board of Directors thought it was the right time to review our mission statement to ensure that it achieved everything we wanted it to and did justice to the work of our organization. Over the past year, with the help of our board, regional executive committees, staff team, and a working group made up of members from around the world, we have created a new articulation of our mission to better communicate the scope and impact of our activities as well as our future aspirations.

It is important to say that we are not changing our mission. The same ethos of providing leadership in responsible land use and creating and sustaining thriving communities that inspired you to join ULI remains at our heart. Instead, we are articulating our mission differently to better capture the breadth, spirit, and purpose of ULI through a more memorable, more inspiring, and more relevant statement.

I am proud to say that this is our new mission statement:

Shape the future of the built environment for transformative impact in communities worldwide

Our new mission statement is supported by three commitments that expand on our objectives and explain how we deliver on our mission. These mission commitments are:

CONNECT active, passionate, diverse members through the foremost global network of interdisciplinary professionals

INSPIRE best practices for equitable and sustainable land use through content, education, convening, mentoring, and knowledge sharing

LEAD in solving community and real estate challenges through applied collective global experience and philanthropic engagement

The mission statement and commitments capture our forward-looking nature, our global footprint, and our commitment to delivering real-world impact in our communities. The commitments emphasize ULI's role in bringing together all sections of the real estate industry and the key part our members play in delivering change through knowledge sharing and applying collective experience. In keeping with our strong commitment to diversity, equity, and inclusion, we explicitly reference the need for diversity in our membership and our belief that communities can only truly thrive if they are equitable.

Having the right mission statement is important to our position and impact as an organization. It aligns us all as members and staff around our shared values and objectives, while also communicating to the wider world who we are, what we do, and what we are looking to achieve. Our new statement not only reflects what we are today, but also what we want our organization to become in the future, inspiring us all to achieve more in delivering our mission.

You will start to see the new mission statement and commitments used in the weeks and months ahead. Our hope is that by this year's Spring Meeting, we will all be consistently using the new articulation of our mission and spreading the word about ULI and its impact.

I hope the new statement and priorities will inspire you to deepen your involvement with ULI and that you will help us shape the future of the built environment for transformative impact in our communities worldwide. **UL**

Owen Thomas, ULI Global Chairman



Owen Thomas.

“We are articulating our mission differently to better capture the breadth, spirit, and purpose of ULI through a more memorable, more inspiring, and more relevant statement.”

—OWEN THOMAS

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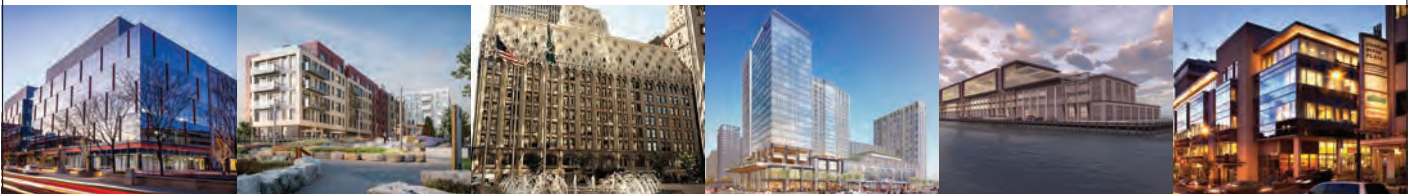
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Tech Takes Hold

SOMETIMES TECHNOLOGICAL IMPROVEMENTS creep up on you. I didn't realize, for example, that kitchen toasters needed to up their game, but my yet-to-be-delivered new toaster is a "smart" device, the proof of its intelligence remaining to be seen at an upcoming breakfast. Toaster technology snuck up on me.

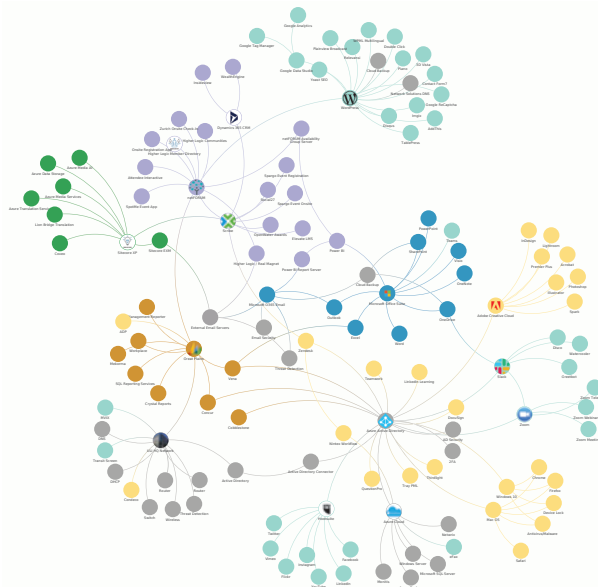
But, like a child outgrowing a new pair of shoes, growth can come in unanticipated bursts. We are in one of those times with technology, thanks to the COVID-19 pandemic. Who expected Zoom to become such an integral part of our lives, business as well as social? This issue of *Urban Land* explores the many ways in which technology zoomed ahead over the past year, overcoming market resistance.

Consider what's happening with drones. Real estate enterprises had started to put them to work for design- and construction-related tasks before the pandemic. But as the article "Drones for Development," which begins on page 92, illustrates, the need to minimize person-to-person contact has boosted their usefulness and given rise to new drone-based service companies.

Fast wireless internet connections underpin many of these technologies. Beginning on page 68, author Josh Cohen leads us through the facts and misperceptions related to the rollout of 5G wireless service, along with the implications for owners and managers of real estate assets. Marketing hype is thick in this arena, and this article cuts through to the bottom line.

Along with its members, the Institute itself has had to stay on its toes to adjust to the realities of pandemic-driven shutdowns. In this issue, Adam Smolyar, ULI's chief marketing and technology officer, guides us through the years-long process of investment—along with trial and error—that allowed ULI to rapidly shift its delivery of services to online formats capable of serving a global audience. The article, "How Technology Allowed ULI to Push Forward," begins on page 78.

This issue also presents one of *Urban Land's* top features—in triplicate. Our Outlook articles, presenting the thoughts of members of ULI's exclusive product councils, are presented for Europe, the Asia Pacific region, and the Americas. All told, a dozen of the world's top real estate practitioners offer their thoughts on how technology, combined with pandemic, will change the landscape for years to come. That package begins on page 46.



And, finally, we present highlights of the *Emerging Trends in Real Estate*® reports published annually in conjunction with PwC. Beginning on page 83, we have the top-line findings for the United States and Canada, Europe, and the Asia Pacific region. Among the conclusions: the pandemic has significantly accelerated the development—and market acceptance—of technology. Whether it's online shopping and banking or the remote evaluation of potential investment properties, tech-enhanced services are becoming the default choice. Many of these new habits will stick around once the coronavirus is tamed.

I invite you to tune into one of the online offerings we developed promptly in response to the mandate for social distancing, which kept many members away from their workplaces. You can find an e-reader version of this magazine—appearing with photographs and advertising just as it does in print—using Knowledge Finder, knowledge.uli.org. This product is searchable by keyword, and all internet links—for articles as well as advertisements—are live. We hope you find it a useful adjunct to the paper magazine, and we all hope for a return to meeting again, face to face. **UL**

Elizabeth Razzi
Editor in Chief



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Sensors connected to heating coils embedded in entryway sidewalks activate automatically to keep walkways safe and clear from ice and snow.

DEVELOP

Insights from the McCoy Symposium: Confidence in U.S. Real Estate for 2021

Commercial real estate is likely to have a good year in 2021, despite the devastation caused by the coronavirus, according to industry leaders participating in the 27th annual ULI/McCoy Symposium on Real Estate Finance.

The invitation-only symposium brings together leading executives in the world of real estate finance and investment to discuss and explore key issues affecting the real estate capital markets and the real estate industry. In December, about 80 participants joined the event through a video call rather than traveling to New York City, where it is usually held.

“I walked away surprised at how optimistic the various groups are,” says Roy H. March, chief executive officer of Eastdil Secured, based in New York City. “These are senior people at real estate groups. . . . They are pragmatic and realistic. I was encouraged by their enthusiasm.”

Vaccine Brings Increased Optimism

Multiple approved coronavirus vaccines gave industry leaders a reason to hope that the U.S. economy—and the real estate business—might still recover quickly from the pandemic, in contrast with the long, slow recovery from the global financial crisis a decade earlier.

“We had the good news of a couple vaccines. That could put us in a better frame of mind,” says Bowen H. “Buzz” McCoy, a ULI Life Trustee who founded the namesake event. “It definitely had an impact on the real estate discussion.”

A return to normal economic life by midyear 2021 would help the properties most hurt by the pandemic avoid being seized by lenders.

“They didn’t expect to see a lot of distress,” says Ken Rosen, chairman of Rosen Consulting Group, a real estate market research firm with offices in New York and Berkeley, California. “I thought there would be a lot of talk about delinquencies and foreclosures.”

So far, sales of distressed assets have been slow because lenders seized relatively few properties. A large number of borrowers have fallen behind in their loan payments, but a relatively small number of these delinquencies have turned into foreclosures. “A lot of delinquent loans are getting forbearance from lenders,” Rosen says.

Lenders have also been relatively slow to sell notes for permanent and mezzanine loans that have missed payments to investors who might take the properties. “Lenders are working with borrowers,” March says.

Frustrated Opportunistic Investors Still Waiting

When the pandemic started in March 2020, many real estate investors began to gather capital to buy properties like hotels, which dramatically lost income as officials ordered restrictions on travel and conference centers shut down.

“People are frustrated who have opportunistic capital,” March says. “There has not been as much capitulation on the owners’ side or the lenders’ side—certainly not as much as we expected.”

Some buyers still hope to find deals at a discount. “There is a lot of dry powder available, waiting for the bid/ask spread to narrow, to buy at a discount to replacement cost,” Rosen says.

Some of those hopes will be realized. “There will be defaults. . . . The opportunity is going to be in hospitality,” March says. “There are operating expenses the hotels have to pay even if they are not open.”

However, he also expects “relief capital” or rescue capital to come into such properties as preferred equity or joint venture partnerships, helping owners hold without having to return them to their lenders.

“There was a lot of talk about recapitalization equity,” Rosen says. “There is a lot of money to do that. It is happening already.”

In the stock markets, the recovery from the crisis caused by the pandemic already looks like a sharp V shape. It took one month for the S&P 500 to drop from its peak before the pandemic to its lowest point, and it took just five more months for it to climb over that previous peak.

Stock investors seem to be more worried about companies focused on commercial real estate. The stock prices of public real estate investment trusts (REITs) were still down 11.6 percent in December from the beginning of 2020, according to March—despite the good news about the vaccines.

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“People are frustrated who have opportunistic capital. There has not been as much capitulation on the owners’ side or the lenders’ side—certainly not as much as we expected.”

—ROY H. MARCH, EASTDIL SECURED

Capital Markets Stay Strong

Low interest rates are also helping even troubled properties solve their problems and are helping properties with stronger fundamentals trade at high prices and low yields.

“Interest rates and spreads are now going down through their lows pre-COVID,” Rosen says. “That gives people a lot more confidence that things can be worked out. . . . That has offset some of the demand issues.”

The U.S. government acted immediately in the first weeks of the pandemic, pouring trillions of dollars into financial markets. Congress unleashed \$3 trillion in fiscal stimulus; the Federal Reserve spent another \$3 trillion in a new storm of quantitative easing. “The Fed flooded the system,” Rosen says.

In contrast, during the 2008–2009 financial crisis, government officials took longer to respond. The current intervention of the Federal Reserve is likely to continue for an extended period. “It will fuel low rates for a long time,” March says.

Drawing Global Investors

Low interest rates around the world are likely to draw investors looking for higher yields on commercial real estate.

“We think there is going to be a lot of capital going towards commercial real estate,” March says.

Yields on commercial real estate investments are now six times higher than the yield on U.S. Treasury bonds, he says. The quantitative easing programs by the Federal Reserve are likely to keep Treasury bond yields low, keeping the yields on commercial real estate investments attractive in comparison.

As a result, investors are bidding up the prices of properties relative to income from the properties despite the economic downturn. “The Federal Reserve’s intervention is likely to drive cap rates lower,” March says.

Strong demand for real estate investors gives owners a little extra security that they can find liquidity for their properties if they need it. “There is always too much money chasing too few properties,” says McCoy. “That takes the edge off.”

Investors are also paying top dollar for properties that are performing particularly well in the pandemic, especially industrial properties, data centers, and cell-phone towers.

Pandemic May Leave Scars

Experts worry—even with vaccines on the way—that the pandemic has done deep damage to the U.S. economy.

Unemployment is still high, and more layoffs are likely during the winter. Many states have already been forced to increase restrictions to fight the coronavirus even as the first doses of the vaccine were distributed.

“I was surprised there wasn’t more talk of the downside risks,” Rosen says. “The pandemic might have caused structural damage to the economy.” He worries that 25 to 50 percent of restaurants may be forced to close before the crisis is over—along with other important small businesses that are thinly or marginally capitalized. “Tourism might take two or three years to come back. The urban infrastructure around cities might take longer,” Rosen says.

Rosen worries that very rapid worldwide economic recovery could lead to rising prices as pent-up demand around the world is released all at once after vaccines are distributed.

“There is a risk we could get inflation of 3 percent to 5 percent,” says Rosen. “It could be a surprise. . . . How do we pull back the stimulus in ways that don’t cause a shock?” He recommends that investors be ready in case governments unexpectedly restore higher interest rates to fight inflation.

BENDIX ANDERSON writes about commercial real estate, sustainable development, and affordable housing.



Former ULI Europe Chairman Roger Orf Named Life Trustee

Roger Orf, former ULI Europe chairman and partner at Apollo Global Management, has been selected as a ULI Life Trustee, an honor reserved for the Institute’s most dedicated and respected members.

Life Trustees are people whose service to the Institute has been meaningful, distinctive, and extraordinary, with individuals selected based on their contributions of time and resources to ULI and to the ULI Foundation; leadership and participation in committees, task forces, councils, and advisory services; standing and reputation in the land use industry; and years as a ULI full member and trustee.

Orf, who has been a ULI member since 1985, was chair of ULI Europe from 2013 to 2016. His philanthropic support was instrumental in bringing UrbanPlan, an educational initiative developed by ULI Americas, to Europe, where it is now used as an academically demanding classroom-based program in

DEVELOPMENTS

which students learn about the fundamental forces that affect urban regeneration.

“ULI has been a huge part of my life, and I’m honored to be recognized in this way,” Orf says. “The Institute is more important than ever before, particularly in these challenging times, as we consider the future of cities. The educational role that ULI can play has been inspirational to me, and hopefully to others, so I will continue to dedicate my time and resources to the future talent of the industry.”

“Roger has made an incredible contribution toward ULI, and he played a key role in expanding our UrbanPlan program globally,” says W. Edward Walter, ULI global chief executive officer. “His passion for sharing knowledge shines through in everything that he does, and he

is very generous with his time in helping others. We would like to congratulate Roger on this award, which is a testament to everything that he has achieved and done for ULI.”

“Roger is a quintessential ULI member, giving back selflessly to improve our organization and expand ULI’s reach,” says current ULI Europe Chairman Marnix Galle, executive chairman of Belgian developer Immobel. “His commitment to improving our communities through the work of our members is a true inspiration, and his recognition as a Life Trustee is well deserved.”

Orf focused on increasing engagement with European city leaders and helping ULI members provide thought leadership to their local real estate communities. He passionately believes in nurturing the next gener-

ation of ULI leaders, noting that his son, Ted, became a member of the Institute in his first year in the real estate industry to gain knowledge and share expertise with his peers.

Besides his chairmanship, Orf has played an active role in providing thought leadership to both the European and global real estate industry. Since 2003, he has been a member of the European Retail and Entertainment Product Council, which provides insight and gives members the opportunity to share the latest emerging trends of the market with each other. He has also been a member of the ULI Foundation Board of Directors, which guides the philanthropic arm of the Institute; the ULI Board of Directors; and the ULI Europe Executive Committee.

Over the course of ULI’s 85 years, fewer than 20 people have been named Life Trustees. They are: Nicholas Brooke, chairman of the ULI Asia Pacific region and chairman, Professional Properties Group, Hong Kong; Joseph Brown, chief innovation officer, AECOM, San Francisco; James J. Curtis III, managing partner, Bristol Group, San Francisco (deceased); James DeFrancia, principal, Lowe Enterprises, Aspen, Colorado; Wayne Doran, consultant, Dearborn, Michigan; Robert Engstrom, president, Robert Engstrom Companies, Minneapolis; Gerald D. Hines, founder and chairman, Hines, Houston (deceased); Frederick Kober, chairman, the Christopher Companies, Oakton, Virginia; Walter Koelbel, chairman of the board, Koelbel and Company, Denver (deceased); Robert Larson, chairman, Lazard Alternative Investments, Bloomfield Hills, Michigan (deceased); Sir Stuart Lipton, partner, Lipton Rogers Developments, London; Bowen “Buzz” McCoy, president, Buzz McCoy Associates, Los Angeles; Alexander Otto, chief executive officer, ECE Projektmanagement, Hamburg; Henry Paparazzo, chairman and chief executive officer, Heritage Development Group Inc./

Heritage Village, Southbury, Connecticut; Wayne Ratkovich, founder and president, the Ratkovich Company, Los Angeles; Stan Ross, chairman of the board and senior fellow, USC Lusk Center for Real Estate, Los Angeles; Melvin Simon, co-chairman of the board, Simon Property Group, Indianapolis (deceased); and James W. Todd, president, JWT Inc., McLean, Virginia.

Three Exemplary Real Estate Projects Win ULI Europe Awards for Excellence

Three exemplary real estate projects from across Europe, the Middle East, and Africa (EMEA) have been named the equal recipients of the inaugural ULI Europe Awards for Excellence; another five were honored as “Special Mentions.” The winners, each of which demonstrates a comprehensive level of high quality and a forward-looking approach to development and design, include two projects in the Netherlands and one in South Africa.

The winners of the 2020 ULI Europe Awards for Excellence are:
▷ **Circl, Amsterdam, Netherlands.** (Developer: BAM, Bunnik; owner: ABN AMRO; architect: de Architecten Cie). Circl is an exceptional project delivering on the innovative principles of the circular economy. As a first mover, the pavilion has succeeded in bringing together the wide array of sustainable elements in a new movement much needed in the real estate industry. With truly innovative approaches, the team of stakeholders behind Circl has delivered consistent and exemplary sustainable solutions for every detail of the building, ranging from the architectural design to the landscaping, use of materials, and the financial model needed to justify the investment in this new sustainable approach. The building

2020 ANNUAL REPORT



ULI’s annual report for fiscal year 2020, *Successfully Navigating a Rapidly Changing World*, is available for download at annualreport.uli.org. This year’s report reflects not only the Institute’s response to the COVID-19 pandemic, but also its longer-term work in addressing the challenges faced by communities on issues such as racial inequity, climate change, and housing affordability. “In this report, you will see how the Institute—through our members—is continuing to make a positive, lasting difference in communities around the world,” says W. Edward Walter, ULI global chief executive officer. “In addition to showcasing our programs and impact, we have created a new diversity, equity, and inclusion section that outlines the first steps we have taken to tackle racial inequity in our industry and our communities, and it includes our member and staff demographics.”



Circl, Amsterdam, Netherlands.



Fenix I, Katendrecht, Rotterdam, Netherlands.



Victoria Yards, Johannesburg, South Africa.

is a true inspiration and continues to engage and educate the wider community, both nationally and internationally, paving the way for more sustainable projects, and perhaps more important, promoting more corporate social responsibility in the real estate industry.

▷ **Fenix I, Katendrecht, Rotterdam, Netherlands.** (Developer: Heijmans Vastgoed B.V.; owners: Holland Immo Group (parking), APF International (commercial and cultural plinth), and Syntrus Achmea Real Estate (rental apartments); architect: Mei Architects and Planners). Fenix I is an exemplary redevelopment project woven beautifully into the urban fabric of Rotterdam’s historic waterfront. Built on a monumental 1922 warehouse, offering a variety of cultural facilities and office spaces, a large steel framework carries 212 apartments designed on an innovative modular system. The variety of unit sizes has facilitated a wide mix of residents, from those who required a 40-square-meter (431 sq ft) apartment to those who bought a 300-square-meter (3,230 sq ft) apartment with a view of the water. The inner courtyard and balcony-like access to the apartments promote interaction between residents and create a feeling of community.

▷ **Victoria Yards, Johannesburg, South Africa.** (Developer: Brian Green; owner: Victoria Yards (Pty)

Ltd.; master plan and architectural guidelines: Daffonchio and Associates Architects; architect: Boom Architects. Victoria Yards is a unique regeneration project that has risen from the ashes of a derelict industrial site to become an entrepreneurial incubation center providing space at cost to social and artistic enterprises from the neighborhood and beyond. It is an outstanding example of how creative thinking, community engagement, and strong leadership can deliver immediate and evolving commercial, social, and environmentally sustainable development. Victoria Yards has created a thriving community that is as much about social cohesion and learning as it is a commercial enterprise.

The five projects recognized with Special Mentions, and their categories, are:

- ▷ EKLA, Brussels—Social Value;
- ▷ The Line, London—Creative Placemaking/Arts and Culture/Community Engagement;
- ▷ The Student Hotel (TSH), Florence, Italy—Repurposing;
- ▷ Triodos Bank, de Reehorst, Utrecht, Netherlands—Climate Change/Resilience/Sustainability; and
- ▷ Wohnquartier Guter Freund, Aachen North Rhine-Westphalia, Germany—Affordable Housing.

The international jury that selected the winning projects was

made up of leading ULI members from across Europe and representing multidisciplinary real estate expertise, including commercial real estate, finance, architecture, land planning and development, and professional services.

Members were jury chairman Giancarlo Scotti, chairman of GcS& Partners and former chair of ULI Italy; Clarissa Alfrink, Avison Young; Germain Aunidas, AXA Investment Managers; Tom Cartledge, Handley House; Theodore Charagionis, Charagionis Group; Sigrid Duhamel, BNP Paribas REIM France; Manfred Guentherberg, Wolfsburg AG; Sophie Henley-Price, STUDIOS Architecture; and Tinka Kleine, PGGM.

“These laudable projects demonstrate what can be achieved with great ambition,” Scotti says. “We believe that they will have a significant positive long-term impact on future real estate projects. These case studies highlight some of the best initiatives around currently, particularly with regard to sustainability, integrating heritage, and involving the community. We believe that they will prove valuable for ULI members and others in the industry to learn from.”

The ULI Europe Awards for Excellence virtual ceremony provided a valuable opportunity to showcase the projects for the world, says Marnix Galle, chairman of ULI

Europe and executive chairman of Belgian developer Immobel.

“The three winners and five Special Mentions demonstrate the high quality of the submissions, with all eight of them strongly aligning with ULI’s main mission of encouraging responsible land use and development, as well as creating and sustaining thriving communities, with a strong focus on affordable housing, sustainability, and social value and community engagement,” Galle says.

Lisette van Doorn, chief executive officer of ULI Europe, commended the high quality of the entries.

“The Awards for Excellence program is very important for ULI as it provides recognition for outstanding development projects and initiatives, and the great work of its architects, developers, and investors, which we can all learn from,” van Doorn says. “The diverse range of projects from many different countries demonstrates that our inaugural competition for the region has captured the imagination of the leading players in real estate.”

The ULI Europe Awards for Excellence recognize superior development efforts across the EMEA region in the private, public, and nonprofit sectors. They are a regional extension of the ULI Global Awards for Excellence program, which began in 1979. The three winning EMEA projects for 2020 will

automatically be entered into the global awards competition for 2021.

For further information about the Europe awards, visit europe.uli.org/awardsforexcellence or email Europe.Awards@uli.org.

DEI ROUNDUP

With Record Class Size, ULI/REAP 2020 Fall Academy Builds Connections to Promote Equity

Project REAP (Real Estate Associate Program) has been working with some of the commercial real estate industry's largest firms to expand diversity, equity, and inclusion (DEI) through education, mentorship, and partnerships. In doing so, REAP is creating a nationwide network of commercial real estate professionals of color.

In mid-December, Project REAP and ULI held a ceremony celebrating the 190 graduates who completed the ULI/REAP Online Academy in 2020. But this year's graduating class is unique—not only by being the largest single cohort in the program's 22-year history, but also by being conducted virtually from start to finish, which allowed for a broader geographic pool of participants.

Historically, REAP academies have trained 25 to 30 participants in a 10-week program through in-person classes in large cities across the United States. They are taught the terminology, processes, concepts, and skills necessary either to enter the commercial real estate industry or to elevate their existing career within the field.

As REAP was preparing for its spring 2020 academy in March, the COVID-19 pandemic was shutting down many cities around the world. It became clear that a 2020 cohort of the traditional in-person program

would not be feasible. Gwyneth Jones Coté, ULI President–Americas as well as a member of REAP's board of directors, recognized that the Institute could step in and provide an innovative solution. As the Executive Diamond sponsor, ULI worked closely with REAP staff to create the fall virtual academy.

"ULI is the preeminent real estate organization and is committed to leading the industry in welcoming diverse professionals into all sectors of commercial real estate," Coté said. "One way is to partner with organizations like REAP, which has been educating and connecting talented individuals from diverse backgrounds since 1998. ULI was able to step into the void caused by the pandemic and create the opportunity for this talented class of candidates to participate in the ULI/REAP Fall Academy virtually this fall. And ULI will offer this opportunity again in the spring."

In his remarks to the graduating class, REAP chairman G. Lamont Blackstone celebrated the possibility of a more robust network born of the virtual format that will live on in the offline world. "You will be at the vanguard of a nation and industry facing this new challenge," he said. "Relationship capital is the foundation of the real estate industry and real estate careers.

"If we reach beyond the silos of REAP class years and geographies, REAP alumni will have a powerful tool to connect with each other," Blackstone said. "If we do this, we will slowly see the fruits of increased productivity, and increased business opportunity that will eventually reach a tipping point when those nodes of connectivity literally skyrocket. Then, and only then, will we see our own version of the network effect."

Though moving the academy online came with challenges, it allowed REAP to open the academy to roughly six times the usual

"Relationship capital is the foundation of the real estate industry and real estate careers." —G. LAMONT BLACKSTONE, PROJECT REAP

number of participants and include representation from 22 U.S. states, Canada, India, and Japan. Participants came from a wide variety of backgrounds ranging from construction management to community development to finance.

The virtual format also allowed for weekly lectures and social events with experienced commercial real estate professionals who might otherwise not have been able to participate. Participant Ayize "Glenn" Gray said, "The weekly ULI/REAP-hosted virtual happy hours and breakout sessions were educational and informative while providing unparalleled opportunities to network and establish meaningful business relationships with peers."

REAP offers an alumni directory to help maintain and foster that relationship capital among graduates. The program also relies on alumni to step into local leadership roles to keep building the nationwide network of REAP graduates. In addition, participants in the academy are given a complimentary one-year ULI membership, giving them access to the Institute's educational resources, events, and professional networks.

Some of the students shared some of their plans for after graduation and what the program meant to them. As one example, Maria Smith Dautruche is a longtime vice president at the New York City-based nonprofit National Urban League but is transitioning into a senior advising role to the organization while she builds up a consulting portfolio. She shared that she hopes to work on using commercial real estate deals to create philanthropic community investments and community partnerships, and the academy helped give her the

confidence to make the leap into a new career.

"Fellow cohort members sharing their stories, offering advice, providing insights and encouragement were integral parts of my ability to complete this program," said Smith Dautruche. "I was overwhelmed with thoughts about 'starting over' and perhaps being at the bottom. But I did some research and took to heart what various presenters said about their jobs and their companies and at the end of this month will be transitioning into my new role."

Kwame Campbell, who works as a real estate conference planner in New York City, said that finishing the fall academy left him excited about the possibility of diversifying the pool of speakers that he can tap into in his current job. "I don't see many people of color in my line of work," he said. "It's often difficult to find people of color to participate as speakers at my conference and I don't see many even attending the conferences. . . . Because of all that, I've really enjoyed seeing and connecting with people of color in the industry."

Academy graduate Shana Loflin already works as a mortgage and real estate broker in Southern California, but she was drawn to the ULI/REAP academy because she considers herself a lifelong learner. Like Campbell, Loflin is excited to take what she learned at the academy to continue changing the face of the industry.

"The hot topic right now [in many cities] is gentrification, owning your own block, and making sure the money is going into the right places," Loflin said. "You see people that look like you that own these projects and develop these projects and it changes the conversation. I hope we continue to push.

This experience empowers us to do that. It gives us the tools to know how to do that.”

“After some 22 years of continuous execution of our academies and networking initiative, the pandemic caused the suspension of our spring academies and risked halting our educational momentum for the entire year,” Blackstone said. “Only the financially strongest educational institutions . . . can survive a black-swan event such as what America faced in 2020. Because of ULI’s visionary leadership, REAP not only maintained its mission but discovered a vehicle for expanding its reach to new markets—including talent domiciled overseas.”

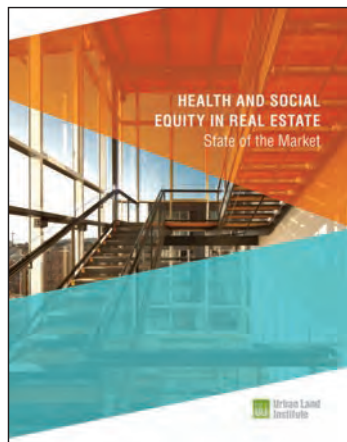
Blackstone also noted that previous financial cycles have had disparate impacts on the diversity of the financial industry as a whole, saying, “Talented minority professionals are at heightened risk of losing employment within [and connections to] the CRE industry when a major economic shock precipitates an industry downturn—that ‘last-in, first-out’ phenomenon was particularly damaging to career prospects of BIPOC [Black, Indigenous, and people of color] professionals during the Great Recession of 2008. The multifaceted aspects of the virtual academy will help to mitigate the impacts on our pools of talent.”

JOSH COHEN is a freelance reporter in the San Francisco Bay area.

DEI ROUNDUP

Two New ULI Reports Highlight the Need to Promote Health and Social Equity

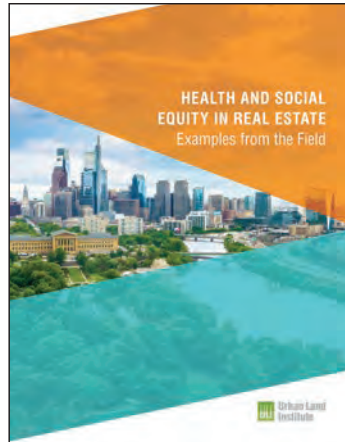
Two new ULI reports outline the state of the real estate industry’s adoption of health and social equity practices and illustrate the



need for the industry to better promote those already being employed. The protests for racial justice that spread throughout the United States and beyond last summer, along with the ongoing COVID-19 pandemic, have elevated health and social equity as focus areas for real estate practitioners.

The companion reports in the Health and Social Equity in Real Estate series—*Health and Social Equity in Real Estate: State of the Market* and *Health and Social Equity in Real Estate: Examples from the Field*—share data and insights on trends, drivers, and leading approaches. Both reports can be found at uli.org/healthandsocialequity and on Knowledge Finder, knowledge.uli.org.

“Health has become a key area of focus for real estate leaders, including developers and building owners, operators, and investors,” says W. Edward Walter, ULI chief executive officer. “The pandemic and the protests have illuminated deep structural inequities in society. As a result, the real estate industry is looking beyond the building to promote healthy and more equitable communities and address racial injustice. These reports build on ULI’s work to help to create healthy and socially equitable communities where all people—no matter their income, race, or background—can grow, thrive, and prosper.”



The *State of the Market* report presents a snapshot of real estate professionals’ growing awareness and adoption of practices supporting health and social equity and identifies opportunities for further inclusion of such practices by real estate organizations.

It offers the first comprehensive and cross-cutting data about the real estate industry’s adoption of health- and social equity-promoting practices and summarizes research undertaken in 2019 by the ULI Building Healthy Places Initiative, with support from HR&A Advisors and the Integral Group. It is based on an industrywide survey with nearly 700 respondents, interviews with 23 industry leaders, workshops, and secondary research.

The report identifies ways the real estate industry could promote social equity, including outreach and engagement to understand community needs; displacement mitigation strategies; and actions and policies that support social and economic inclusion, such as those regarding hiring practices. The most widely adopted planning strategies are those that address transit, walkability, and biking infrastructure, and access to nature or open space.

During 2020, public health and racial equity became key issues in the national discourse and in the real estate industry. As a result, the trend toward health equity in real

estate is expected to accelerate. *State of the Market* outlines recommendations and opportunities for development, design, and consulting firms to advance the cause in the real estate industry, including advocating for the adoption of best practices; sharing knowledge and replicating successes; committing to a comprehensive stakeholder engagement process at all stages of planning and development; and broadening the promotion of health “beyond the building.”

The *Examples from the Field* report looks at developments that have incorporated health and social equity principles into their designs and policies and identifies elements of the business case for doing so based on interviews

Get Caught Up with *Urban Land* Reading Lists

ULI members can take a deep dive into *Urban Land* content organized according to top areas of interest. Available through Knowledge Finder, *Urban Land* Reading Lists include select articles curated around topics such as technology in real estate, public/private partnerships, and more.

Both new and revised Reading Lists are added to Knowledge Finder each month. The most popular lists for 2020 were “Rethinking the Modern Workplace” and “Understanding Mixed and Multi Use” and “Creating Affordable Housing at Scale.”

Members can find Reading Lists at knowledge.uli.org.

—Brett Widness is *Urban Land* online editor.

DEI ROUNDUP

James Lima: On Exploring Issues of Environmental Justice and Land Use

Real estate practitioners can drive meaningful advances in equity by learning about, and partnering with, community-based organizations committed to change.

Policies of environmental injustice, which have disadvantaged low-income communities and communities of color for decades, have longstanding effects on individuals' lives.

A recent study published in the journal *Climate* found that temperatures in formerly redlined neighborhoods are about 13 degrees Fahrenheit (7.2 degrees C) hotter than those in non-redlined neighborhoods. This indicates that communities of color are more exposed to the urban heat island effect—a phenomenon in which built surfaces absorb and reemit the sun's heat—and its pernicious impacts on health and quality of life.

Research has also consistently shown that communities of color are exposed to substantially more polluted air than are other communities and are more likely to be located near noxious power plants and other toxic sites. Moreover, lower-income and nonwhite individuals are less likely to have access to open space in their neighborhoods, according to "Spatial Disparities in the Distribution of Parks and Green Space," a paper published by the U.S. Department of Health and Human Services and the Centers for Disease Control and Prevention.

A ULI technical assistance panel (TAP) that I chaired in 2017, focused on the industrial neighborhood of Gowanus, Brooklyn, developed recommendations for how major proposed changes in land use policies, real estate strategies, and urban design approaches could combat these environmental justice challenges. The TAP's proposals, codeveloped with ULI's community-based partner the Fifth Avenue Committee, helped inform a neighborhood rezoning proposal that would address the urban heat island effect, improving the health and quality of life of residents while facilitating new development.

One TAP recommendation worth greater investigation nationally is to require that all environmental review procedures consider the potential community impacts from urban heat island conditions and offer mitigation as warranted. Why not apply such a policy nationally and attract necessary resources to burdened communities?

ULI initiatives challenge real estate and urban development practitioners to consider the role they can play in fulfilling a community's social, environmental, and economic needs, suggesting a way forward for ULI as it seeks to be more cognizant of its ability to lead positive change. ULI has always been an astute convenor of professionals from all real estate disciplines; it is a smart decision for the Institute to engage in more robust dialogues and partnerships with community-based organizations that know their communities best and advocate for social and environmental justice within them. Collaborations of this sort are foundational to the creation of equitable economic opportunity, inclusive social and environmental infrastructure, and expanded affordable and accessible housing choices that meet local needs.

In my real estate and economic advisory firm's work across the country, we consistently see the economic, social, and environmental good that springs from such collaboration. In San Jose, for example, we are advising SPUR (the San Francisco Bay Area Planning and Urban Research Association) on how some of the value created through park improvements and the real estate investments they generate can be captured and reinvested to fund place management and other public realm improvements that will benefit underserved residential communities.

These projects can also be enormous value creators for downtown developers, owners, and anchor businesses. In Pensacola, Florida, we made the policy argument to the local government that public investments in a waterfront redevelopment plan would provide a reasonable return on that

investment and, equally important, would form an essential component of a broader equitable economic development strategy in a city that, like so many others, is taking meaningful steps to right the wrongs of past systemic racism.

Let's all see to it that ULI and its programs continue to be enriched by deep engagement with the network of capable, community-based organizations across the country that have long been advocating for local needs. The challenges ahead are as daunting as we have ever known. Surely the best way forward is through forging diverse partnerships and collaborations intent on addressing environmental justice and doing the ongoing work needed to transform cities and regions into more resilient—and more equitable—economies and communities.

JAMES LIMA is president of James Lima Planning + Development and a member of the ULI Sustainable Development Council.

Four Organizations Advocating for Environmental Justice

ULI's Center for Sustainability and Economic Performance invited leaders of several environmental justice organizations—many funded by institutions such as the Kresge Foundation, which also supports ULI's work in this arena—to talk about elements of environmental justice as they pertain to the land use industry. Through a series of interviews with their leaders, ULI hopes to introduce them as resources to members—and to highlight important issues for land use decisions going forward. These interviews can be found at the *Urban Land* online version of this article, uli.org/environmentaljustice. The organizations included:

- ▷ Catalyst Miami, www.catalystmiami.org
- ▷ Fifth Avenue Committee (New York City), www.fifthave.org
- ▷ Initiative for Energy Justice (Boston), iejusa.org
- ▷ The Greenlining Institute (Oakland), www.greenlining.org

with 44 real estate stakeholders. The report presents findings from research undertaken in 2019 and 2020 by the ULI Greenprint Center for Building Performance.

Implementation of health and social equity practices has qualitative value that is driven by occupant demand, community success, government incentives, competitive branding/marketing, and building certifications. *Examples from the Field* includes case studies from 17 development projects and companies focused on health, social equity, or a mix of the two.

By demonstrating what companies have already achieved at their properties and their motivations, *Examples from the Field* aims to accelerate the adoption of health and social equity initiatives in commercial real estate portfolios marketwide. The report also identifies tools, calculators, resources, and partnership groups for commercial real estate stakeholders interested in deepening their firms' commitment to and strategic alignment with health and social equity initiatives.

Among the development projects highlighted for their successful commitment to health and social equity are the following:

▷ **The Renaissance, Charlotte, North Carolina.** A mixed-income residential complex developed by Laurel Street on behalf of the Charlotte Housing Authority, the Renaissance was built through public/private partnerships and offers increased financial stability for residents, educational integration of students from early childhood and pre-kindergarten through eighth grade, and promotion of active living. With the understanding that social equity must be achieved through a multifaceted approach, the Renaissance West Community Initiative was created as a non-profit organization to promote the most equitable living environment for its residents over the lifetime of the development.

▷ **Freedom Plaza, Watts, Los Angeles.** Developed by Primestor, this pedestrian-oriented community offers not only several businesses that employ local residents, but also sustainable building methods such as drought-tolerant landscaping and contemporary architecture. The large open-air center allows for spaces for live performances and is decorated with two murals that were vetted and approved by the community. The property also sits at a transit hub offering residents and visitors ample public transportation options. Businesses at Freedom Plaza have hired local residents as an extra form of equity in a community that is 85 percent Latino and 14 percent Black.

▷ **Prologis Park Tacoma, Building D, Tacoma, Washington.** Prologis, a global logistics real estate company, is integrating health and social equity into its industrial and warehouse spaces. The company is working to train and mentor a new generation of logistics workers and provide healthy warehouse buildings where they can work. Under the WELL building standard's warehouse pilot program, Prologis designed Prologis Park Tacoma, Building D, with features to integrate occupant health and wellness, including sustainable design elements, insulation, ventilation and natural light, an outdoor walking trail for use during employee breaks, a learning garden with a blueberry patch to promote healthy eating, and a collection of eight murals painted by a local artist. In addition, Prologis in 2018 launched the Community Workforce Initiative in Los Angeles to provide job opportunities and career pipelines to disadvantaged groups. Prologis has since expanded the program to additional cities across America, with a goal to train 25,000 individuals by 2025.

JUSTIN ARNOLD is senior manager of communications at ULI.

Kansas City, Missouri, Chosen as 2021 ULI Hines Student Competition Study Site

The East Village neighborhood in downtown Kansas City, Missouri, has been selected as the study site for ULI's 19th annual ULI Hines Student Competition. This educational initiative, open to graduate-level students, is an exercise to encourage innovative ideas and cross-disciplinary collaboration and provides an opportunity to devise a comprehensive design and development program for an actual large-scale urban site.

This year, 110 teams representing 62 universities in the United States, Canada, and Singapore registered to compete, including 34 teams with students from more than one university. The team with the winning proposal will receive \$50,000, of which \$5,000 goes to the university or universities the team represents. Each of the

remaining three finalist teams will receive \$10,000.

The competition, the initial stage of which was held in January, simulates an actual design, planning, and development scenario, and reflects Kansas City's vision to ensure that its greater downtown area is a vibrant, connected core for the city and region. In the first round, students propose how to create a thriving, mixed-use, mixed-income neighborhood in the East Village neighborhood. Students are asked to consider issues of housing affordability, equity, transportation, mobility, sustainability, and resilience in their proposals. Though it focuses on a real site, the competition is a creative exercise; there is no expectation that the student proposals will be implemented.

A jury of ULI members who are experts in real estate, land use, and design will select four finalist teams by late February. During the final phase of the competition, those four teams will expand their original proposals. The teams will present their revised proposal twice: first to a panel of local



DEVELOPMENTS

experts in March, and then to the jury during the finals in April.

“We are very pleased to bring the ULI Hines Student Competition to Kansas City,” says Michael Collins, chair of ULI Kansas City and a member of the ULI Americas Executive Committee. “Kansas City is a city on the rise, and we look forward to seeing the submissions and creativity that the students bring to the East Village neighborhood.”

The competition encourages cooperation and teamwork—necessary talents in the planning, design, and development of great places—among future professionals in real estate and the many allied professions. Teams must be multidisciplinary and include students pursuing at least three different degree programs across at least three different disciplines. This mix

typically includes graduate students who are pursuing programs in real estate development, architecture, landscape architecture, urban planning, urban design, finance, historic preservation, engineering, and law.

In the first round, the competition allows each team of five students 15 days to create proposals that illustrate innovative approaches to five general elements: 1) planning context and analysis, 2) a master land use plan, 3) urban design, 4) site-specific illustrations of new development, and 5) development schedule and finances. Participants have received project briefing materials, including a comprehensive statement of the challenge, background information on the site, market information, relevant existing design proposals, and site maps and photos.

“This is not only a competition; it is an opportunity for industry leaders to mentor student teams, ultimately encouraging and shining a spotlight on new ideas that are worthy of notice by the industry,” says Cindy Chance, executive vice president of ULI Learning and Product Councils, Americas.

“The competition gives ULI members a glimpse into the future, revealing how the next generation of city builders, the most diverse along every dimension, are thinking about growing and revitalizing our communities. We want to thank the many ULI members who helped prepare the challenge for the students and who will be mentoring teams throughout the competition.”

The competition is funded through an endowment from Gerald D. Hines, chairman and founder of

the global Hines real estate organization and recipient of the 2002 ULI Prize for Visionaries in Urban Development. A legend in the real estate industry, Hines was widely known as a leader who pioneered the use of high-quality planning and architecture as a marketable feature of development in office, residential, and mixed-use projects.

Since the first competition in 2003, more than 9,725 students on over 1,945 teams have participated, including 360 students who have made it to the finals. **UL**

For more information on the ULI Hines Student Competition, visit uli.org/hines.



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INSIDE THE ULI FOUNDATION

Supporting ULI's Diversity, Equity, and Inclusion Initiative through ULIF

WHAT DO ADVISORY SERVICES, UrbanPlan, the Center for Sustainability and Economic Performance, the Terwilliger Center for Housing, and the Women's Leadership Initiative have in common? Not only are they some of the most trusted and far-ranging of ULI's activities, they are committed to improving the environments in which all people live, work, and play through accelerated efforts to promote diversity, equity, and inclusion (DEI) to effect real change.

Social, health, and economic inequities in land use, development, and community revitalization are increasingly at the forefront of real estate decisions around the United States. Across all our mission-driven programs, DEI efforts are foundational to ULI's broader mission. The Institute is dedicated to providing leadership for lasting change and helping communities eliminate the barriers that perpetuate racial and social injustice in our cities. Now is the time for us to collectively work to transform the structural inequality brought on by both current and historical land use practices.

"Promoting and advancing innovations and best practices that result in communities that are equitable by design are key priorities for ULI's work," says Gwyneth Jones Coté, president of ULI Americas. "We can work together to find solutions that make lasting differences in our communities and our industry."

Increased philanthropic investments are vital to making this visible difference. Over the

course of half a century, the ULI Foundation—a charitable 501(c)3 organization—has ensured the success, strength, and growth of the Institute's present and future mission-driven work. A chief focus is to expand and increase programs and outreach efforts to improve diversity within ULI and the real estate industry. With your support, the Foundation can help grow the following programs conducted through the Institute's Diversity, Equity, and Inclusion (DEI) Initiative.

- ▷ Expand UrbanPlan to reach more minority students in more underserved communities and add a module on ethical and historical development practices to prepare future community leaders.

- ▷ Strengthen the Real Estate Diversity Initiative (REDI) program and bring it to more district councils, building it to a best-in-class program to help women and people of color with career advancement and professional network expansion.

- ▷ Create a better industry pipeline for diverse students through the mentorship and programming of ULI Learning, particularly the branded Foundations of Real Estate (FoRE) certificate program, with a focus on historically Black colleges and universities (HBCUs) and minority-serving institutions. Many of the students reached through these programs may not otherwise have considered a career in real estate.

- ▷ Help communities understand how yesterday's discriminatory decisions and practices have led to today's barriers, and develop new best practices targeting more equitable future development. Advisory Services opportunity panels leverage ULI members' expertise to address deeply rooted social inequities in land use and public engagement.

"We know we have work to do. It won't be easy. Over time, these efforts will make a large impact. Our goal is to strengthen the Foundation to enhance our thought leadership capabilities and support the efforts of cities across the country to tackle these problems with the input of informed industry leaders and citizens through our district councils."

—DOUG ABBEY, ULI FOUNDATION CHAIR

- ▷ Focus on the engagement, leadership, and visibility of women within the Institute and the commercial real estate industry by increasing participation in the Women's Leadership Initiative (WLI), through WLI Circles and other efforts that serve as models for other diversity initiatives.

- ▷ Grow Pathways to Inclusion, a program offered to minority real estate professionals, to reach more participants and expand to even greater numbers of district councils.

Support from the Foundation also ensures that ULI can build on the existing work of centers across the Institute to promote DEI throughout our communities. This includes efforts by the Terwilliger Center for Housing to expand the availability of attainable housing, providing mixed-income housing solutions that focus on creating more diverse, equitable, and inclusive neighborhoods. In addition, this includes efforts by the Center for Sustainability and Economic Performance to make the provision of social equity and inclusivity a key part of improving urban resilience and sustainability,

and efforts by the Building Healthy Places Initiative to promote healthy living environments for all residents in our communities.

"The tarpaulin covering our society has been ripped off, exposing deep fissures and rifts. The usual platitudes ring hollow," says Doug Abbey, chair of the ULI Foundation. "We know we have work to do. It won't be easy. Over time, these efforts will make a large impact. Our goal is to strengthen the Foundation to enhance our thought leadership capabilities and support the efforts of cities across the country to tackle these problems with the input of informed industry leaders and citizens through our district councils."

To join your fellow members in support of these and other efforts, visit us online at foundation.uli.org. You can choose to support the Diversity, Equity, and Inclusion Initiative with a contribution, or select any of the specific programs that interest you. With your continued help, ULI can serve as the catalyst for the change we want to see in our communities. **UL**

HELENE KISER is ULIF vice president of advancement communications.

Jim Curtis's legacy is building a better future.
You can, too.



“ The purpose of my gifts and estate plan bequests is to contribute toward the building of a better future by providing resources of inspiration, discovery, and innovation. My ultimate objective is to improve the quality of life and economic productivity for future generations. **I believe this investment in partnership with ULIF will make a visible difference!**”

Jim Curtis's legacy of leadership and generosity will continue to make a visible difference for generations to come. His bequest to the ULI Foundation will broadly support ULI's mission-focused work in urban infrastructure in cities around the world.



To find out more about membership in the James J. Curtis Society and how a planned gift can benefit you and your family while also providing support for ULI programs and initiatives, [visit foundation.uli.org](http://visit.foundation.uli.org).



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UL10

RON NYREN

Extra-Green Buildings

Ten new buildings exemplify sustainable design creativity.

IN 2020, McDONALD'S opened a restaurant targeting net-zero energy use in Orlando's Walt Disney World Resort—as clear a sign as any that sustainable design has gone mainstream. Yet, as much as green principles and technologies have become more prevalent over the past decade, energy demand in buildings still rose 7 percent between 2010 and 2018, and buildings are responsible for nearly 40 percent of energy- and process-related carbon emissions, according to a 2019 United Nations

Environment Programme report. Making sustainable practices even more widespread and reaching for deeper shades of green will be necessary to slow the building industry's contributions to environmental harm.

The following 10 projects—all completed during the past five years—model an array of green design measures that go above and beyond the usual. They include an office building that generates twice as much electricity as it consumes; a student services building with an

undulating, energy-saving aluminum roof; a library that welcomes daylight into 80 percent of regularly occupied spaces; and several buildings that meet the stringent energy performance criteria of the Passive House Institute—affordable multifamily residences in Chicago and the Bronx, New York; micro apartments in Philadelphia; and student housing just outside Melbourne, Australia.

RON NYREN is a freelance architecture and urban design writer based in the San Francisco Bay area.

1.2 Redman Place

LONDON, UNITED KINGDOM

Just outside Queen Elizabeth Olympic Park, the vegetated roof atop 2 Redman Place hosts not only native plants, but also bird and bat boxes designed by students at a local school. To further support wildlife, the facility also includes what is billed as London's largest "living wall," which comprises 21,500 square feet (2,000 sq m) of native plants. The facility's rainwater harvesting system is estimated to save enough drinkable water each year to fill 4.5 Olympic-sized swimming pools.

Part of the new mixed-use business area known as International Quarter London, 2 Redman Place was designed by the local office of Rogers Stirk Harbour + Partners for the local office of Lendlease Development and completed in 2019. Tenants include Cancer Research UK, the British Council, and financial technology company FNZ. A triple-glazed closed-cavity facade provides high thermal performance and relies on integrated automatic blinds to control heat gain and maximize natural light. In addition to drawing energy from photovoltaic panels, the facility taps into the nearby Stratford Energy Centre district heating and cooling system.



A. LANGLAIS/COURTESY OF ROGERS STIRK HARBOUR + PARTNERS (RSHHP) AND LENDLEASE



MORLEY VON STERNBERG/COURTESY OF ROGERS STIRK HARBOUR + PARTNERS (RSHHP)

2. Austin Central Library

AUSTIN, TEXAS



With the goal of creating the most daylight library in the country, the joint venture of Lake|Flato Architects of San Antonio, Texas, and Shepley Bulfinch of Boston organized Austin Central Library around a six-story glazed atrium. The design team created a four-foot-tall (1.2 m) scale model of the atrium, brought it to a park, and fine-tuned it to ensure a bright but glare-free interior. A roof overhang and perimeter light shelves provide shading, and baffled clerestory windows reflect light off a plaster ceiling. Solar panels shade the publicly accessible rooftop butterfly garden. Screened outdoor reading porches offer views to Shoal Creek and Lady Bird Lake.

In drought-prone Austin, water conservation was key. The brown-field site is part of the Seaholm EcoDistrict, the mixed-use redevelopment of a former power plant. The design team pressed a nearby former underground vault, owned by the city utility, into service as a 373,000-gallon (1.4 million liter) cistern that collects water for drip irrigation and toilet flushing. The library opened in 2017.

4. The Dalney Building at Georgia Tech

ATLANTA, GEORGIA

As part of the Georgia Institute of Technology's plans to reduce on-campus stormwater runoff by 50 percent, the research university is creating the Eco-Commons, which will ultimately comprise 80 acres (32 ha) of green space along original stream paths that existed before the land was developed. The first phase, which is underway, consists of eight acres (3.2 ha) of traditional Piedmont woodland. The university freed up five of these acres (2 ha) by replacing surface lots with an 800-car parking garage as part of the Dalney Building, completed in 2019.

Designed by New Orleans, Louisiana-based Eskew Dumez Ripple, the 303,000-square-foot (28,000 sq m) Dalney Building provides office space for more than 250 staff members, as well as a conference facility. The facility will filter rainwater captured from neighboring buildings and accommodate a biological wastewater reclamation facility to treat blackwater for nonpotable use throughout the campus. Projected to consume 65 percent less energy than the benchmark set by Architecture 2030's 2030 Challenge, the building features a roof designed to support more than 800 kW of photovoltaics.

3. Capital Flats: Phase Three, the Battery

PHILADELPHIA, PENNSYLVANIA

Local developer/architect/builder Union Flats has been redeveloping a site in Philadelphia's Northern Liberties neighborhood over the past two decades. The first phase adapted a meat packing plant into an eight-unit apartment building; the second phase consists of eight duplexes topped by a green roof and solar thermal panels. The third phase, the Battery, adds 25 micro apartments designed according to Passive House standards, consuming 80 percent less energy than a conventional counterpart.



TIMOTHY McDONALD

Completed in 2017, the Battery achieves its sustainability goals through strategic solar orientation; geothermal wells that deliver heating, cooling, and hot water to all units; a vegetated roof; an airtight building envelope with triple-pane windows; centralized energy recovery ventilation; and a photovoltaic roof canopy designed to meet all of the building's energy needs on an annual basis. White panels on the facade are illuminated by light-emitting diode (LED) lights that glow green when the building's energy performance goes as planned, yellow when it starts veering from the ideal, and red when energy use is too high.



PHOTOGRAPHY BY RION RIZZO

5. Gillies Hall at Monash University

FRANKSTON, VICTORIA, AUSTRALIA

Gillies Hall combines the use of cross-laminated timber (CLT), which sequesters carbon and provides excellent insulation, with an airtight building envelope to achieve Passive House certification. Jackson Clements Burrows Architects of Richmond, Victoria, exposed the CLT structure throughout the six-story building, which includes 150 studio apartments organized into two 15-room wings on five floors. Each floor has a communal kitchen, lounge, and study area to encourage interaction.

A folded, orange metal sunscreen provides exterior shading to cut solar heat gain. Rooftop photovoltaic panels, heat-recovery



PETER CLARKE

ventilation systems, and double-glazed windows further lower energy consumption. The all-electric building relies entirely on renewable energy, aided by the university's power purchase agreement with Murra Warra Wind Farm. The building's first floor contains gathering spaces for all on-campus residents. Completed in 2019, the project involved restoring a dry creek bed and incorporating a rainwater harvesting system.



PETER CLARKE

6. Half Moon Bay Library

HALF MOON BAY, CALIFORNIA

The small coastal city of Half Moon Bay is known for its beaches and its surf-friendly waves. In response to regional growth, the city partnered with the County of San Mateo to replace its outdated library with a new facility that would meet future needs and celebrate the area's agricultural roots. Noll & Tam Architects of Berkeley, California, minimized the building's apparent mass



ANTHONY LINDSEY PHOTOGRAPHY

by breaking it into two smaller volumes, each one story above street level, with a two-story volume at the rear. Natural, durable materials such as wood, stone, and patinated copper harmonize with the coastal surroundings.

Designed to achieve net-zero energy use, the library is equipped with a high-efficiency building envelope, high-performance mechanical systems, operable and automated windows, a radiant floor heating/cooling electric heat pump system, heat-recovery ventilation units, deep overhangs, and high levels of insulation. A photovoltaic array supplies all of the library's electricity needs. Rainwater is filtered through bioswales, a bioretention planter, and a vegetated roof. Located close to bus transit, the library opened in 2018.



ANTHONY LINDSEY PHOTOGRAPHY

7. Park Avenue Green

BRONX, NEW YORK

Billed as the largest Passive House affordable housing development in the United States, Park Avenue Green in New York City's south Bronx incorporates 154 apartments earmarked for low- and extremely low-income households, including formerly homeless families. The ground floor of the 164,000-square-foot (15,000 sq m) building includes a 4,300-square-foot (400 sq m) community facility with 15 subsidized studios as well as an art gallery for the not-for-profit arts organization SpaceWorks.

New York City-based Curtis + Ginsberg Architects designed Park Avenue Green to use 70 percent less energy than a conventional counterpart, with a highly insulated, airtight building envelope; high-performance windows and doors; energy-efficient lighting and appliances; and energy recovery units. Rooftop photovoltaic panels supply power, along with a cogeneration micro-turbine that serves as the main hot water heater and doubles as an emergency generator during power outages. Completed in 2019 for affordable housing developer Omni New York of New



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York City, the building fits onto an irregularly shaped site and references neighboring warehouses in its form.

8. Powerhouse Brattørkaia

TRONDHEIM, NORWAY

Trondheim is so far north of the equator that the amount of daylight each day varies from 4.5 hours in winter to 20.5 hours in summer. Despite this, Powerhouse Brattørkaia produces, on average, twice the electricity it consumes each day, serving as a microgrid that powers neighboring buildings as well as electric buses and cars. The goal of capturing solar power shaped the office building's sharply sloping roof, with photovoltaic panels covering nearly 32,000 square feet (3,000 sq m) of the roof as well as portions of the upper facade.

A glazed atrium brings sunlight deep into the 194,000-square-foot (18,000 sq m) building's floors and serves as a public garden. The public can also visit the café and visitor center on the first floor and learn about the building's energy features.



IVAR KVAAL

Extensive insulation and heat recovery systems conserve energy, and the heating and cooling rely on a water-to-air heat exchange system that leverages the stable temperature of water deep in the adjacent harbor. Oslo-based Snøhetta completed the building in 2019 for Oslo-based developer Entra.



IVAR KVAAL

9. Student Services Building at California State Polytechnic University, Pomona

POMONA, CALIFORNIA

The wavy standing-seam aluminum roof of Cal Poly Pomona’s new student services building not only references the rolling foothills and nearby San Gabriel Mountains, but also reduces the building’s energy use per square foot per year to half the usage of an average building of comparable size. The facility consolidates previously scattered student services into a new building. In designing the three-story, 140,000-square-foot (13,000 sq m) building, Los Angeles–based CO Architects performed solar studies to inform the roof’s shape. Perforated metal overhangs, which vary in size depending on orientation to the sun, shade the reflective glass curtain wall.

The highly insulated roof reflects sunlight to mitigate heat gain. Skylights help illuminate the top floor, and open offices extend across the floor plates to receive plenty of natural light. The roof also shades a pedestrian breezeway that passes through the building’s main volume and its two-story wing. Seating and gathering spaces along the breezeway provide a place for students to stay cool in hot weather. A bioswale filters stormwater for irrigation. The building was completed in 2018.



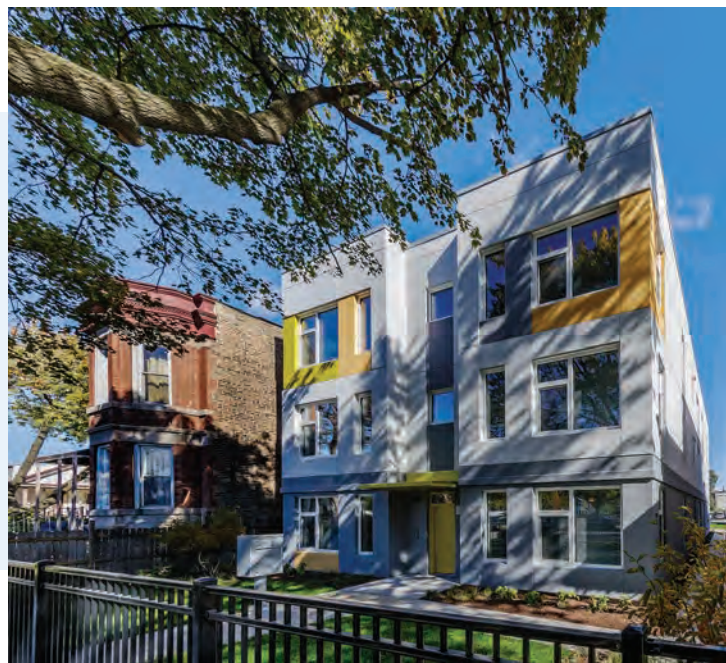
BILL TIMMERMAN

10. Tierra Linda

CHICAGO, ILLINOIS

Tierra Linda is the first sustainability-oriented development created by the Latin United Community Housing Association, a Chicago-based nonprofit affordable housing organization. Scattering 45 affordable apartments along the 606 trail through the city’s Humboldt Park and Logan Square neighborhoods, it includes a six-flat building certified by Passive House that houses six low-income families and was completed in 2018.

Local firm Landon Bone Baker Architects designed the Passive House flats with high levels of insulation and an airtight building envelope. To make this possible required obtaining special permission from the city to install the energy recovery ventilation system, because it was not recognized by the building code. Each unit has an indoor bike rack to encourage residents to use the trail for cycling. The building has a “twin,” a six-flat counterpart that is identically laid out and built to the federal Energy Star standard but lacks the Passive House measures. Both buildings are monitored for energy use to enable comparison. **UL**



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REAL TECH

How accelerating
developments in
technology will
aid the return to
normalcy

A cleaning robot patrols Singapore
Changi Airport.





OUTLOOK FOR TECHNOLOGY

RON NYREN

How are real estate technologies shaping a world transformed by the coronavirus pandemic?

MEMBERS OF ULI'S TECHNOLOGY and Real Estate councils discuss the coronavirus pandemic's shakeup of work/life patterns, how technologies enable new ways of working and living, technologies on the horizon that hold promise for the future, and other related trends.



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AMERICAS

What are some of the coronavirus pandemic's biggest effects on the way people live and work?

SEAN CLARK: The biggest theme is the shift toward working from home, which is enabled by technology. There will be a long enough period of time for working from home to “stick.” That will influence where people want to live and what kinds of environments they want to live in. But that has to be enabled by better technologies. I don’t know how the marketplace will adjust to the shift to working from home, but new technologies are going to emerge that make the work-from-home experience more seamless.

MARK GILBREATH: Companies are downsizing their real estate portfolios and providing employees with more flexibility and choice in terms of where they work. This will drive an accelerated adoption of flexible office space: office space that is made available with more flexible terms, for shorter periods—hours, days, months, several years—versus the prior norm, a 10-year lease, with thousands of employees coming to one central location. With flexible office space, if two employees need a room somewhere for a meeting, they can reserve it. Or if an employee relocates from a primary to a secondary or tertiary market, they can reserve an office space near their home. Or a team of 50 employees might lease space for themselves in a satellite market for three years for a specific project. Also, many forward-looking companies are embracing a redistribution of the employee base, as Facebook has. That benefits employees, who may prefer to locate to a secondary market with a lower cost of living, and employers, because the cost of office space in those markets can be lower and they can reach a broader, more diverse employee pool than in the past.

STEVE LEFKOVITS: In the multifamily sector, the number-one impact is the difference in the way that people are now using their home spaces and the added value of having extra rooms that you can close the door to when you need to be on Zoom. Right behind that, I’d say, is automation. The indus-

try was already trending toward remote operations, and now they’re critical, especially from a leasing standpoint, because it may be months or even years before prospective residents are interested in in-person tours of properties. According to satisfaction surveys, most people are more satisfied by self-guided tour technology than they are by in-person tours, so I think that will be a permanent change. Also, we have seen resilience in the flexible rental market. Renting apartments for daily or overnight or weekend lodging has taken a hit, but there are flexible rental operators who are thriving by providing longer-term accommodations for essential workers, empowered by smart building technology and integrated platforms that automate that tenancy.

What technologies are allowing the real estate industry to navigate the pandemic?

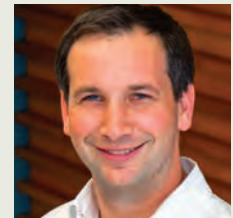
JAKE FINGERT: We’re interested in technology solutions that are solving long-term problems. As an example, one of our most recent investments has been in a company called Notarize, a remote online notarization company. Real estate is the largest user of notarizations, and there is big opportunity for the market to shift to digital notarization. It’s a lot more convenient for people to get documents notarized from their couch as opposed to having to go to someone’s office or having a mobile notary drive to them. We have seen a dramatic acceleration in the acceptance of digital notarization by title companies, single-family homebuilders, and others in the real estate ecosystem.

CLARK: At AvalonBay, we transitioned almost overnight to contact-free customer interactions. We had already built an AI [artificial intelligence]–based platform to manage lead follow-up and tours. Most of our customer interactions are happening virtually. How much that trend continues after the pandemic is over is an open question, but hopefully some of adjustments can help drive operational efficiencies. Our AI platform generates natural language responses via text or emails or phone: if you call our customer service center to schedule a tour, the

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system offers a choice between text or email for follow-up. The platform can schedule a tour and even handle follow-up questions having to do with community-specific information, such as parking fees or whether a gym is available.

What new business models are arising in response to the pandemic?

LEFKOVITS: There have been a number of startups that offer concierge services for apartment buildings, and one of them, Amenify, has shifted to providing catering to residents in apartment communities. So many people work at home now, and they want prepared meals at lunchtime. Amenify works with local professional chefs who can provide several meal options. Delivering in bulk to a community can be very cost-effective. If there are three meal options for the community to choose from, with, say, 20 individual lunches prepared of each variety, the cost to each resident is similar to the cost of them preparing their own meal. But it saves them 20 to 30 minutes plus cleanup time. More startups will be considering apartment communities as aggregation centers for services in this way.

CLARK: Within AvalonBay's retail portfolio, we're starting to see uses like cloud kitchens and conversion to office uses such as flex office or expanded coworking emerge. Undoubtedly, technology will play a role in the adoption of those business models.

FINGERT: In offices, people care a lot more about cleaning than they did before. In some cases, we're seeing owners of office buildings going from cleaning common spaces two or three times a day to five to eight times a day. There are technology companies that offer robots for cleaning, and although they have been around for a while, the return on investment for buying or renting a robot to help with cleaning can change dramatically if you're cleaning a space seven times a day. However, it is unclear if these changes are long term and if the current solutions in the market will continue to be the best ones in the long term.

What challenges do you see ahead as we navigate the changes the pandemic has brought us?

GILBREATH: For companies transforming their workplace strategies from a model that has been tried and true for the last 50-plus years, this is an enormous cultural as well as operational shift. To adapt to a distributed workplace future that combines working from home with flexible office use and smaller, more efficient headquarters locations is a big, multidisciplinary undertaking. Some employees will want to work from home all the time, while others will relish the opportunity to come back to headquarters full time. Those are the people issues. Then there are the supply chain issues. Large employers will need efficient mechanisms to evaluate and tap into the many different providers of flexible office space, from WeWork to Regis to countless others. There are price considerations, as companies evaluate the total cost of workplace: as they downsize their traditional fixed real estate and tap into flexible office spaces, they need to make sure they have a positive ROI [return on investment], or at least a neutral one. And companies will need process controls to do all this in a thoughtful, controlled fashion.

CLARK: Without question, the largest effects of the pandemic are its impacts to the economy. Understanding how the pandemic will influence customer decisions about where to live is a difficult question to answer. This could bring a shift to suburban communities and a desire for larger floor plans. Understanding the critical technology investments that will be needed and the shifts in investment strategy will be among the greater challenges.

FINGERT: One challenge is legislation. People often underestimate what an important role the government plays in enabling technologies and allowing innovations to be successful. Notarize is a great example, given that a number of state governments have authorized remote online notarizations and Congress is considering a bill authorizing them at the federal level. Another area where we're seeing impacts from legislation is around mortgages, which are impacted by government regulation and eco-

“ONE OF THE **WONDERFUL THINGS THAT WILL BE ACCELERATING POST-COVID IS THE EXPLORATION OF THE HIGHEST AND BEST USE OF THE EXISTING BUILT LANDSCAPE.**”

—MARK GILBREATH, LIQUIDSPACE

conomic policies. Technology is starting to play more of a role in digitizing the mortgage process, too. Legislation can accelerate the transformation of the digital mortgages or slow it down.

What emerging technologies are you particularly excited about?

CLARK: Even though it still seems to be a long way off, the one that comes to mind immediately is driverless technology. The potential it could have on living patterns and the built environment is profound. It also appears that investment in smart home technology is accelerating, and as greater adoption takes hold, I’m sure we’ll find ways to leverage the benefits to both customers and AvalonBay.

GILBREATH: In the near future, as companies start to allow their employees to emerge from home, they are reopening headquarters offices with new adaptations to make them healthier and safer. But there is a dramatic uptick in companies providing employees with the option to tap into flexible office space as an alternative. That might take the form of providing all employees with a technology-enabled mechanism to identify and book a space to work as needed, whether that’s a space near their homes to work alone, or a space to collaborate with a group of colleagues at a location proximate to everyone, or simply a desk back at headquarters.

LEFKOVITS: There is increasing awareness of the value of offering apartment residents greater financial flexibility. A number of financial tech startups provide financial relief in the rental process. Some of them are focusing on workforce housing or affordable housing. But with the expiration of emergency federal unemployment benefits, and the recognition that the old model of everyone having a traditional W-2 job broke down many years ago and that people now pull together their income in many different ways, I think we will see more payment flexibility like this, allowing residents to pay rent as their income shows up.

What other trends are catching your interest?

FINGERT: We’re highly focused on investing in great products that are solving real problems and creating real value for people in the industry. And one of the questions we ask when considering an investment is, are these solutions nice to have, or something that real estate owners and operators need to have? In this pandemic, some of the property technologies in the “nice to have” category are struggling as real estate owners and operators are streamlining their budgets and putting off new purchases.

LEFKOVITS: There is a huge demand for “internet of things” technology to automate building operations, but all that technology costs money. It’s possible to subsidize that technology by shifting to a bulk internet model, where apartment community owners buy internet service for the entire building in bulk and resell it at retail, using the differential to subsidize upgrades to the property that enable it to be operated remotely. I’m excited about that because it’s the first time I’ve seen an application of one building revenue source to solve another problem.

GILBREATH: One of the wonderful things that will be accelerating post-COVID is the exploration of the highest and best use of the existing built landscape. For example, idle retail space in a secondary market might become flexible office space. Owners of office towers are wrestling with the simple prospect of getting everybody up to the 50th floor in the constrained space of the elevator. Contrast that with the prospect of providing those employees the opportunity to ride a bicycle or drive five minutes to a flexible office location in a nearby strip mall where they can walk in the front door. There is a lot of opportunity here, from the standpoint of economics, sustainability, and end-user utility. **UL**

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OUTLOOK FOR TECHNOLOGY

EUROPE

RON NYREN

What will the new post-COVID tech-enabled workplace look like?

EXPERTS AND MEMBERS OF ULI'S European Technology and Real Estate Council discuss how the COVID-19 pandemic will reshape expectations, practices, and technologies in the long run; the changing relationship between building owners and tenants; the potential effects on providers of shared and flexible office environments; and other trends.

What lasting changes do you think the pandemic will have on the real estate industry?

SUSAN FREEMAN: A lot of the changes we're seeing in the real estate industry started well before COVID struck, but for many companies, the pandemic has accelerated these trends. Many people have discovered that they don't have to commute to an office building in the middle of London or New York City; they can work effectively at home. Professor Carlos Moreno [scientific director of entrepreneurship and innovation at the Sorbonne] predicts that our big office towers will become mixed-use towers where people live and work. I think once everyone has the vaccine, people will feel safe living in cities again and riding public transport, but people won't be commuting the same way they did before.

BOUDEWIJN RUITENBURG: There is a new interest in healthy working environments. Many companies are reviewing their real estate portfolios out of a desire to reduce costs where they can by cutting back on square meters, but they definitely want to end up with healthier spaces. The days of large groupings of workstations are over. So a number of buildings will be phased out earlier than expected and renovated or adapted into other uses. As the office market shrinks, there will be a flight to quality as companies seek to meet new sustainability targets. Meanwhile, workers have experienced a little more freedom, so there will not be the same push

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to arrive at the office by nine and stay until five or six. We believe cities will definitely bounce back because they are attractive and, from a sustainability standpoint, efficient. But people will spread out their commuting times more than in the past. They might focus on concentrated work at home, then commute to the office for the interaction and creativity they can find there.

ANTONY SLUMBERS: Things are absolutely not going to go back to the way they were. We've developed different ways of working. There will be two drivers of fundamental changes to the workplace. The first is related to environmental conditions, which have a real impact on physiology and cognitive function. When we return, en masse, to office buildings, landlords will have to prove their buildings are safe. Second, employee surveys show that about 70 percent of people say they are more productive working remotely than in the office. Every smart company is going to recognize that most employees don't want to come to the office five days a week. But the office is good for when you need to work with people.

CHARLIE KUNTZ: Lasting changes in the workplace include the increased importance of supporting collaboration, creativity, and innovation in spaces that not all employees will be occupying all the time. The office will be a central hub. So it becomes the building owner's responsibility to support that. From a technology perspective, that means offering tools and services that make the experience better

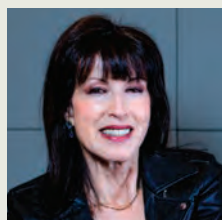
for the occupants—anything you can do to allow them to better understand that their space is being used to the best of its capabilities and that it is healthy. Owners will have to figure out how to more proactively support the culture and productivity that occurs in their tenant spaces, getting out in front of what they believe their clients' needs will be and preparing to meet them when those needs arise.

RONEN JOURNO: I believe we're entering an era where tenants are going to be treated like clients. We will see a much more human-centric, technology-enabled industry where building owners and operators are striving for intimacy with their clients, understanding how to manage the assets as efficiently as possible while being respectful of the environment and connecting tenants to the surrounding neighborhood. Owners will be making sure that the way occupants engage with services is as seamless and as transparent as possible. Also, with the rise of Uber and Airbnb, people have come to expect more choices. If they can consume the service as opposed to buying the asset, they will want to have that option.

Are there particular technologies that will be more prominent in the post-COVID real estate industry?

JOURNO: I think it's important that all of us in the real estate industry not get carried away with the gold rush of property tech, but to break it down into segments. One segment is the technologies

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“WHY AREN’T WE USING OUR AIRSPACE FOR DRONE DELIVERIES? IN BIG CITIES, PEOPLE ARE WORRIED THAT THIS WOULD BE DANGEROUS OR DIFFICULT, SO THERE WON’T BE A RUSH TO SWITCH TO DRONES FOR DELIVERIES. BUT IT’S TOO IMPORTANT NOT TO CONSIDER.”

—SUSAN FREEMAN, MISHCON DE REYA

that enable us to drive efficiency in the building, reducing energy consumption and reducing waste. That’s important for our investors, our tenants, and our clients. The second segment is the way people connect with the physical assets. It’s important that whatever you put in place is easy to use and scalable so it can be adapted to mixed-use buildings, single-tenant buildings, or office campuses. The third segment includes wellness and health. I think we’re entering a period where people expect to know the quality of the air and the light and the acoustics.

KUNTZ: It’s less about the end-point solution and more about reducing the friction that exists when you’re operating a building and handling several different technologies and tools. I believe large technology companies like Microsoft and Google and Salesforce are going to try to integrate technologies. There is a lucky overlap between tools that provide convenience to tenants and those that make buildings safer and healthier. They include engagement apps, touchless access control systems, space utilization sensors, and air quality sensors.

RUITENBURG: Companies want to know how office space is being used, they want to measure the air quality and energy consumption and the amount of daylight, and they want to optimize the use of meeting rooms. And tenants will confront landlords with these expectations. Landlords don’t tend to measure these factors. So these new demands will have to be negotiated in contracts going forward. Touchless technology will also take flight. That will push the use of apps that make it possible to control the workplace environment—building access, doors, elevators—without having to touch the surfaces.

FREEMAN: I’m fascinated by platforms like Equiem that can help connect disparate workforces. At the outset of the pandemic, these platforms were used to enable workers at a particular office building or campus to stay connected with each other and to book meeting rooms. Now, they can help people get back in the office safely by allowing people to

book a lift in a high-rise, or check out how busy a building is so they can come at a time when it is less occupied. The kind of data we can gather from these apps will be incredibly valuable. Technology that monitors energy use and air quality will also be increasingly important. A lot of investment needs to be made in R&D to reduce carbon emissions. That will be dictated by carbon neutrality legislation, by lenders, and by tenants who want to make sure they lease space in buildings with low energy emissions and healthy air.

SLUMBERS: Technologies targeted at measuring environmental conditions are already going strong because they enable landlords to operate their buildings at a more granular level and cater to the individual needs of the occupants. Also, we will need spaces that are easier to reconfigure on short notice: a coffee shop during the day becomes an event space in the evening, for example. There are new technologies for enabling walls and partitions to be moved more easily.

What do you think will be the role for providers of shared and flexible office environments?

RUITENBURG: Over the past five or 10 years, flexible workplace providers started popping up. Now, they are suffering because they offer relatively short leases and so many of these leases have been terminated. But I believe these companies will stay because traditional landlords don’t offer this flexibility. I expect a few investors will start supporting the bigger flexible workplace platforms. The majority of space will be leased traditionally because it provides companies with a dedicated place with its own identity, but these tenants also want access to additional services such as flex space, overflow space, different kinds of meeting facilities in the immediate area. If you develop a new building, you should offer not only traditional workspaces, but also these kinds of flexible spaces.

JOURNO: Providers of flexible offices are going to have a challenge on their hands. Larger occupiers are accelerating the optimization of their footprints. At the same time, large companies have to repurpose their offices to become collaboration hubs. They will be seeking out the prime assets in the prime locations, with well-serviced, technology-enabled, healthy buildings ideally in mixed-use locations. Flexible office operators will be challenged to compete with well-financed, very experienced landlords who can fine-tune their offerings much more quickly.

KUNTZ: At Hines, we are focused on providing flexibility within the buildings that our tenants are already in—their long-term spaces. Flexibility and access to collaboration spaces are not incompatible with long-term leases. Tenants can get everything in one place from a building owner who can simplify a complicated industry for them.

SLUMBERS: The more flexible buildings become, the more real estate becomes about delivering a service rather than selling a product. There's a good argument to be made that any company that requires less than 10,000 square feet [930 sq m] of space should be outsourcing their real estate completely because constantly monitoring and optimizing space is a complicated business. I have a slide that I use in my presentations that says, "No company wants an office; what they want is a productive workforce."

What other trends are you seeing?

SLUMBERS: I think there will be a new breed of real estate company whose job is to enable companies to have productive workforces. To create a great workplace, you need people with real estate knowledge, people with IoT [internet of things] networking knowledge, people who understand data, people who understand work environments, people who understand human resources, and people who understand hospitality. At the moment, these are six siloed industries. I think we'll start to see new companies that can package all of those areas of expertise in one ecosystem of suppliers. The question is which players in the industry will be able to pull all that together.

JOURNO: Tenants don't care who owns the building or who operates the building. They care about the experience that their employees and their own clients are having. Currently, we have a fragmented industry, with investors, operators, and landlords, and we need to make the experience seamless for our clients. By having a vertically integrated way of managing buildings and the strategic deployment of technology, we can shield the end user from the fragmentation of the industry.

KUNTZ: Often the real estate operator stands between the investor and the customer, trying to meet both parties' needs. Now operators will be much more customer-centric than they have been in the past, and they will have to find ways to pilot and explore new technologies in a way that insulates the customer from too much disruption and insulates the investors from too much risk. That requires operators to carry out a lot of R&D. The trick is to conduct the testing of new solutions in a safe, isolated place. Sometimes that occurs in the buildings of the investors who are partnering on the solution; sometimes that occurs in your own amenity spaces.

FREEMAN: Traffic is a real problem in larger cities, especially because so many of us are relying on online ordering for purchases, not thinking about the fact that our packages arrive in a carbon-emitting van. So why aren't we using our airspace for drone deliveries? In big cities, people are worried that this would be dangerous or difficult, so there won't be a rush to switch to drones for deliveries. But it's too important not to consider. In the City of London, cars are discouraged and parking is discouraged. So if we're building new high-rise residences in the city center, how are we getting deliveries to these buildings? Weaning ourselves off our reliance on the car is going to be a challenge, but our cities are so much nicer and more livable if they can offer pedestrian areas and outdoor tables and trees and grass. **UL**

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OUTLOOK FOR TECHNOLOGY

RON NYREN

ASIA PACIFIC



How will the coronavirus pandemic change the intersection of real estate and technology?

Autonomous patrol and cleaning robots move about Takanawa Gateway Station in Tokyo.

MEMBERS OF ULI'S ASIA PACIFIC Tech Council discuss the potential long-term impact of the coronavirus pandemic on the real estate industry, its effects on the workplace and the sharing economy, new business models rising to meet the challenges of the post-COVID world, and other trends.

What lasting changes do you think the COVID-19 pandemic will have on the intersection of the real estate industry and technology?

BILL LEE: COVID-19 has accelerated the evolution that the real estate industry was already undergoing in terms of technology. Many tech companies were already having people work from home before the pandemic, and now it has become the norm in many kinds of workplaces. The pandemic forced companies to upgrade their hardware, software, and data infrastructure to support the flexible workplace. Without COVID-19, I'm not sure we would have arrived at that point for another five, 10, or even 20 years. But today's pandemic workforce experienced the flexible workplace, and in the post-pandemic world, I believe this flexibility is expected and is here to stay. The retail sector has undergone a lasting change. If you weren't into shopping online and relying on food delivery before COVID, you definitely are used to it now. For large office campuses, the food delivery aspect has to be rethought. We used to want employees to congregate for meals, and now the design is heading toward making it easier for individual orders to be delivered to people to eat at their desks.

JAMES WONG: Some technology trends have accelerated because of COVID, and some have slowed. For example, in our hotels, many of our guests require that we make contactless check-in

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and checkout available. They won't come otherwise. At the same time, during the pandemic we are trying not to let employees go, so we have paused many of the automation initiatives we had planned for front-of-house and back-of-house operations, such as initiatives to automate laundry service and use robots for cleaning. On the construction side, here in Hong Kong the labor force has long relied on cross-border and casual labor, but because of COVID that labor force has not been as available. The drop in manpower has accelerated investment in automation and robotics. For example, instead of having a construction worker drill holes to install wiring in false ceilings, we have invested in a startup that makes a robot that can drill at six times the speed of a human, 24 hours a day if necessary. Of course, robots are not cheap. We are running numbers to compare the costs of human labor with the costs of a robot and the depreciation to see if it is worth it or not.

AKINORI KANAYAMA: At the moment, the pandemic is less severe in Asia than in the United States or Europe. In Japan, commuting is very serious. My company operates railways conveying 4 million passengers per day. The number of passengers decreased to 50 percent in the spring of 2020. Since then, ridership has returned to 80 percent of its 2019 level. We expect 85 percent will return in the long run. But many white-collar workers won't return to commuting even after the pandemic is over, so that will be a significant change. Also, the population of Tokyo has started to decrease in the coronavirus era. This geographic dispersal may continue in the future because people want more space to live in, which they can have in rural areas and smaller cities if they can work remotely. The medical field will also change because medical examinations can take place online.

What aspects of life do you think will return to pre-COVID conditions?

WONG: In the travel industry, I believe there has been an overly pessimistic view of air travel. Right now, airlines and airports are in bad shape because of the drop in travel. But I think that the

“WE ARE RUNNING NUMBERS TO COMPARE THE COSTS OF HUMAN LABOR WITH THE COSTS OF A ROBOT AND THE DEPRECIATION TO SEE IF IT IS WORTH IT OR NOT.”

—JAMES WONG, HON KWOK LAND INVESTMENT COMPANY

volumes of air travel we've seen in the past are definitely coming back. People are tired of being stuck in one place. If anything, airports will see a 110 percent increase in capacity, and I don't think anybody is ready for that. Logistics has taken up some of the airline capacity during the pandemic as cargo shipments are up, but as passenger travel returns, the demand for cargo will not go down. That will have to be figured out.

KANAYAMA: Humans are social animals. They like to gather at parties, meet people, laugh, and talk with each other. So everything based on human nature will return. I also think the sharing economy will return. Right now, it has paused because people don't want to be in other people's cars or homes. But as people change their lifestyle and disperse geographically, they will want more flexible use of space and with new technologies that can restart once COVID is over.

LEE: COVID-19 has made a major habitual change in hygiene and cleanliness in the workplace. I recently worked in Seoul for two months during the height of the pandemic, and people wore masks and didn't stay in close quarters. There were air purifiers with UV-C filters, and the designs of lobbies had shifted to facilitate testing people. But the design and layout of the physical workplace hadn't changed much. Also, because of the pandemic, we have been relying on screens to interact. But people need direct human contact, and therefore office work environments will return. Interaction and spontaneous discussions in a physical setting create the potential for innovative thought. I do think when everyone returns to the “semi-office,” there will be fewer individual assigned seating areas and more touchdown space and flexible spaces that can serve multiple uses, such as all-hands meetings.

Contributing their insights:



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“AS A COMPANY THAT RELIES ON COMMUTERS, WE ARE TRYING TO MONETIZE PASSENGER DATA. IN THE FUTURE, PEOPLE WILL NOT COMMUTE AS MUCH AS THEY USED TO, SO WE NEED OTHER SOURCES OF REVENUE. **BIG DATA IS VERY IMPORTANT IN JAPAN.**”

—AKINORI KANAYAMA, TOKYU CORPORATION

Are there ways that Asia is ahead of the curve in employing technology compared with other parts of the world?

KANAYAMA: We need new ways to move goods to stores. In Japan, freight companies are using new technologies to be more efficient. Because Japan has greater population densities than the United States, it may be easier for us to be efficient. But even in more-remote cities, we are trying to upgrade delivery systems. In Japan, robotics are also becoming more common—in every field. Many people are adopting robots to provide physical services because we are losing population and have a labor shortage; we need robots to help us. There are many robots in the home here, performing actions such as cleaning. I was very surprised to learn there are devices that can respond to people’s thoughts. That kind of technology means people can enjoy talking with robots now.

LEE: The Asian countries embodied the use of technology in almost every aspect of their lives. With everything from payment systems to operating systems and user interfaces in new cars, I’ve directly witnessed an adoption of technology for efficiency and broader human comfort that went beyond the Western markets. Recently, the Asian countries have proven—at least in the first phase of the pandemic—to be more responsive, and the citizens were willing to give up some personal data so that collectively society as a whole could do better. Korea identified its first coronavirus case the same day as the United States, and yet per capita, they have done much

better and are now living a much more normal life. They used technology for contact tracing and for issuing constant alerts and safety reminders. There is little excuse not to use the technology that is out there, except for fear of trusting the government to use your personal data responsibly. The Edward Snowden and WikiLeaks data leaks have stayed on people’s minds, especially in the Western world.

What new business models are emerging in response to the pandemic?

WONG: We are seeing greater integration of automation in new areas, such as building inspections. Hong Kong currently has restrictions on drone flights in urban areas, but I believe that next year the government will allow drone inspections of buildings in certain places, especially for new construction. Drones can also perform thermal imaging to test a building’s insulation and identify energy leaks.

LEE: Denser urban areas in China and other Asian cities have experienced the rise of “ghost kitchens” that serve five or six restaurants for delivery only. I see that as likely to be a permanent change. It’s an example of taking what Amazon and Alibaba are doing for e-commerce and applying it to many aspects of our life. Through data mining and assessment, many of the e-commerce companies understand what you want before you want it. In Asia, some of the more inventive and state-of-the-art home appliances have sensors that monitor the stock of, say, your refrigerator, and you can have items automatically sent to you just before you run out. There is also a lot more efficiency happening because of the rise of the sharing economy—not just ghost kitchens, but also other service providers that can take care of your household, your transportation, your food, or any of your other needs in life. There is an enormous amount of pressure for some of these corporations to deliver almost in real time to people, so we are seeing more mini-satellite warehouses with specific inventories.

What other trends are you seeing?

KANAYAMA: Shopping malls are challenged to compete with e-commerce. It may be that shopping

malls will change into places to have experiences, not to shop. In Shibuya, we operate four malls, and we are working with fashion designers to make a new ecosystem with the help of technology. We provide space for their products and a platform for shoppers to buy their products easily. Malls can be more like virtual museums for people to enjoy. So we are changing the value chain to provide our tenants with not only space, but also new functions. Also, as a company that relies on commuters, we are trying to monetize passenger data. In the future, people will not commute as much as they used to, so we need other sources of revenue. Big data is very important in Japan.

WONG: The rollout of 5G is happening. That is going to have a massive impact on the internet of things [IoT]. In hospitality, all of the back-of-house robotics and automation will be controlled using 5G and IoT technologies. However, COVID has probably delayed the rollout of 5G another year. Because 5G has a shorter range than 4G, it requires installation of many transmitters in a building, and because office buildings are virtually empty due to COVID, installation has not been moving forward. Another property technology issue is the management of cold storage. With the distribution of vaccines, for example, cold storage is essential. In Hong Kong, two doses per person for a population of 7.5 million adds up to 15 million doses that need storing. Management of cold storage is much more technically complex than managing conventional warehouses because of the need to monitor temperature and ensure that shipments are received and stored quickly. So we need better management software.

LEE: As companies adopt more technological tools, the important thing in the design of the workplace and other kinds of spaces is to focus on the emotional qualities of people. The technology-supported workplace of the future isn't going to look like Tokyo in the 1980s, with blinking neon and technology flashes everywhere. Technology will operate in the background. Technology is now so much a part of humanity that the design focus should be on humanity. Well-crafted user interfaces with hardware and software have made it much easier for

“WITH EVERYTHING FROM PAYMENT SYSTEMS TO OPERATING SYSTEMS AND USER INTERFACES IN NEW CARS, I’VE DIRECTLY WITNESSED AN ADOPTION OF TECHNOLOGY FOR EFFICIENCY AND BROADER HUMAN COMFORT THAT WENT BEYOND THE WESTERN MARKETS.”

—BILL LEE, GAW TECHNOLOGY AND INFRASTRUCTURE, GAW CAPITAL PARTNERS

people to use and interact with high-tech devices: you voice a command and your favorite music fills the room. With this continued trend, people will have easy access to machine-driven solutions more quickly. Also, mass data will fuel AI [artificial intelligence] algorithms, which will give rise to predictability. In a world where everyone will have access to solutions and greater predictability of outcomes, I believe people will need to have a fair amount of EQ [emotional quotient] to be effective. The shift out of the IQ-oriented world will focus us to value characteristics that drive better EQ. The surrounding spaces will need to support direct human interaction and the emotional qualities of people. It is exciting for real estate: we can truly design for people now. **UL**

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HEALTHIER BY DESIGN

PATRICK J. KIGER

Developers, architects, engineers, and scientists are blending design and technological innovations to transform buildings into enduring lines of defense against disease.

IN SAN FRANCISCO, 30 VAN NESS, a 47-story mixed-use tower with 333 condominiums and 270,000 square feet (25,000 sq m) of office space, already had been in the planning stages for several years in spring 2020. That is when the COVID-19 pandemic and resulting shutdown of many businesses abruptly forced the commercial real estate sector to confront a stark new reality: congregating in close quarters was now seen as a potential public health hazard.

The 30 Van Ness project is not scheduled for completion until 2024, long after vaccines are expected to have brought the pandemic to an end.

Even so, the building's developer, international real estate firm Lendlease, recognized that the terrifying toll inflicted by the coronavirus may have permanently shifted prospective tenants' priorities and made health an ongoing focus. In response, the developer went back to the drawing board and added numerous features intended to protect future occupants and visitors, not just against the coronavirus, but against future disease threats as well.

Those changes included a redesigned heating, ventilation, and air-conditioning system for the commercial space, with better-than-MERV 15 filtration



Above and top right: Part of an anticipated trend of wellness-oriented buildings, 30 Van Ness, a planned mixed-use tower in San Francisco, is designed with features such as touchless entry, upgraded ventilation, and increased natural light.

Facing page: In reaction to the pandemic, developer Lendlease altered the design of 30 Van Ness, adding more than \$10 million worth of features to help protect the health of occupants.

capable of catching smaller disease-carrying particles and droplets of moisture that might get through many existing buildings' filtration, as well as greater access to fresh outdoor air. Automation activated by workers' mobile phones enables them to get from the lobby entrance to their desks without touching any surfaces. Lendlease even upgraded its stairwells, increasing ventilation and access to natural light to enable building occupants to avoid elevators and engage in some healthy walking in the process.

The modifications added at least \$10 million to the project, the overall cost of which has not been disclosed. But Arden Hearing, Lendlease's executive general manager for development for the West Coast, sees the additional money as well spent. He foresees a trend toward "next-generation, future-proofed, wellness-oriented commercial office buildings" that will have a competitive advantage over traditional buildings.

Already, "there are some tenants who wouldn't consider space that is not next generation," Hearing says. "We've heard from some investors who want to focus on next-gen, future-proofed, wellness-oriented office space, as well. It's not just about COVID. I describe it as future-proofing, not COVID-proofing, because if COVID goes away tomorrow, this all still makes sense. It's the right thing to do."

Others in the commercial real estate sector have similarly shifted focus. Developers, architects, engineers, and scientists are working to develop design and technological innovations to protect



Above and below: In next-generation, wellness-oriented buildings such as 30 Van Ness, access to outside air and natural light is an important design feature.



building occupants and users from the coronavirus and future disease threats as well. They are attacking the problem from multiple angles, ranging from improving air quality inside buildings and creating

The interior design of 30 Van Ness breaks up spaces to allow for social distancing while maintaining a visual connection.



LENDLEASE/SCB ARCHITECTS/STEEL BLUE RENDERING

touchless entry systems to exploring the use of mobile apps, smart building technology, and big data. They also are aiming to make building operations and environmental conditions more transparent so occupiers can feel greater confidence.

Experts say these efforts could have a transformative impact, even after COVID-19 eventually is brought under control, by establishing that health- and wellness-promoting design and technology can create value and a competitive advantage for developers and building owners. Beyond that, some can even envision buildings as a crucial line of defense against future disease outbreaks in the decades ahead.

Clearing the Air

The pandemic forced many companies to allow employees to work remotely, a shift that 78 percent of CEOs expect will continue even after the health threat subsides, according to an August 2020 survey by business services and advisory firm PwC. But virtual workplaces also bring added stresses as employees struggle with work/life balance and the difficulty of collaborating over online video. An April 2020 poll released by Smartsheet, an enterprise platform firm, found that three-quarters of office workers who had to switch to working from home felt less connected to the business. As a consequence, it can be expected that workers, in some number, will be returning to offices.

“Gathering and working together indoors is a huge piece of human existence,” says Kevin Van Den Wymelenberg, an architecture professor and director of the University of Oregon’s Institute for Health in the Built Environment. “We simply have to figure this out.”

He thinks the answer is to harden buildings against large-scale disease outbreaks, similar to the way they are designed to withstand floods and other natural disasters. For airborne pathogens such as the one that causes COVID-19, that means controlling the air inside buildings to prevent the pathogens’ spread.

Some considerations are fairly basic—using an HVAC system that maintains 40 to 60 percent humidity, which hinders the spread of aerosols carrying the coronavirus, and providing access to sunlight, which can make the coronavirus inactive, Van Den Wymelenberg says. Those conditions also happen to be beneficial to natural protections against pathogens. “Abundant sunlight, for example, helps the circadian system regulate the healthy sleep cycle,” he explains. “That leads to a more robust immune system.”

Another key is upgrading filtration to remove aerosols, although in existing buildings that must be balanced against the ventilation system’s ability to move air or the resulting energy penalty may be too great. “We need to keep in mind the climate change

“I DESCRIBE IT AS FUTURE-PROOFING, NOT COVID-PROOFING, BECAUSE IF COVID GOES AWAY TOMORROW, THIS ALL STILL MAKES SENSE. IT’S THE RIGHT THING TO DO.”

—ARDEN HEARING, LENDLEASE

problem at the same time that we’re managing the pandemic, because it also kills people,” Van Den Wymelenberg says.

Another promising strategy is to change how filtered air is moved through a room. In traditional systems, filtered air is pushed down from overhead ducts, which often means it has to travel through a cloud of warm, rising, exhaled air, which can contaminate the filtered air before it reaches a person’s desk.

Van Den Wymelenberg advocates an alternative approach in which filtered air is released from vents along the floor and the exhaled air is drawn out through vents at the top of the room. “I think it can be significant,” he says, though studies to validate the technology are still underway.

This approach is easier to execute in new construction, but it can also be implemented through a retrofit of an existing structure, Van Den Wymelenberg says.

Monitoring is another key tool. Because air samples in buildings can be subjected to the same tests for the coronavirus that people receive, testing building spaces regularly could make contact tracing more efficient. “You can’t test every person every day, but you could test every building every day,” Van Den Wymelenberg says. “I’d like to recategorize buildings as part of our public health strategy.”

Developing a Touchless, Antimicrobial Environment

Whereas efforts to stop COVID-19 increasingly focus on the air, hindering surface contamination by microbes also can play a role in fighting disease outbreaks.

Corning, for example, has developed Guardiant technology, through which a glass-ceramic material is mixed into paint for application to walls, metal fixtures, and other surfaces. In laboratory



BOKA Powell designed this 10-story parking garage for Christus Health’s headquarters in Irving, Texas.

The design for the Christus Health building in Irving, Texas, incorporates step-out balconies and a roof terrace on the conference center level.



The planned interior of the Christus Health headquarters in Irving, Texas.



tests, such paints have been able to kill 99.9 percent of viruses—including ones most resistant to disinfectants—as well as bacteria in less than two hours, according to Joydeep Lahiri, a division vice president and program director of specialty services at Corning. The paints retained their antimicrobial properties even after the simulated equivalent of six years' worth of scrubbing.

“We imagine a world in which all the coated surfaces around us—in our homes or in any of the public areas where we spend time—could be coated with an antimicrobial paint,” Lahiri says.

Another strategy is to reduce the number of surfaces people touch.

For new buildings, “the number-one change we’re adding is touchless access,” says Don Powell, a founding partner and design principal at Texas-based architecture firm BOKA Powell. Smartphone apps or card readers can enable occupants to get from the garage to the ground floor and pass through sliding doors, then instruct an elevator to take them to their offices, all without requiring them to grasp a door handle or push a button. “We can get people to their desks without touching anything that’s considered public,” Powell says.

BOKA Powell also has designed what Powell describes as a healthy restroom, with individual toilets and sinks in private compartments, each with its own separate ventilation system. Though users will be provided with disinfectant wipes, there also is the option of using UVC light to sterilize units between uses, Powell says.

Other design details could make offices safer. Powell likes the idea of separating desks with high glass partitions that would block one person from breathing on another, and a higher ratio of enclosed private offices than is now typical. Increasing access to outdoor space and fresh air is another plus. BOKA Powell’s design for Christus Health’s 15-story headquarters building in Irving, Texas, which Powell says is scheduled to break ground this year, will have step-out balconies and roof terraces on the conference center floor. “There is some sense of separation and social distancing in outdoor spaces,” Powell says.

The redesign of building lobbies, which are heavily used areas, is another strategy for protect-



The plan for the Christus Health headquarters in Irving, Texas, incorporates outdoor spaces to provide greater safety and to allow for exercise and recreation.

“YOU CAN’T TEST EVERY PERSON EVERY DAY, BUT YOU COULD TEST EVERY BUILDING EVERY DAY.”

—KEVIN VAN DEN WYMELENBERG, UNIVERSITY OF OREGON

ing health. In addition to incorporating touchless technology, J. Kevin Heinly, a principal and managing director in the San Diego office of the Gensler design firm, has advocated maintaining healthy air quality with features such as living walls, which use plants to organically filter air and add oxygen to indoor spaces. Since Heinly wrote an article on this topic for the Gensler website in March 2020, “the application of many of these ideas has evolved and become part of the overall building COVID design strategies,” he says.

Touchless concepts can be used in multifamily residential projects. In Rockville, Maryland, the 238-unit Kansa Twinbrook apartment community recently opened by AvalonBay Communities is designed to test a new model for highly automated apartment complexes that provide high-quality housing at a lower price by reducing staffing costs. Karen Hollinger, the firm’s senior vice president of strategic initiatives, says no leasing agent is on the premises; instead, when potential renters come for a tour, the company office in Virginia Beach can open doors remotely and digitally process the applications.

Although Kansa Twinbrook was designed before the pandemic, it includes numerous features that could be advantageous during a disease outbreak.

Bucking the recent trend of smaller units and large common areas, AvalonBay opted to create bigger apartments, which make it easier for residents to work from home and have room to exercise. The building also is optimized for handling e-commerce deliveries, which have soared since the start of the pandemic, and has bigger storage lockers for delivery companies, which can access the building with latch codes. In addition, instead of a central air compressor for the building, each unit has a separate HVAC system, and residents can reach their units via an open-air stairwell so they do not have to share an elevator.

Mobile Apps, Big Data, and Artificial Intelligence

Major West Coast developer Hudson Pacific Properties recently revamped its design for Washington 1000, a 16-story office tower on Olive Way in Seattle that is scheduled for completion in the first quarter of 2023.

In addition to upgrading to a more advanced HVAC system, Hudson Pacific plans to incorporate antimicrobial copper-alloy door handles, handrails, and other touch points to help reduce transmission of disease, though the company has not yet selected

Below left and below: Hudson Pacific’s Washington 1000 office building in Seattle will incorporate antimicrobial technology and materials. The developer has created a mobile app to provide up-to-date health information directly to tenants.



HUDSON PACIFIC PROPERTIES/LMN ARCHITECTS



HUDSON PACIFIC PROPERTIES/LMN ARCHITECTS

Like many other recently planned buildings, Washington 1000 in Seattle will include outdoor space for meetings and activities.



HUDSON PACIFIC PROPERTIES/LMN ARCHITECTS

a brand. On other surfaces, the company will use Sherwin-Williams Paint Shield, a mixture added to latex paint to kill and reduce buildup of bacteria. Hudson Pacific also will use a UVC device built into the escalator—it has not yet chosen a specific vendor—to sanitize the handrail surface. In restrooms, space has been increased to make it easier to practice social distancing, and fixtures are touchless.

To help protect the health of building occupants, Hudson Pacific also will use a mobile building wellness app, My HPP Office, which it has developed in collaboration with tenant experience platform vendor HqO, says Natalie Teear, company vice president for sustainability and social impact. The app will enable the company to transmit health-related bulletins in real time to building occupants—letting them know, for example, when it is necessary to institute a new health precaution, such as tightening occupancy limits in elevators.

“Typically in the past there would be an email to key contacts, and you’d have to hope they would forward the memo to employees,” Teear notes. Instead, the app allows Hudson Pacific to reach out directly.

Apps can be leveraged in other ways to protect against disease. To assist workers returning to buildings after the easing of shutdown orders, engineering firm Thornton Tomasetti devised Healthy Reentry, an app for smartphones and computers that it is giving to other companies without charge.

Workers who opt to use the app check in to report their work location and provide updates on their health status—green for symptom-free, orange for some symptoms, and red for those who have tested positive for COVID-19. Access to that per-

sonal data is restricted to a few designated individuals in the company’s human resources department who can use the app to inform other workers who may have had contact with an infected colleague, explains Robert Otani, Thornton Tomasetti’s chief technology officer and a senior principal at the firm. In addition, “If you go to orange or red, you get an automated notice from the app telling you to either quarantine or isolate,” he says.

In the near future, automated building management systems could use artificial intelligence (AI) to fight disease threats. Engineering and design firm Arup, for example, is working to develop AI-powered modeling and simulation software to augment Neuron, the state-of-the-art building management system already being used in buildings in Hong Kong and Beijing.

The modeling and simulation would help the understanding of the air movement and distribution within the area so as to predict the flow of pollutants, Tony Lam, Arup’s building performance and system leader in east Asia, and his team explain via email.

As building sensors gather data on factors ranging from the body temperature of visitors and occupants to the concentration of particles in the building’s air, AI would compare it to historical data and predict emerging problems. The building then would make subtle adjustments to ventilation or air purification, or use microbe-killing UVC light to counter the threat, according to an article by Lam on the Arup website.

While scientists elsewhere reportedly are working on sensing technology to detect virus concen-

“AI CAN ANTICIPATE THE LOAD THE WORKERS WILL PUT ON THE OFFICE AT ANY GIVEN MOMENT AND PREPARE THE SPACE FOR THEIR OCCUPANCY. AI CAN ALSO BE MONITORING WHEN AREAS ARE VACATED, RESTRICT ACCESS, FLUSH AND REPLENISH THE AIR, INITIATE A UV OR OTHER TO-BE-DEVELOPED SANITIZATION PROCESSES.”

—JASON DE CHAMBEAU, PERKINS&WILL

trations in the air, Lam and his team say, Arup is collaborating with university researchers on studies that may reveal whether other indoor pollutants can be correlated with the presence of viruses in interior air. “From that, we can possibly deduce whether there are any potential risks in that area,” they say.

Another innovation developed by Arup, Mass-Motion crowd and pedestrian simulation software, can use data from sensors and video to understand how people use public spaces—a capability that could help building operators figure out how to maintain social distancing protocols. “We can also explore what happens in a building when someone waiting to come inside refuses to wear a mask and violates that building’s COVID rules,” says Trent Lethco, Arup’s leader of transport consulting in the Americas.

Jason de Chambeau, a design principal for Perkins&Will, envisions such systems eventually interacting directly with building occupants. “AI can anticipate the load the workers will put on the office at any given moment and prepare the space for their occupancy,” he says. “AI can also be monitoring when areas are vacated, restrict access, flush and replenish the air, and initiate a UV or other to-be-developed sanitization processes.”

A Future Focus on Healthy Buildings

Despina Katsikakis, U.K.-based global lead for total workplace for real estate firm Cushman & Wakefield, says she has spent many years trying to convince clients that spending to make building environments healthier will have a positive effect on worker productivity, citing research that shows higher cognitive performance in buildings with healthier air.

“I think it’s a bigger social issue as well,” she says. “What would it feel like if we left work each evening feeling better than when we arrive? What would that mean to employers in terms of value?”

But because the pandemic has provided an example of how health affects companies’ bottom lines, it is a lot easier to make the case that healthier buildings generate economic value. Suddenly

clients are interested in the nuances of air filtration systems, Katsikakis notes. By necessity, “everyone is becoming an air quality expert,” she says. “I don’t think that is going away.”

The Center for Active Design, which operates the Fitwel program for certifying healthy buildings, has worked with researchers to develop a new Viral Response Module certification, which sets minimum indoor environmental standards and other requirements, but also looks for company policies that support behavioral change and build trust among staff and tenants.

“The trust piece is really important,” says Joanna Frank, the center’s founding president and chief executive officer. “You need to understand how to communicate with tenants and residents about how you are operating mechanical systems and upgrading cleaning protocols.”

With scientists predicting more pandemics in the future, having a credential that shows a building has been optimized to protect against disease outbreaks may become more important in the marketplace.

John Macomber, a senior lecturer in business administration at the Harvard Business School and coauthor with Joseph G. Allen of the book *Healthy Buildings: How Indoor Spaces Drive Performance and Productivity* (Harvard University Press, 2020), envisions a near future when landlords will provide tenants with real-time dashboards viewable on their smartphones and other devices. These dashboards will display everything from real-time air-quality measures to the results of the latest scans for pathogens. The cost of building upgrades might even be financed by insurance and health care companies that would benefit from the downstream savings.

After the pandemic, “people aren’t going to forget this,” Macomber predicts. “They’re going to have health on their minds for a long time.” **UL**

PATRICK J. KIGER is a Washington, D.C.-area journalist and author.

Although it could be three to five years before the promise of 5G internet can be realized in offices and multifamily spaces, the real estate industry is starting to think about what kind of impact 5G will have inside the built environment.

JOSH COHEN

IT IS HARD TO ESCAPE THE 5G HYPE. Just about any time you turn on the TV or watch videos online, you see an ad from Sprint, T-Mobile, or Verizon trumpeting the blazing-fast, no-lag future of 5G that is rolling out nationwide and the promise that it holds for streaming video, gaming, and videoconferencing on the go. At the same time, Apple, Samsung, and other mobile device makers are touting the 5G-readiness of their next-generation phones and tablets. To hear the telecom and tech giants tell it, the 5G revolution is almost here and it is time for everyone to jump on board.

In reality, however, ubiquitous 5G is still several years away. The physical infrastructure needed for wall-to-wall coverage in cities and suburbs is very expensive—experts are talking about 5G implementation costing trillions of dollars—and it will take a long time to build out. But as providers continue to shout from the rooftops about the promise of 5G, excitement in the general population grows along with their expectations of fast, seamless wireless internet access wherever they go.

The telecom companies will be responsible for delivering that wireless service in the public realm.

A FACT CHECK OF CLAIMS ABOUT 5G WIRELESS TECHNOLOGY



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But the responsibility for that access indoors in offices and homes where people spend most of their time will fall on commercial and residential building owners and operators.

And though it could still be another three to five years before the promise of 5G can be realized in offices and multifamily spaces, the real estate industry is starting to think now about what kind of impact 5G will have inside the built environment and whether 5G will live up to the hype and supplant wi-fi as the wireless technology of choice.

Some experts think that 5G will be the foundation for transforming offices and homes into the fast, connected, flexible, device-heavy environments that tenants will demand. Others are skeptical that 5G can overcome limitations such as its high cost to implement indoors, its ongoing cost to use, and the competition coming from the next generation of wi-fi technology.

Urban Land spoke with real estate and technology industry professionals, wireless-access advocates, and other experts to understand how 5G could reshape offices and multifamily residential buildings and what owners and operators need to be doing now to prepare for the 5G future.

What Exactly Is 5G—and Wi-Fi 6?

Of course, 5G is the next-generation cellular mobile data network. It will eventually replace 4G LTE—though not for many years—much the way that 4G has largely replaced 3G in most places. 5G operates on a much higher part of the radio frequency spectrum, which, in turn, has a much shorter wavelength. That short wavelength—called millimeter wave by the industry—allows for much higher speeds. The telecom companies promise speeds as much as 100 times faster than those offered by 4G. According to Deloitte, the consultancy and auditing firm, those speeds are at least five years off, if they ever are fully reached. In the immediate term, 5G speed will likely be double that of 4G in urban environments. In three years' time, it will be 10 to 20 times faster than 4G. Eventually, it could be 50 to 100 times faster than 4G.

Perhaps as important as the speed it offers, 5G promises to deliver four to five times lower latency than current cellular data networks offer. The lower the latency, the less lag experienced by users. At

the cutting edge of technology, that low latency will help facilitate autonomous vehicle use or telemedicine—two uses in which dropped signals could be matters of life and death. Most users probably are not in such dire need of an uninterrupted broadband signal, but they absolutely want their video-conferencing service to stop lagging in the middle of a work meeting or their Netflix stream to stop lagging on movie night. The greater bandwidth of 5G will also be able to handle more devices being connected to it at once.

One major challenge for 5G is the need for many more small towers to distribute the signal. The signal for 5G does not travel as far as the signals of the older networks. So, while telecom companies will continue to use their large towers, they will be adding many small towers as well—potentially hundreds of thousands of them throughout the United States—on light posts, roofs, and other existing structures in the urban environment.

5G is not the only new wireless technology on the horizon, though. It is worth mentioning that the next generation of wi-fi technology, called wi-fi 6, also promises faster speeds, lower latency, and an ability to service more devices at once. Some experts think it will be a viable, potentially less expensive alternative to 5G for in-building use. Wi-fi 6-compatible devices and routers started hitting the market in 2020. At the least, building and office managers interested in providing wi-fi 6 will need wi-fi 6 routers. Some buildings might need to upgrade their copper cable or install fiber optic to deliver the speeds that wi-fi 6 is capable of.

What Can 5G Do for Real Estate?

At its simplest level, 5G could be one way for building owners and operators to meet the ever-growing demand from tenants to have the fastest internet possible. Homes are filling with many more devices as the “internet of things” (IoT) becomes more ubiquitous, with each of those things requiring a connection. A 2019 report by Deloitte found that the average U.S. home with broadband had 11 internet-connected devices ranging from computers and phones to smart speakers and refrigerators. That number is expected to continue to grow in the coming years.

“If a resident lives in an area with a fully deployed 5G network, they will come to expect blazing-fast speeds at every turn,” says Kevin Donnelly, vice president of government affairs for the Washington, D.C.–based National Multifamily Housing Council (NMHC). “Resident surveys year after year show us if a prospective resident walks into a property and their signal drops, they’re more than likely to move to the property across the street that doesn’t have a signal challenge.”

Commercial building owners and operators also expect a high demand for 5G from tenants, and 5G could be a way for office buildings to stand out from the competition.

“New tenants are going to want 5G,” says Manuel Fishman, a lawyer with the firm Buchalter who represents commercial real estate developers and who is a former chair of the San Francisco Building Owners and Managers Association’s government affairs committee. “The trend now in first-class office buildings is to adopt more of a hospitality model because tenants have options to work remotely and because there’s going to be a heightened need for a perception of safety in office buildings. 5G does fit into that hospitality model.”

Fishman imagines that 5G will be a key issue in lease negotiations in 2021 and that tenants might expect building owners to subsidize the cost of 5G infrastructure, especially if office rent rates drop as expected.

Others in the wireless world, however, think that while tenants may start demanding 5G because of telecom marketing, wi-fi will continue to make more sense for most users.

“For the life of me, I can’t imagine why, if I was a prospective tenant, having 5G inside the building would be that appealing to me,” says Christopher Mitchell, director of the community broadband networks initiative at the Institute for Local Self-Reliance. “I don’t want something that I’m paying per megabit for or [that] gets capped at a certain data usage per month. I want something that’s basically unlimited and fast and affordable. . . . 5G would be so much more expensive because of the fees that the cell carriers charge. And it’s not clear to me you’d get better performance on 5G than with wi-fi 6.”

Still, some people think that 5G has transformative potential beyond simply meeting customer demand.

The COVID-19 pandemic has transformed many aspects of multifamily operations, including moving previously in-person services entirely online. Donnelly says he expects that to continue long after the pandemic abates.

“It’s a blessing and a curse, but the pandemic has really shown us the future of multifamily in a lot of ways,” he says. “Existing connectivity has allowed for acceleration in a lot of ways that show a hint of the future. Virtual tours and online leasing are two trends we think are here to stay. 5G could allow property owners and managers to take an even more hands-off approach to leasing.”

Paul Bingham is the founding director of Trusted Wireless, a London-based consultancy focused on in-building wireless technology. He is also the founder of Smart Connected Buildings, a community of real estate and technology professionals working on smart-building issues. Bingham thinks that 5G has the potential to transform how commercial real estate fundamentally operates.

“You’ve got a lot of building owners now that are trying to convert and change their business model to attract the new flex worker, and a lot of their buildings aren’t wired or cabled or able to be flexible,” Bingham says. “The biggest benefit for 5G is that if you’ve got 5G wireless infrastructure throughout the building, ultimately the building is completely flexible to deploy whatever you want, wherever you want.”

He continues, “The traditional commercial real estate model is going to change. Building operators are not going to have long-term tenants that are going to sign 10- to 15-year tenancy agreements. They’re going to have short-term, flexible tenancy agreements where the occupants of the building will change continually and the building will need to reinvent itself. 5G allows a platform for building owners and asset owners to be far more flexible, innovative, and nimble.”

Because 5G is powerful and flexible, it potentially future-proofs the office in a way that allows new tenants to move in without needing to do major renovations and rewiring to accommodate their technology needs.

Bringing 5G Indoors?

One of the big physical obstacles of 5G’s shortwave signal is that it does an even worse job of penetrat-

OWNERS WILL LIKELY NEED TO INSTALL DISTRIBUTED ANTENNA SYSTEMS (DASs) OR LOW-POWER SMALL-CELL TRANSCEIVERS INSIDE THEIR BUILDINGS TO TRANSMIT THE 5G SIGNAL. . . IT COULD COST AS MUCH AS \$100,000 TO INSTALL A DAS IN A SMALL- TO MIDSIZED DOWNTOWN OFFICE BUILDING. A 50-STORY COMMERCIAL BUILDING WOULD BE MANY TIMES MORE EXPENSIVE.

ing glass and concrete than 4G (which already was not great). This means that users inside offices and apartment buildings will have a very difficult time using the telecom company’s outdoor 5G signals.

To remedy this, owners will likely need to install distributed antenna systems (DASs) or low-power small-cell transceivers inside their buildings to transmit the 5G signal. Fishman estimates that it could cost as much as \$100,000 to install a DAS in a small to midsized downtown office building. It would be many times more expensive to install one in a 50-story commercial structure.

“The big question is: who’s going to pay for it?” Fishman asks. “Verizon and AT&T are going to be using all their capital for the public network. They’re really not going to be throwing money at us building owners. Who’s going to pay for the capex [capital expenditures]? Who’s going to pay for the radio antennas?”

Donnelly is similarly concerned about the capital expenditure for new infrastructure. “When you’re already dancing on a tight balance sheet, making these major upgrades—and increasingly doing it without contributions from providers—can really impact affordability across the board and what rents residents ultimately pay.”

Some in the industry are hoping that because the telecom companies need significantly more antennas and towers to make the 5G network function, they will be able to lease rooftop space to the telecom companies. Whether that comes to fruition remains to be seen.

Dealing with Distrust

One potential pitfall of hosting 5G equipment in or on a building is the broad level of misinformation and conspiracy theory around 5G. Some fear that 5G towers will emit harmful radiation. There also are conspiracy theories that 5G towers spread the virus that causes COVID-19.

The conspiracy theory is patently false, and scientific research has found that cellular tower radiation is probably not harmful. According to the

American Cancer Society, “Newer 5G signals still use [RF or radio frequency] waves, so they are still forms of non-ionizing radiation, which is not thought to have the ability to directly damage DNA. At this time, there has been very little research showing that the RF waves used in 5G networks are any more (or less) of a concern than the other RF wavelengths used in cellular communication.”

Still, fears regarding 5G have led people to burn and damage more than 140 5G towers in the United Kingdom and Europe. In May, ABC News reported that there had been five arson attacks on cell towers in Memphis, with another 14 towers in western Tennessee purposefully getting shut off by attackers. At a less destructive scale, a group of protestors in Berkeley, California, delayed the installation of two 5G small cell towers.

Whether 5G can deliver on its promises of high speeds, minimal lag, and great connectivity for the ever-increasing number of devices remains to be seen. Even optimists expect that it could still take another three to five years before building operators could fully realize the power of next-generation wireless.

Donnelly is hoping for the best but is not holding his breath. “For the last three to four years, we in the multifamily industry have really been scratching our heads about what this means for us. There’s so much and we’ve failed to see the reality play out in our communities as quickly as we’d been promised. This was sort of touted as a potential game-changer—and we still hope that is the case—but I think we still need to overcome the challenge of building structure and design.” **UL**

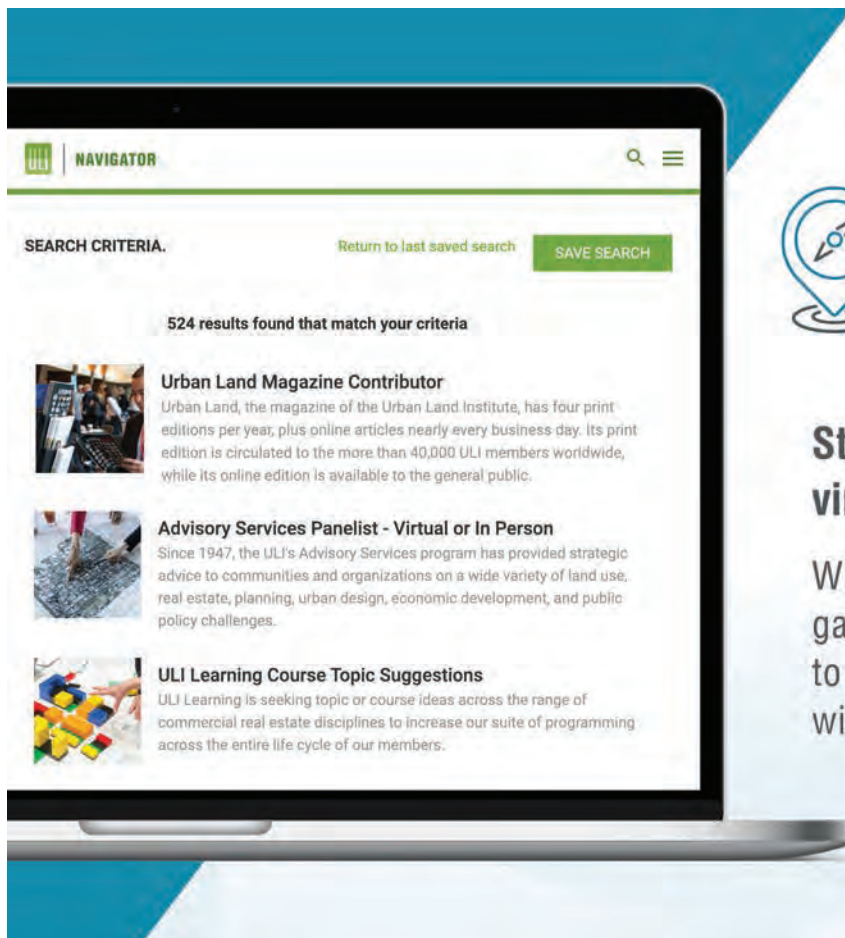
JOSH COHEN is a freelance writer in the San Francisco Bay area. His work has also appeared in the *Guardian*, the *Nation*, *Next City*, and *Crosscut*.



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VIRTUAL | MARCH 16-17, 2021

HOUSING OPPORTUNITY CONFERENCE



The Housing Opportunity Conference is one of the premier national meetings of the market-rate and affordable housing development community, drawing a diverse mix of private and nonprofit real estate developers, public officials, urban and regional planners, housing advocates, architects, investors, and lenders with one common goal—to expand opportunities for a full range of residential development in their communities.

The 2021 conference will be held virtually, March 16–17. Registration opens soon, and more information is available at the conference webpage, housingconference.uli.org.

Each year, the ULI Terwilliger Center for Housing highlights the efforts of leaders across the country working to expand housing opportunity.



The Jack Kemp Excellence in Affordable and Workforce Housing Awards recognize exemplary developments that meet affordable and workforce housing needs and help create mixed-income communities of opportunity. Developments that meet the criteria are encouraged to apply now.

For more information, visit uli.org/kemp.



The Robert C. Larson Housing Policy Leadership Awards recognize innovative state and local policy initiatives that support the creation and preservation of affordable and workforce housing. The 2021 awards program is now open for applications and nominations of state or local governments that deserve consideration for this award.

For more information, visit uli.org/larson.

Get Involved with the Terwilliger Center for Housing

The goal of the Terwilliger Center for Housing is to advance best practices in residential development and public policy, and to support ULI members and local communities in creating and sustaining a full spectrum of housing opportunities, particularly for low- and moderate-income households.

Established in 2007 with a gift from longtime member and former ULI chairman J. Ronald Terwilliger, the center integrates ULI's wide-ranging housing activities into a program of work with three objectives: catalyzing the production of housing; providing thought leadership on the housing industry; and inspiring a broader commitment to housing. To get involved and learn more, sign up for the newsletter and join the Terwilliger Center's monthly webinars by emailing housing@uli.org.

SET TO LAUNCH IN 2023, the Punggol Digital District will form a fresh nexus between higher education and industrial innovation, represented by its two anchor institutions, the Singapore Institute of Technology (SIT) and a new business park developed by JTC Corporation, an industrial property developer and manager.

The “digital business district,” spread over 123 acres (50 ha) in the

northeast of Singapore, will be integrated with surrounding residential areas and nature parks.

At the 2020 ULI Singapore Annual Conference, held virtually, SIT president Tan Thiam Soon discussed how SIT has taken the ongoing development of its campus in the work-in-progress district as an “opportunity for reimagination.” The session was moderated by Hwang Yu-Ning, chief planner and deputy chief

executive officer of Singapore’s Urban Redevelopment Authority.

Tan noted the need to reconsider the definition of education in response to the remote learning required by the current pandemic, as well as to think about what the “university learning environment of the future” should be, he said.

Formed in 2014, SIT is Singapore’s newest university, now with the third-largest enrollment and the first to be

YONG SHU CHIANG

PUNGGOL DIGITAL DISTRICT

Singapore’s new university plans for the future of learning.



The heart of the new campus.

SINGAPORE INSTITUTE OF TECHNOLOGY

based completely on cloud infrastructure. More than 90 percent of its students come from the five local polytechnics—postsecondary education institutions.

“We call ourselves a university of applied learning—the first in Singapore,” said Tan. “We offer a number of very unique programs, and we place a lot of emphasis . . . on connecting academic knowledge to real-world application.”

To this end, SIT has introduced for its students eight- to 12-month structured industry attachments, similar to internships or co-op programs in the United States.

“The fact that we have to work with industry, we recognized very quickly we really need to build a university that’s nimble and responsive. When industries are changing, we have to think very hard about how to respond to those changes,” said Tan. “We see ourselves as a disruptive university, and we are fortunate that at this moment in time we are building a new campus which will be key to continue our journey of disruption.”

The promotional tagline for the Punggol Digital District is “The Future Is Yours to Create.”

For SIT, being colocated with JTC’s business park—situated near the scenic waterfront facing Coney Island, also known as Pulau Serangoon—through a pilot flexible land use arrangement promises to greatly enhance symbiotic industry/academia collaboration for future generations.

Across the two organizations’ campuses, developed with the same master planner and connected via dedicated links that include an elevated pedestrian walkway, there will be a mingling of physical facilities such as research labs, learning facilities, incubator space, and maker space—the result of deliberate space swaps. In short, students and enterprises will find themselves as closely integrated as possible.



SINGAPORE INSTITUTE OF TECHNOLOGY

The digital district is expected to bring forth 28,000 new digital-economy jobs, arising from more than \$15 billion in investment across an area the size of 70 football fields.

One key feature of the district is the Open Digital Platform (ODP). The ODP software uses sensors throughout the district, including more than 10,000 on the SIT campus, to integrate smart technologies such as robotics and the “internet of things” to gather data and derive real-time findings useful to companies, students, and public agencies.

The entire Punggol Town precinct is meant to be a “living lab” testing new ways of living, learning, working, and delivering services. These include test-

ing green technologies and sustainable urban solutions, which will abound throughout the district.

By the same token, the entire SIT campus, to be powered by its own “islandable” multi-energy microgrid, is being primed to facilitate learning, innovation, and experimentation.

“One of the things that we wanted to see is the university—not just the physical part or the microgrid—but the university in totality being used for learning and experimentation,” Tan said.

The question was whether the university could try completely new approaches and build a kind of space to facilitate that level of experimentation. “We are really talking about creating a

Open Digital Platform software uses sensors throughout the district, including more than 10,000 on the Singapore Institute of Technology campus, to integrate smart technologies such as robotics and the “internet of things” to gather data and derive real-time findings useful to companies, students, and public agencies. **The entire Punggol Town precinct is meant to be a “living lab” testing new ways of living, learning, working, and delivering services.**



Industry and academic interests are mingled throughout the district.

living lab [with this campus] that would go beyond just the physical space to innovate and inspire learning, inspire interesting projects, and inspire industry to come and work with us,” he added.

Tan shared SIT’s approach to being a disrupter in education: “A lot of things we do, we didn’t do just to be different or innovative,” he said. A university of applied learning needs to keep up with ever-changing trends and developments across multiple industries, he said.

SIT also intends to remain relevant to alumni after they graduate.

“One of the ideas that we have been pursuing a lot in the last few years is this idea that once you enter university at SIT, you enter a work/learn continuum. Your whole life is [linked to this] continuum and you will never really graduate, per se,” he said.

“In SIT, we have a motto: ‘Once a SIT-izen, always a SIT-izen.’ So how much will you learn throughout your career, and when will you come back to SIT?

We try to bring that message across very strongly to our students.” **UL**

YONG SHU CHIANG is an editor, writer, and consultant based in Singapore who has written for the *Straits Times* and CNET Asia.

This article originally appeared in *Urban Land* online. A recording of the 2020 ULI Singapore Annual Conference is available to ULI members on Knowledge Finder, knowledge.uli.org.



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REGISTER FOR THE 2021 ULI VIRTUAL HOUSING OPPORTUNITY

March 16–17, 2021 Conference

One of the premier meetings of the nation's residential development, lending, investment, and policy community, this conference brings together a diverse mix of private and nonprofit real estate developers, public officials, urban and regional planners, housing advocates, architects, investors, and lenders with one common goal—to expand housing opportunities in their communities.

Register today at housingconference.uli.org.

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Be recognized for innovative state and local policy initiatives that support the creation and preservation of affordable and workforce housing.

Jack Kemp Excellence in Affordable and Workforce Housing Awards

Submit your exemplary development that demonstrates creativity in expanding housing opportunities.

Applications will be accepted until April 2, 2021.

Learn more about all ULI Awards Programs at uli.org/awards

LANDWR I

How Technology Allowed ULI to Push Forward

ADAM SMOLYAR

Decisions made years ago to invest in new technologies—and to continually upgrade existing platforms—allowed ULI to pivot rapidly to online delivery of vital member services.

WHEN PANDEMIC FORCED BUSINESSES and organizations around the world to search for ways to continue operating without face-to-face interactions, ULI quickly shifted to an online business model to serve our more than 45,000 members worldwide. A years-long investment in technology enabled ULI to continue to provide member value while reimagining the existing program of work and offerings in new and exciting ways.

The greatest lesson learned from this experience is this: technology is not just how your product gets delivered; technology is a critical part of the product itself and can be your competitive advantage.

Services Enhanced through Technology

Fundamentally, we believe that technology enables ULI to provide a continuous stream of member-facing value. Members have told us what matters to them, and we have listened.

Their need for networking is supported by our online Member Directory (members.uli.org). Those looking to be more engaged with ULI can find volunteering and leadership opportunities through the online Navigator (navigator.uli.org). And members who need access to ULI's unparalleled content can explore the breadth and depth of our offerings using the online Knowledge Finder platform (knowledge.uli.org). In essence, Knowledge Finder is a global resource of real estate trends and best practices, delivering information that is actionable, improves decision-making and outcomes, and helps members succeed.

Among the key lessons learned from this real-world test of ULI's capacity to function and thrive through technology are the following:

▷ **Anticipate future needs and start building for them today.** It takes time to go from

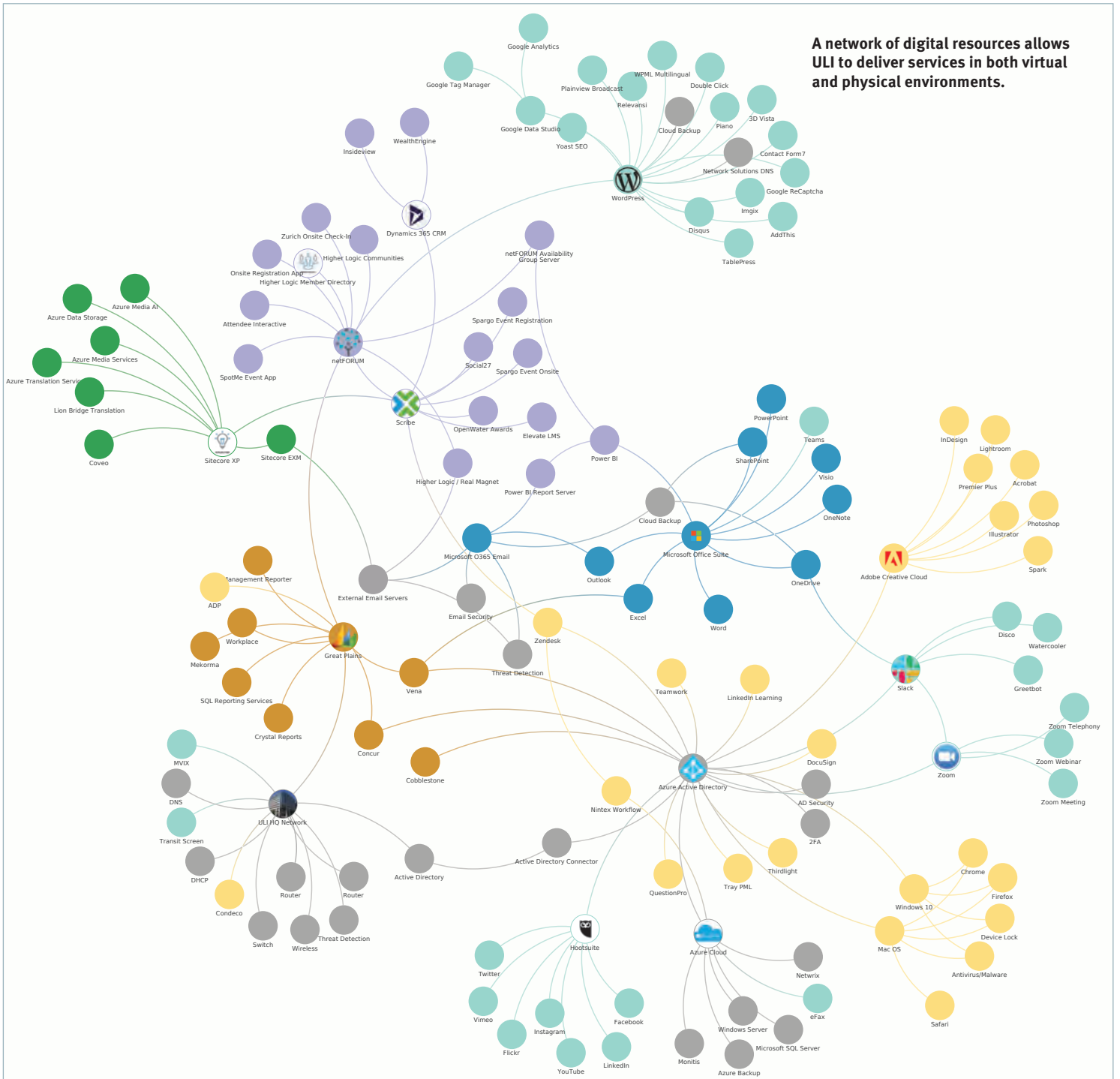
concept to development to pilot to launch. The ULI Global Board of Directors, under the leadership of Randy Rowe, chairman of Green Courte Partners and ULI global chairman from 2015 to 2017, saw the need to bring together all of ULI's content and make it easy for members to access and search. That happened more than three years ago; we are now beneficiaries of that amazing vision, which is also a key part of our Global Strategic Plan.

▷ **A successful plan is not about the product alone.** It is about building a platform that provides a critical foundation to enable continuous evolution and innovation. Successful technology-based product development builds on a true network effect: the more participants there are, the more value they bring to the rest of the network participants. Importantly, we can leverage machine learning to help with personalization of the members' experience both while they are using the website and through automated yet personalized emails that match the members' stated interests with suggested and recently published content.

▷ **There is no such thing as a static technology-based product.** It must change—a lot—so build an evolutionary cycle into your road map. Over the past year alone, during the challenges of the pandemic, we have added new content types to the Knowledge Finder offerings available to ULI members. These include ULI Learning programs, virtual tours, webinars, and new books. We also have added new functionality to existing online services, such as the ability to personalize the presentation of content based on a member's stated interests, and automatic transcription of videos and webinars.

▷ **Technology done right allows an organization to truly differentiate itself from**

TES



competitors. And it allows this to be done transparently and consistently. With the use of multilingual auto-translation technology, ULI is able to deliver on its global brand promise and truly connect members and content anywhere in the world. Though our websites have been multilingual for the past few years, we just launched auto-translation from English to Japanese in Knowledge Finder, with Chinese, French, Spanish, and German on the schedule for this fiscal year.

Fundamental Decisions Set the Stage

One important decision we made about 30 months ago was to move away from the BlueJeans videoconferencing platform—which had proved unpopular among members and staff alike—to a relatively new company that offered high-definition-quality video meetings and an easy-to-use interface: Zoom. We could not have predicted the explosive growth in webinars

over the past year—increasing from 24 webinars offered per quarter to almost 800, while sustaining 98 percent customer satisfaction, according to survey results.

Our technology stack and ecosystem have matured significantly. Just in the past couple of years we delivered global implementation of the Microsoft Dynamics CRM (customer relationship management) system, added a new ULI Learning management system, a new ULI Awards management platform, and a new on-site registration system. We also launched YooPay, a China-based platform that is integrated with WeChat—a Chinese messaging, social media, and mobile payment app—for both payments and marketing.

Transforming our major conferences into virtual-only events was a mega-endeavor that presented the need to devise a virtual experience that could deliver as much of the in-person feel and networking opportunities as possible. Selecting a platform that would serve the needs of speakers,

attendees, sponsors, and staff was challenging enough; doing so in a matter of weeks was truly remarkable. We have used the platform, Social27, first in the Asia Pacific region for the REImagine conference in September, followed by the ULI Virtual Fall Meeting in October, and we will deploy it again at the ULI Europe Conference, February 8–10.

With every execution of these technologically enabled programs, we are learning and improving. Our technology continues to evolve along with the demands facing the organization. Lessons learned from one deployment inform the decisions going forward. After all, sharing “lessons learned, mistakes made” is the ULI way. **UL**

ADAM SMOLYAR is ULI chief marketing and technology officer.



Building a Successful Sustainability Program: The ULI Blueprint for Green Real Estate

Real estate has immense potential for creating positive financial and environmental value, and the time to start is now.

ULI recently published The ULI Blueprint for Green Real Estate to help real estate owners and investors looking to develop or accelerate a sustainability program, and developers looking for ways to integrate sustainability into their development strategy.

Download the resource at uli.org/greenprintblueprint

The content is laid out to support a firm's sustainability lead in building a holistic program from the ground up:

- Building the foundation of a sustainability program
- Best practices in new construction
- Quick wins in existing buildings
- Financing and implementing capital projects
- Integrating sustainability across the real estate value chain
- Tracking, reporting, and communications
- The evolution of “sustainability” programs

Electricity Infrastructure, Low-Carbon Real Estate, and Wildfire Resilience

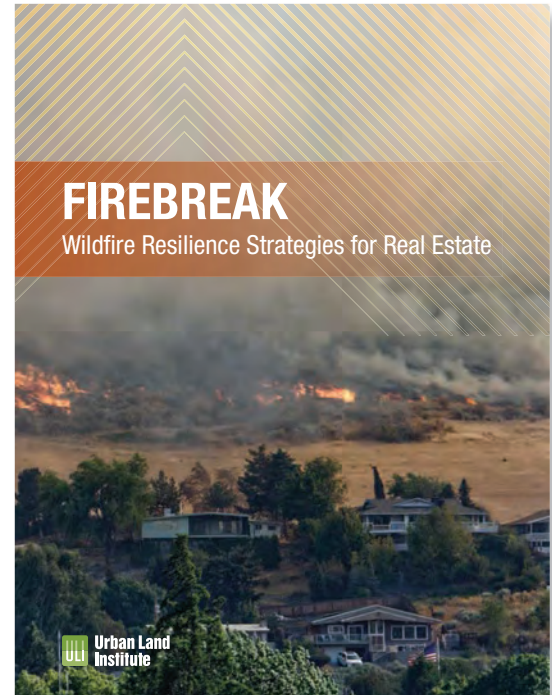
An excerpt from Firebreak: Wildfire Resilience Strategies for Real Estate, a report published by the ULI Center for Sustainability and Economic Performance, with support from the Kresge Foundation. The report details the implications of wildfires for the real estate industry and explores best practices in building design and land use policy that can reduce the damage caused by wildfires and help set communities up to thrive in the long run. The report shows that real estate developers, urban planners, and public leaders increasingly are aware of the land use drivers of wildfires and documents their concern about the consequences of wildfires, and how they are implementing asset and community-scale resilience efforts. Members can download copies using Knowledge Finder, knowledge.uli.org.

INCREASING THE RESILIENCE of electric infrastructure—a significant amount of which is in wildfire-prone wildland/urban interfaces (WUI), where development mixes with or is adjacent to natural areas with abundant vegetative wildfire fuel, and rural areas—could mitigate the chances of fire ignition and spread, increase the security of critical communications, improve service reliability, create more widespread backup-power options, and limit potential wildfire infrastructure damage. Such large-scale grid improvements not only are necessary to improve wildfire resilience but also are needed to address countrywide aging equipment, capacity bottlenecks, and increased storm and climate impacts—all while demand is increasing.

For electric utilities, managing infrastructure is critical to limiting damages; utilities' largest wildfire exposures are from the liabilities they may incur if their assets are found to have been responsible for igniting a fire. In California, for example, utilities are able to raise rates to cover disaster costs only if the Public Utilities Commission approves the increases, and that is approved only if the commission finds that the utility "reasonably and prudently operated" its equipment.

Significant grid updates present opportunities to create an energy system that is low- or zero-carbon and renewable. However, transitioning to more renewable energy sources and greater electrification—key strategies in progressive green building and transportation policies—also creates a need for more electric infrastructure, setting up a potential conflict between achieving sustainability and wildfire resilience goals.

Developing a more wildfire-resilient and low-carbon electrical system involves a series of tough decisions and tradeoffs with large-scale infrastructure updates. Undergrounding transmission wires, for instance, would very effectively decrease the chances of their sparking a wildfire; however, doing so would be costly and potentially would make the transmission wires vulnerable to other hazards such as earthquakes or construction accidents. Similarly, installing and enabling more widespread use of generators—a type of



distributed energy resource that typically runs on diesel fuel—would limit the negative effects of preventative de-energizations but would increase greenhouse gas emissions.

Emerging technologies such as batteries and on-site solar offer enhanced storage capacity and renewable, low-carbon power locally without the need for as many high-voltage transmission lines. However, though individual assets across the United States have successfully integrated these emerging technologies, the grid and infrastructure are not yet advanced enough to integrate one-off projects on a large scale.

Wildfire-Resilient Energy Solutions

Strategies for improving the wildfire resilience of the electrical grid include some well-established tactics such as energy efficiency and vegetation management as well as further development and implementation of emerging technologies.

▷ End-use efficiency

- Minimizing energy demand keeps a stressed grid functioning longer and allows for critical services to be met even when power generation is limited. End-use efficiency is a cost-effective strategy familiar to many in the public and private sectors.



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- Utility companies are longstanding stakeholders in reducing energy demand and they are expanding efficiency incentive programs because of wildfires.

Utility efficiency and incentive programs can include rebates on energy-efficient equipment to reduce energy use, free or reduced-cost LEDs, and smart thermostats for residential customers, or large-scale tenant improvement rebates or financing programs to help commercial clients install more-efficient upgrades.

- The wide range of policies being implemented at the local level to achieve emission-reduction targets includes stricter energy codes, mandatory energy and emissions benchmarking, building efficiency ratings, mandated compliance with emissions targets, building energy-performance standards, all-electric building ordinances, and mandatory renewable energy targets.

▷ **Electric-grid hardening**

- Hardening the electric grid could prevent fires from igniting, speed post-event recovery, and generally improve service reliability.

- Grid hardening refers to a set of traditional resilience strategies implemented by utilities to strengthen physical infrastructure. Strategies include undergrounding wires, protecting or replacing vulnerable utility poles, insulating

power lines, removing overhanging tree branches or other nearby threats, and installing smart sensors to more quickly identify and isolate issues.

▷ **Distributed energy resources (DERs) and backup power**

- DERs generate small amounts of power over a wide geographic area. They reduce power flow through the grid, lessening the chances that overloaded transmission lines will sag, come in contact with vegetation, and spark a fire. DERs include on-site solar, battery energy storage, microgrids, and backup emergency generators.

- Although individual DER technologies may be well developed, linking them to the grid at a large-enough scale to change from the current centralized system to a distributed one is a major challenge. Managing the input of DERs into the wider grid is another challenge for utilities, which often do not have an inventory of DERs or control over when and how much power DERs contribute.

Implementation Trends

Maximizing energy efficiency remains one of the most important wildfire resilience strategies that the real estate sector can implement. In 2019, about one-third of all energy use in the United States occurred in residential and commercial buildings. Lowering the demand for energy through

building efficiency has the regional impact of reducing the need for the electric infrastructure that can spark wildfires and for the expensive protection of additional assets during an event. Reducing emissions through efficiency also would mitigate climate change (and climate-driven wildfire risk) and reduce the energy use from running air conditioners and filters that are more likely to overload the grid during fires and heatwaves.

Increasingly, developers and designers are considering DERs, especially backup-power capacity and the ability to “island” off grid, in new development. Speaking of a 220-unit senior-living project under development in Northern California, Mithun principal Antonio Pares emphasizes that backup power is a main design consideration. “There’s a lot of discussion about whether to have emergency generators that run the entire community or just a part of it to create an emergency evacuation zone . . . because of the immediate threat of fire to the structures, evacuation challenges with a less-than-mobile community, and the impact of the fires in the region every summer in terms of air quality.”

Governments also are interested in scaling up emerging energy technologies to enhance wildfire resilience, reduce the frequency and impacts of de-energization, and meet their greenhouse-gas-emissions reduction goals. Improved regional infrastructure planning is an additional tool to reduce wildfire risks, balance sometimes-competing priorities, and minimize the disruption of preventative de-energizations. “One way to reduce wildfire risk is by co-locating energy supply resources closer to the consumers who use energy, so we lessen dependency on larger transmission infrastructure. The long distances and varied terrain of transmission are where some of our greatest vulnerabilities to risk lie related to disruptions, and that is valuable in terms of understanding infrastructure planning,” says Neil Webb, director of markets and growth at Ramboll, a member of the research focus group contributing to the report. **UL**

2021

EMERGING TRENDS IN REAL ESTATE®

Around the World



EMERGING TRENDS: UNITED STATES

COVID-19 Accelerates Change in the Real Estate Industry

A focus on social justice intensifies while economic uncertainty remains.

THE COVID-19 PANDEMIC HAS HEIGHTENED the desirability of lower-density areas for both residential and commercial real estate, with interest concentrated in the Sunbelt markets, according to *Emerging Trends in Real Estate® 2021*, the latest edition in the annual series of reports published by ULI and PwC. Cost-conscious companies will gravitate toward cities that are business-friendly and low-cost with large, growing workforces. Raleigh/Durham, North Carolina, for example, is nicknamed the “Bay Area of the East Coast” due to a surge in technology jobs and the area’s reputation as an education mecca. Homebuyers will look for suburban locations with low taxes, affordable housing, automobile-oriented transportation, and good job prospects. While growth in the suburbs has been a consistent trend since this report first predicted it five years ago, greater family formation among millennials and flexible work-from-home policies are boosting this shift.

Social unrest and protests in cities across the United States also have played a role in the reevaluation of presence in urban cores. Seventy percent of respondents agree that the real estate industry can address and help end systemic racism in ways that include promoting diversity, equity, and inclusion within the sector, and looking for ways to develop underserved communities. On a rating scale of social issues in real estate, income and racial inequality moved from little to moderate importance last year, to moderate to great importance in the latest survey.

“Times of great change always present significant opportunities,” says W. Ed Walter, ULI global CEO. “In the near term, our suburbs will benefit from new growth spurred by shifting demographics and changes to living and working patterns resulting from the COVID crisis. Our cities will have the opportunity to respond by reimagining their public realm, building more resiliently, and reinventing assets, such as retail, that were already struggling before the pandemic. As an industry, we have the opportunity to strengthen by truly embracing diversity and tackling the challenges faced by our communities.”

“Now more than ever, the real estate industry has the chance to take the lead in using planning and development skills and investment capital to reshape our work and lifestyle environments. These tools can be used to address

societal issues of safety, green space, and racial equity,” says Byron Carlock, PwC partner and U.S. real estate practice leader. “The gauntlet of responsibility is ours to embrace, and industry leaders see the opportunities and are responding with investment and leadership.”

Top Trends

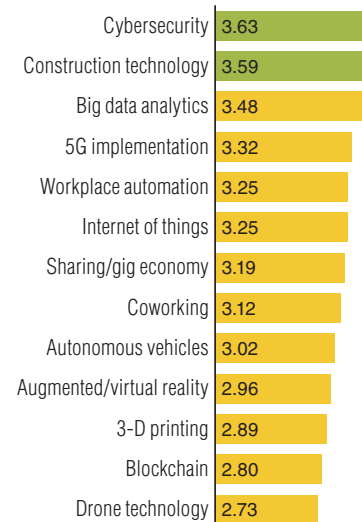
▷ **The Economy (and Real Estate Sector) Hang On:** Though real estate capital markets have settled, most anticipate overall real estate prices to fall 5 to 10 percent as income is curtailed for several years. Industrial properties, data centers, and single-family homes are expected to rise in value, while retail and hospitality properties will see the largest declines. The long-term outlook in the real estate sector hinges on the country’s ability to rein in COVID-19.

▷ **Exodus to the Suburbs:** COVID-19 is accelerating suburban growth, especially in Sunbelt markets. Appearing first in the 2020 report and now ranked second for 2021, Austin, Texas, has continued to see a surge in the suburban office and homebuilding sectors. With a greater emphasis on health and safety, the need for lower-density environments and more space has only grown. Remote work and higher taxes in large cities due to declining tourism and business tax revenue are contributing to the shift away from urban cores.

IMPORTANCE OF DISRUPTERS FOR REAL ESTATE IN 2021



Real estate industry disrupters



Source: *Emerging Trends in Real Estate 2021* survey.

▷ **“Work from Home” Changes Office Outlook:** The rapid shift to widespread remote work is considered the ultimate test of digital transformation in the workplace. Companies that invested in digital capabilities saw great success with work-from-home policies, and 94 percent of real estate professionals agree that companies will allow employees to work remotely at least part of the time in the future. As a result, some businesses will shrink their footprints as a cost-savings measure. However, more than 60 percent of professionals agree that office tenants will look to expand spaces for new ways of collaboration and interaction, while complying with social distancing measures.

▷ **The Essentials—Safety and Wellness:** Eighty-two percent of professionals agree that health and well-being will become a more important factor across all sectors of real estate. The industry will need to meet higher standards of cleanliness and safety to make tenants and customers feel safe and attract them back, particularly to hotels, office buildings, retail outlets, and restaurants. The new focus on personal safety will lead to new services and advanced technology that provide cleaner buildings, improved HVAC infrastructure, sensors, touchless entry, and contact tracing apps.

▷ **Social Justice and Racial Equity:** The industry must do more to address social and racial inequality in the United States. Nearly half (48 percent) of respondents disagree that real estate understands how past policies and practices have contributed to systemic racism. Seventy percent agree that the real estate industry can address and help end racial inequality. Existing job training and recruiting programs for minorities and underserved communities need to be supported and expanded. Real estate professionals are also evaluating efforts to invest in and develop minority and low-income neighborhoods, with an emphasis on housing and schools.

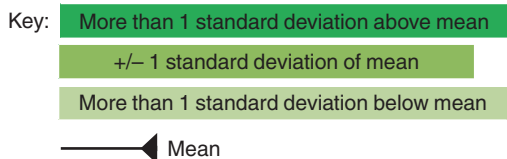
▷ **Stores Still Matter:** The next few years promise to be what one respondent called “retail’s great transition period,” as demand for larger retailers and department stores dwindles in favor of discount stores, fast fashion, and online retail. More than 80 percent of participants agreed that COVID-19 accelerated the shift in retail that likely would have occurred over the next few years. Expect to see a much smaller physical retail presence and vast amounts of vacant space with lower rents. Top brands will take advantage of lower prices to upgrade their locations, while malls will leverage empty space to improve their tenant roster or convert to distribution centers for online retailers.

▷ **Affordable Housing Remains a Major Issue:** COVID-19 has accelerated the housing disparities in the United States as many low-income workers experience unemployment and possible eviction. With state and local governments facing large revenue declines, experts agree that the federal government has the wherewithal to provide programs and resources

OVERALL REAL ESTATE PROSPECTS

1	Raleigh/Durham	41	Kansas City, MO
2	Austin	42	Omaha
3	Nashville	43	New York—other boroughs
4	Dallas/Fort Worth	44	Chicago
5	Charlotte	45	Westchester, NY/Fairfield, CT
6	Tampa/St. Petersburg	46	Pittsburgh
7	Salt Lake City	47	Tacoma
8	Washington, DC—Northern VA	48	Tucson
9	Boston	49	Cincinnati
10	Long Island	50	Richmond
11	Atlanta	51	Portland, ME
12	San Antonio	52	Houston
13	Denver	53	Milwaukee
14	Northern New Jersey	54	Birmingham
15	Phoenix	55	Sacramento
16	Cape Coral/Fort Myers/Naples	56	St. Louis
17	Inland Empire	57	Deltona/Daytona
18	Orange County	58	Detroit
19	Boise	59	Spokane, WA/Coeur d’Alene, ID
20	Washington, DC—MD suburbs	60	San Francisco
21	Indianapolis	61	Virginia Beach/Norfolk
22	Philadelphia	62	Tallahassee
23	Charleston	63	Des Moines
24	Orlando	64	Albuquerque
25	Columbus	65	New York—Manhattan
26	Greenville, SC	66	Portland, OR
27	West Palm Beach	67	Gainesville
28	Los Angeles	68	Las Vegas
29	Jacksonville	69	Honolulu
30	Miami	70	Cleveland
31	San Diego	71	Chattanooga
32	San Jose	72	Hartford
33	Fort Lauderdale	73	Oklahoma City
34	Seattle	74	Louisville
35	Madison	75	Knoxville
36	Oakland/East Bay	76	Baltimore
37	Washington, DC—District	77	Memphis
38	Jersey City	78	Providence
39	Minneapolis	78	Buffalo
40	New York—Brooklyn	80	New Orleans

Source: *Emerging Trends in Real Estate 2021* survey.



ET Canada: Finding the Right Deals

INVESTORS ACTIVE IN CANADA are looking for buying opportunities. But despite widespread agreement about the outlook for some asset classes, interviewees say that the right opportunities have been slow to materialize. Many believe it is because we are in a time of price discovery and that until some of the uncertainty dissipates and buyers and sellers converge on the value of an asset, there will be fewer transactions.

“We’re finally getting rent increases that we’ve wanted, we’re awash in cash and don’t know what to do with it,” said one interviewee, whose company’s portfolio includes industrial assets. The company has been “very challenged to find product worth owning,” the interviewee added.

Also affecting deal flow is an ongoing flight to quality. Investors are looking carefully for the best assets worth paying more for while making price adjustments for riskier opportunities and those outside their core competencies. Prudence reigns, leading many to take a wait-and-

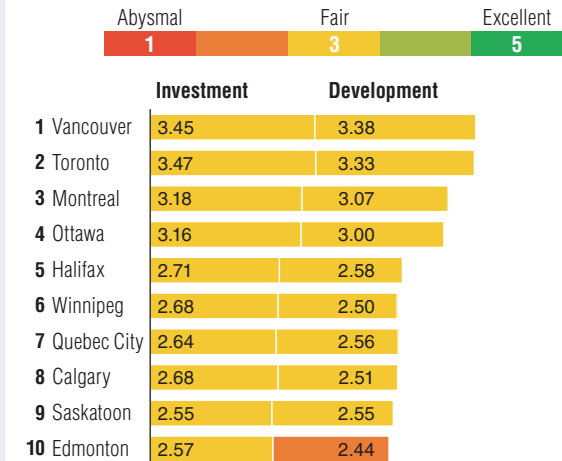
see approach while they line up capital for potential opportunities.

Our survey showed a significant rise from last year in the number of respondents who believe that capital is undersupplied, which may reflect the current environment of prudence and price discovery. But overall, there is a general feeling that debt capital markets are in balance; there also is a sentiment from many interviewees that Canada—which has seen consistent growth in foreign direct investment in real estate in recent years—is in a good position to be even more attractive to investors seeking stability in the current environment.

In the meantime, deals are still happening. While we have yet to see many

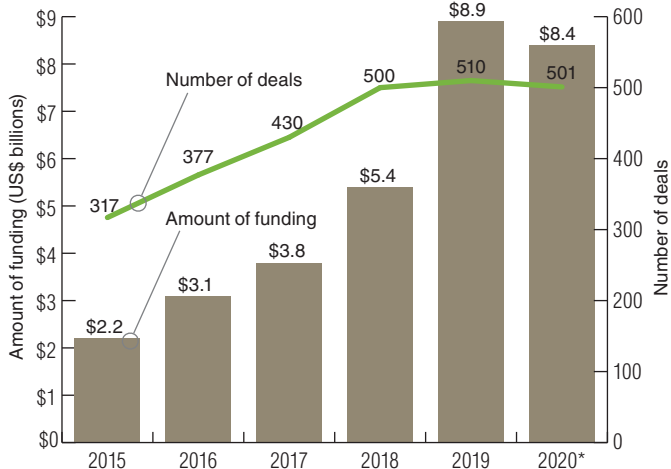
large publicly announced deals, we are seeing private transactions behind the scenes. Many have involved joint ventures or partnerships aimed at injecting liquidity into organizations that need it and to de-risk projects.

CANADA MARKETS TO WATCH: OVERALL REAL ESTATE PROSPECTS



Source: *Emerging Trends in Real Estate 2021* survey.

REAL ESTATE TECH GLOBAL FINANCING HISTORY



Source: CB Insights, accessed September 9, 2020.

*Full-year projection.

to this problem, including the expansion of the Low-Income Housing Tax Credit and Section 8 vouchers.

▷ **The Great Fiscal Challenge:** Real estate taxes—generally the largest source of local government revenue—are likely to decline as hotels and shopping centers (and potentially offices) lose tenants and value. Long-term revenue declines will affect all government services but could be particularly impactful on infrastructure investments, a critical need (not just for real estate) this report has highlighted for many years. An analysis by the National League of Cities predicts 65 percent of cities will delay or cancel infrastructure projects because of COVID-19.

Now in its 42nd year, *Emerging Trends in Real Estate*® is one of the most highly regarded annual industry outlooks for the real estate and land use industry. It includes interviews and survey responses from 1,687 leading real estate experts. ULI members may download a copy from Knowledge Finder, knowledge.uli.org.

EMERGING TRENDS: EUROPE

Real Estate Faces “Hugely Challenging Time” but Maintains Long-Term Appeal Due to Low Interest Rates

Berlin tops the rankings for overall real estate prospects, according to the joint PwC/ULI report, leading a strong showing from German cities demonstrating resilience amid COVID-19.

EUROPE’S PROPERTY SECTOR IS IN THE MIDST of a cyclical downturn that is coinciding with long-term structural changes to real estate, according to the 18th edition of the *Emerging Trends in Real Estate® Europe* report published by ULI and PwC. However, real estate generally is seen as one of the few asset classes to generate acceptable returns at a time of low or negative interest rates.

The survey of almost 1,000 industry leaders from across Europe says that retail and offices will be most affected, due to widespread uncertainty related to rent collections amid the pandemic. This has led to investors increasingly assessing the underlying operational risk of the occupiers and focusing on their own strengths as operators of real estate to keep the income secured.

Capital flows into the sector are altering how funds can be deployed. While a majority still expects Asian capital flowing into Europe to increase, this percentage is significantly lower than in previous years, with interviewees citing the inability of overseas investors to visit a property in Europe before purchase.

The challenges around business travel and the risk of future lockdowns are raising concerns about deal sourcing. The industry had been working through a pipeline of deals that originated pre-pandemic, subject to conventional due diligence, and mostly with existing partners.

However, the assessment of new opportunities within restrictions and the difficulty of building new relationships in the “Zoom era” might significantly slow down transaction volume further going forward. But this could give an advantage to those players with a greater footprint and with resources already in place in more countries. This could benefit real estate markets in the bigger countries, such as Germany, that have sufficient critical mass and which may

present the possibility for investors to travel domestically to see properties and overcome some of the restrictions.

The “digital switch,” the increased pace of digitalization around the globe boosted by COVID-19, is also having an impact on investors’ sector preferences, with logistics, data centers, and communications towers and fiber identified as having strong potential. In addition, life sciences and health care are coming out favorably, a trend accelerated by COVID-19, as well as residential real estate, which is still high on the list of investors’ interests.

Lisette van Doorn, CEO of ULI Europe, says, “European real estate is at a turning point, trying to work out its future role in society while facing the cyclical challenges following the outbreak of the pandemic earlier this year and the ongoing uncertainty this creates.”

OVERALL REAL ESTATE PROSPECTS

Overall rank		Overall prospects
1	Berlin	2.20
2	London	2.12
3	Paris	2.09
4	Frankfurt	1.87
5	Amsterdam	1.86
6	Hamburg	1.77
7	Munich	1.77
8	Madrid	1.55
9	Milan	1.25
10	Vienna	1.24
11	Dublin	1.20
12	Brussels	1.18
13	Barcelona	1.16
14	Warsaw	1.15
15	Lisbon	1.09
16	Stockholm	1.01
17	Luxembourg	0.97
18	Copenhagen	0.97
19	Helsinki	0.81
20	Zurich	0.71
21	Lyon	0.64
22	Manchester	0.63
23	Rome	0.60
24	Prague	0.59
25	Birmingham	0.57
26	Budapest	0.47
27	Edinburgh	0.45
28	Athens	0.45
29	Oslo	0.41
30	Istanbul	0.36
31	Moscow	0.15

- ▲ More than 1 standard deviation above mean
- +/- 1 standard deviation of mean
- ▼ More than 1 standard deviation below mean

Source: *Emerging Trends in Real Estate® Europe 2021* survey.

SECTOR PROSPECTS IN 2021

Overall prospects	Rank	Investment	Rank	Development	Rank	Income
1 Data centres	1	○ 4.55	1	○ 4.45	1	○ 4.30
2 Logistics facilities	2	○ 4.51	2	○ 4.39	3	○ 4.21
3 Life sciences*	3	○ 4.43	3	○ 4.32	4	○ 4.09
4 New energy infrastructure*	5	○ 4.29	4	○ 4.26	2	○ 4.23
5 Industrial/warehouse	6	○ 4.24	5	○ 4.12	5	○ 3.92
6 Health care	7	○ 4.18	7	○ 4.02	6	○ 3.90
7 Private rented residential	9	○ 4.12	8	○ 4.02	8	○ 3.84
8 Affordable housing	8	○ 4.12	6	○ 4.04	9	○ 3.69
9 Communication towers/fibre*	4	○ 4.36	13	○ 3.62	7	○ 3.86
10 Social housing	11	○ 3.96	9	○ 3.92	13	○ 3.65
11 Retirement/assisted living	10	○ 4.00	10	○ 3.87	11	○ 3.66
12 Self-storage facilities*	12	○ 3.94	11	○ 3.85	10	○ 3.68
13 Housebuilding for sale	13	○ 3.71	12	○ 3.74	12	○ 3.65
14 Co-living	14	○ 3.47	14	○ 3.46	14	○ 3.38
15 Student housing	15	○ 3.36	16	○ 3.28	15	○ 3.16
16 Serviced apartments	16	○ 3.33	15	○ 3.32	16	○ 3.12
17 Central city offices	17	○ 3.21	18	○ 2.93	17	○ 3.10
18 Parking	20	○ 3.08	17	○ 3.06	18	○ 3.10
19 Business parks	18	○ 3.16	20	○ 2.79	19	○ 2.94
20 Flexible/serviced offices and co-working	19	○ 3.08	19	○ 2.80	20	○ 2.79
21 Suburban offices	21	○ 2.81	21	○ 2.54	21	○ 2.78
22 Retail parks	22	○ 2.78	23	○ 2.30	22	○ 2.53
23 Leisure	23	○ 2.66	22	○ 2.49	23	○ 2.38
24 High street shops	24	○ 2.45	25	○ 2.14	24	○ 2.27
25 Hotels	26	○ 2.21	24	○ 2.15	27	○ 2.01
26 City centre shopping centres	25	○ 2.24	26	○ 1.87	25	○ 2.10
27 Out-of-town shopping centres/retail destinations	27	○ 2.11	27	○ 1.78	26	○ 2.02

○ Generally good = above 3.5 ○ Fair = 2.5–3.5 ○ Generally poor = under 2.5

Source: *Emerging Trends in Real Estate® Europe 2021* survey.

“COVID-19 has fast-forwarded a number of trends already started—for example, related to digitalization, remote work, and online shopping—but given the artificial environment amidst ongoing lockdowns and government support to employees and businesses, it remains hard to work out the long-term impact.

“The search for yield, which is now even more dominant than pre-COVID, continues to attract investors to real estate, especially core and income-generating, such as residential that continues to appeal to investors, in the ‘safest havens’ across Europe.”

Gareth Lewis, real estate director at PwC U.K., says, “The pandemic has amplified a number of previously identified structural trends. These include the uptick in e-commerce and remote working, causing investors and the industry at large to reexamine the historical risk-and-return profile for many types of real estate.

“It’s clear that, at this time of significant uncertainty, investors continue to see Europe’s core cities as safer bets and there remains cautious optimism. With London jumping up two places to second in the rankings—despite the challenges faced by all major cities—many investors see the long-term value.

“Further, central banks’ decisions to depress interest rates for the foreseeable future may see an uptick in investment activity as pent-up capital is deployed.”

Simon Hampton, real assets leader at PwC U.K., says, “The uncertainty of this year has shifted priorities in the sector. We’ve seen a move away from the mainstay sectors of retail, hospitality, and leisure; a pause in relation to office; and a strengthening demand for alternative sectors such as housing, data centers, life sciences/health, energy, and communications infrastructure; and a continued desire for industrial property and logistics warehouses—which all benefit from growing demand in this new environment.

“There’s a growing requirement to look more closely at the value that can be derived from these demand shifts, and newer, emerging asset classes. Investors in the sector are therefore looking beyond real estate and into broader real assets—the built environment and infrastructure that surround us. These are all inextricably linked—not only to one another, but to how we live, work, consume, and spend our leisure time.”

Angus Johnston, real estate leader at PwC U.K., says, “The real estate industry faces a uniquely challenging period combining a potential recession in the immediate term and series of structural challenges in the medium term. Both are likely to lead to changes to the use and value of our existing stock of real estate. How these challenges play out and how the industry responds to them will define the future shape of our sector.”

Investing in Society

Following COVID-19, environmental, social, and governance (ESG) strategies have gained far more interest. With many already committed to reducing the environmental impact of the built environment, executives surveyed now see growing importance for the social aspects of their strategies.

“2020 has also seen the real estate world begin to evaluate its wider role in society more seriously—from addressing diver-

sity and inclusion in the workplace to a far greater emphasis on the environmental, social, and governance agenda,” Lewis says. “The social upheaval brought about by COVID-19 has the potential to accelerate the growth and prominence of impact investing in the built environment, with social impact increasingly being considered as part of an overall strategy rather than a specific investment strategy via specialist funds or products, although there is still a long way to go.”

European Cities Ranked for Investment and Development Prospects

Some comfort is to be taken from the fact that there has not been a late-cycle development boom, meaning that ahead of potential business failures, European real estate supply and demand are broadly in balance; stalwarts like Berlin, London, and Paris are still being backed for their long-term prospects.

The city rankings in this year’s report reflect both the caution and opportunities driving the market, with a focus on cities believed to offer liquidity and stability. Berlin tops the list as the overall favorite for prospects in 2021, with investors encouraged by the relatively strong performance in tackling COVID-19 by Germany as a whole.

Real estate executives were cautious about the overall outlook, with interviews undertaken between July and September resulting in a marked decline in business confidence, with 28 percent seeing a decrease in business confidence compared with 13 percent in 2019.

In addition, 44 percent anticipated a fall in profitability compared with 15 percent in 2019. Epidemics or pandemics caused 88 percent of those polled to be “concerned” or “very concerned,” while 79 percent were concerned or “very concerned” about international political stability.

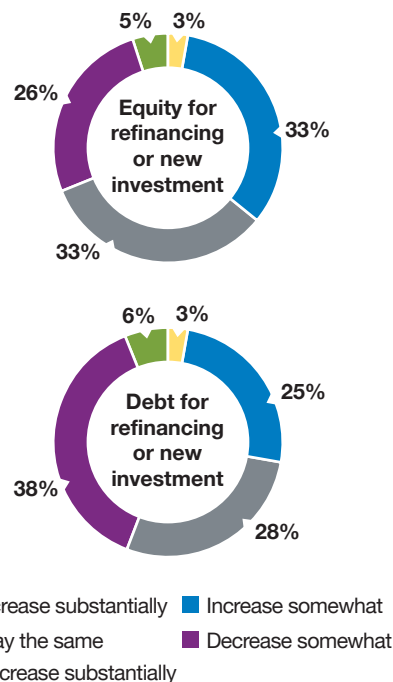
Those surveyed saw better news in the prospect of central banks’ “lower for longer” interest rates, seeing reassuring levels of real estate investment activity even during the depths of Europe’s first lockdown, with many citing “pent-up capital” waiting to be deployed.

Capital Markets

Domestic investors are expected to come to the fore in 2021, with intercontinental travel severely limited for North American and Middle Eastern investors.

A majority (53 percent) of respondents expect Asian investors, who are seen as recovering first from the COVID-19 pandemic, to increase their investments in Europe in 2021, although this percentage is significantly lower than in previous years. About a third expect European investors to increase their commitments next year and a small majority expect this to stay stable. However, 51 percent of respondents expect North American investors to decrease their investments into Europe.

AVAILABILITY OF EQUITY AND DEBT FOR REFINANCING/NEW INVESTMENT IN 2021



Source: Emerging Trends in Real Estate® Europe 2021 survey.

Top 10 Sector Prospects

Three of the top four property types in Emerging Trends Europe’s sector rankings are likely to benefit from the increased pace of digitalization around the globe, a change boosted by COVID-19, including data centers, communication towers and fiber, and logistics facilities.

Life sciences also has been cast in a new light by COVID-19, with many developers and investors scrambling to learn about a sector that has traditionally been highly specialized but where strong potential is seen, given long-term demographic trends, and the anticyclical nature of the sector.

Residential remains highly favored by investors, with three sectors in the top 10. Respondents did raise concerns around increased regulation, however.

Given the strong growth of remote work and uncertainty regarding the future role of the workplace, no office sectors feature in the top 10 this year; even flexible/serviced and coworking have slipped down the rankings as the industry is taking a wait-and-see approach. **UL**

EMERGING TRENDS: ASIA PACIFIC

Asia's Resilient Real Estate Market Braces Itself for Market Correction

Singapore, Tokyo, and Sydney remain bright stars.

WHILE THE SUCCESS OF ASIA PACIFIC GOVERNMENTS in containing the spread of COVID-19 has helped limit its impact on local real estate markets, concerns are growing that a correction may be in the cards next year, according to the *Emerging Trends in Real Estate® Asia Pacific 2021* report jointly published by ULI and PwC.

The report names three markets where stress seems likely to surface. First is China, where a liquidity squeeze is creating bank financing challenges for smaller developers. Second is India, where the implosion of local nonbank finance companies has created opportunities for foreign private-equity funds. And third is Australia, where the economic impact has

been most acute and where greater market transparency is likely to open up more buying prospects.

Singapore, Tokyo, and Sydney continue to rank as the top three markets for investment and development prospects in the region. These markets each promise a sense of safe harbor in an increasingly hostile global environment, in terms of both geopolitical and economical risks. Seoul rose steeply in this year's investment prospects rankings as South Korea enjoys the benefit of a deep domestic economy that allows assets to be brought or built with a view to serving domestic demand rather than outwardly facing geopolitical risk. Ho Chi Minh City once again is seen as the sole emerging-market city with the best prospects for growth, boosted by its successful containment of the pandemic and a rapidly growing economy spurred by the escalating trade tensions between the United States and China.

"The Asia Pacific region has been remarkably resilient to the challenges faced by coronavirus, particularly compared to Western markets, but we expect to see some market correction," says David Faulkner, president of ULI Asia Pacific. "Despite the common rhetoric that the pandemic has ignited many changes to our society, what we have seen so far in the real estate sector is an acceleration of trends already underway before the arrival of COVID-19. ESG [environmental, social, and governance] themes are

one example of this, as is a movement by developers toward designing general-purpose structures that can be adapted to serve multiple purposes over their lifetimes."

K.K. So, Asia Pacific real estate tax leader for PwC, says, "2020 has certainly been a challenging year for Asia Pacific real estate, witnessing a steep decline in transaction volumes. However, investors in the region remain nimble and are already grasping opportunities emerging from the crisis. While remaining focused on mainstream asset classes, they are also looking at other sources of reliable income streams in a down-trending market."

Sectors to Watch

The report highlights that logistics will probably be the asset class that emerges from the pandemic strongest as it continues to witness sustained demand, driven by

CITY INVESTMENT PROSPECTS

Generally poor Fair Generally good

1	Singapore	6.24
2	Tokyo	6.04
3	Sydney	6.00
4	Seoul	5.72
5	Ho Chi Minh City	5.66
6	Melbourne	5.58
7	Shanghai	5.55
8	Osaka	5.54
9	Shenzhen	5.51
10	Guangzhou	5.11
11	Taipei	5.06
12	Beijing	4.98
13	Auckland	4.93
14	Bangkok	4.83
15	Mumbai	4.82
16	Jakarta	4.67
17	China-second-tier cities	4.64
18	New Delhi	4.62
19	Manila	4.56
20	Kuala Lumpur	4.48
21	Bangalore	4.37
22	Hong Kong	4.18

Source: *Emerging Trends in Real Estate® Asia Pacific 2021* survey.

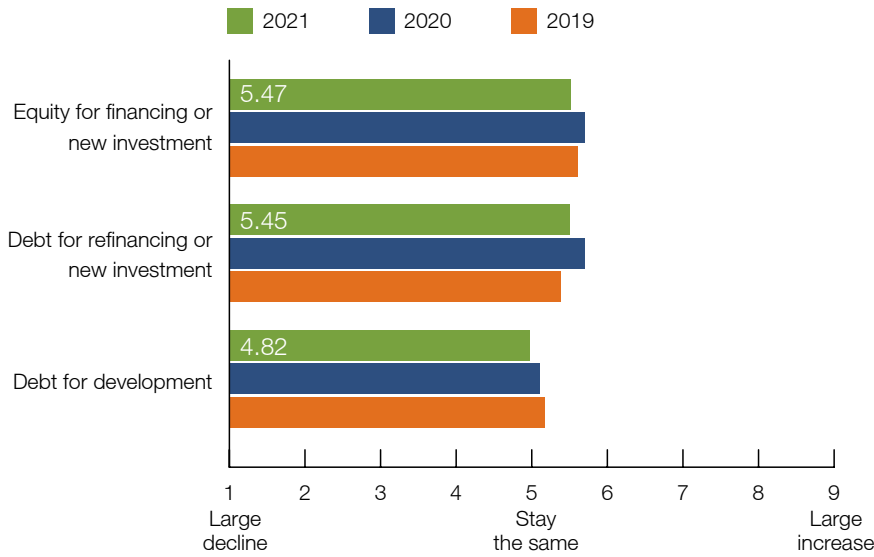
CITY DEVELOPMENT PROSPECTS

Generally poor Fair Generally good

1	Singapore	5.72
2	Sydney	5.70
3	Tokyo	5.68
4	Ho Chi Minh City	5.65
5	Shenzhen	5.43
6	Melbourne	5.32
7	Seoul	5.31
8	Shanghai	5.30
9	Osaka	5.22
10	Guangzhou	5.09
11	Taipei	4.90
12	Beijing	4.75
13	Manila	4.72
14	Auckland	4.71
15	China-second-tier cities	4.71
16	Bangkok	4.69
17	Mumbai	4.64
18	Jakarta	4.61
19	Bangalore	4.57
20	New Delhi	4.51
21	Kuala Lumpur	4.47
22	Hong Kong	3.95

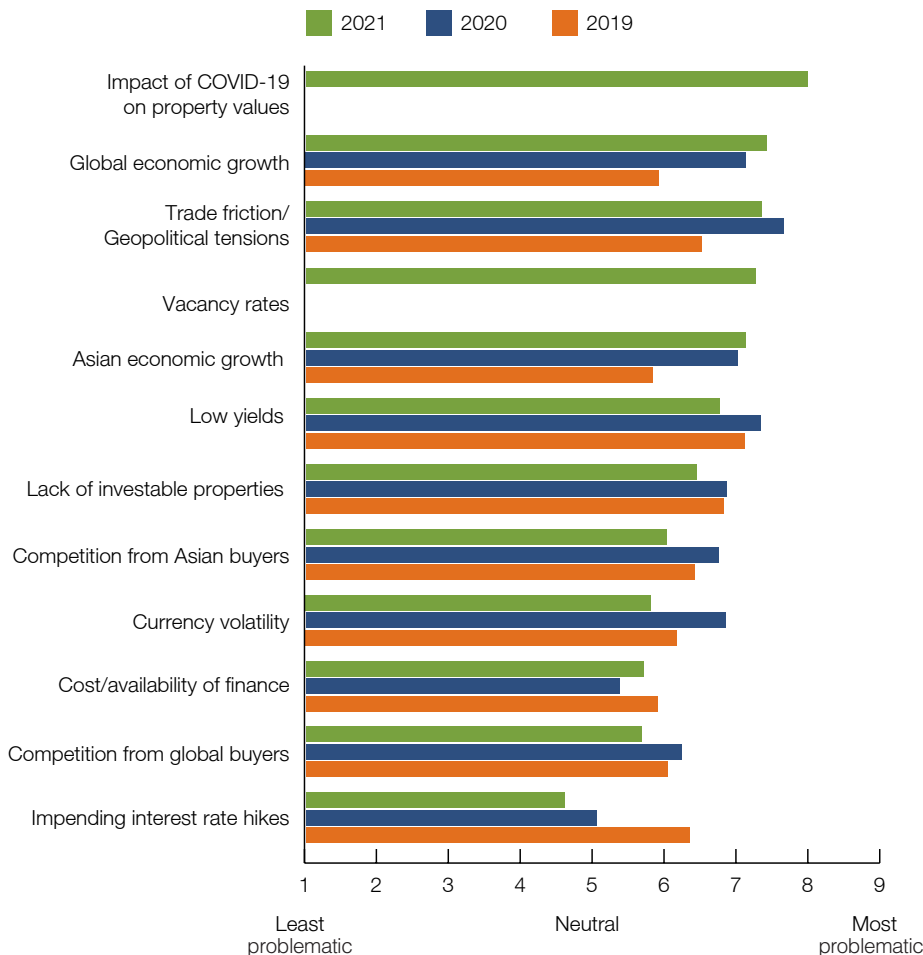
Source: *Emerging Trends in Real Estate® Asia Pacific 2021* survey.

EXPECTED CHANGE IN AVAILABILITY OF DEBT AND EQUITY FINANCE



Source: *Emerging Trends in Real Estate® Asia Pacific 2021 survey.*

MOST PROBLEMATIC ISSUES FOR REAL ESTATE INVESTORS



Source: *Emerging Trends in Real Estate® Asia Pacific 2021 survey.*

several cyclical and structural drivers, in particular the robust growth in e-commerce.

Meanwhile, residential sectors in the Asia Pacific region have remained surprisingly resilient to the impact of COVID-19, despite threats of economic downturns. In an environment of uncertainty, this upbeat consumer sentiment—together with an equally reliable long-term mortgage and rent payment track record—earmark the residential sector as a defensive asset class that investors in the region are targeting.

Other trends of note include the following:

- ▷ Asian companies are divesting real estate corporate assets in the form of sale-and-leaseback transactions;
- ▷ Positive signs point to growing demand for green debt in the Asia Pacific region;
- ▷ Respondents in the Asia Pacific region tend to be less in favor of a long-term work-from-home trend;
- ▷ Travel bans have affected markets with more international investors, such as Australia;
- ▷ There is a standoff between buyers and sellers over asset pricing; and,
- ▷ Hot desking may soon be a thing of the past.

The *Emerging Trends in Real Estate® Asia Pacific 2021* report is based on a survey of 391 real estate professionals, as well as 134 interviews, including investors, developers, property company representatives, lenders, brokers, and consultants. The full report is available on Knowledge Finder or at asia.uli.org/emerging-trends. **UL**

Drones for Development

The pandemic has accelerated the use of contactless drones for comprehensive applications in real estate development.

IN RECENT YEARS, drones have increasingly provided affordable aerial photographic imagery that was previously performed using less-maneuverable and less-agile airplanes and helicopters. Drones initially were used primarily for marketing, but developers are discovering new ways that drone applications can improve results at multiple stages of real estate acquisition, planning, design, development, finance, construction, marketing, leasing, management, maintenance, repositioning, and sale.

Since the Federal Aviation Administration (FAA) authorized the use of commercial drones in June 2016, their use has grown significantly, and the global market for their use in the real estate and construction industry has been projected to

reach a cumulative market value of \$20.5 billion by 2025. Professional service firms use drone pilots who are specifically trained and licensed, and imagery costs may range from a few hundred dollars to several thousands of dollars. Companies like San Francisco–based DroneHive often use software data analytics to augment aerial imagery, particularly for applications that require regular inspection and monitoring.

With declining drone pricing and an increasing number of applications, some real estate developers have established in-house drone teams. FAA rules permit operators to fly drones under 55 pounds (25 kg) at altitudes below 400 feet (122 m). The FAA also requires operators to obtain a remote pilot certificate, which demonstrates that operators understand the regulations, operating requirements, and procedures for flying drones safely.

Drone manufacturer DJI, based in Shenzhen, China, makes the Phantom 4 RTK, a quadcopter system specialized for mapping and priced under \$10,000. Since drone service companies typically have sophisticated artificial intelligence programs and expert analysts for such things as roof inspections, they now permit clients to upload their in-house drone teams' images for professional analysis and compar-

ison. While drone package deliveries have received widespread press coverage, they remain mostly in testing phases.

With the impetus of the pandemic, developers may expect increasing use of drones in almost all aspects of real estate. Impediments imposed by the pandemic to traditional travel to multiple places for on-site human inspection by stakeholders, investors, planners, architects, surveyors, engineers, contractors, lenders, appraisers, insurers, government officials, and other parties have accelerated the need for technological solutions that drones can provide with more flexibility, higher quality, and lower expense than with traditional methods.

Ubiquitous availability of online satellite imagery by Google Earth, Google, Apple, and Bing Maps has vastly improved developers' ability to visually assess locations for potential acquisition and development. But the dates of such images vary widely, and the images are static as of the dates of infrequent flights. Also, the imaging is not targeted specifically to the assessment of a property for potential development.

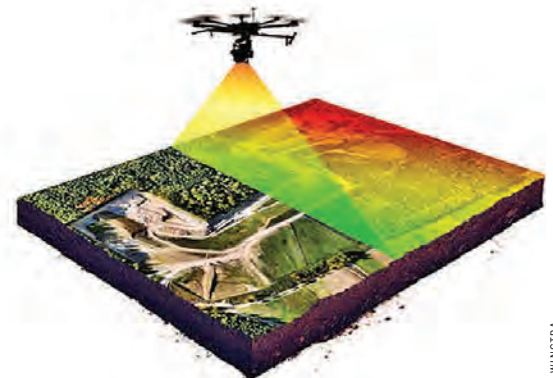
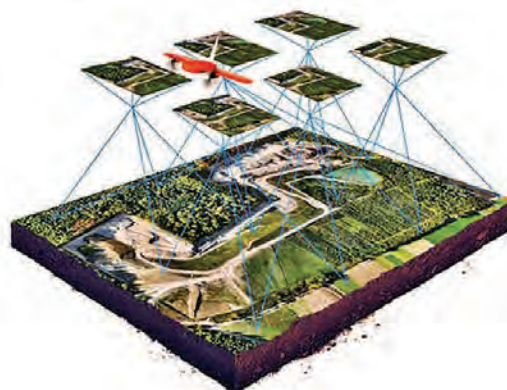
By contrast, drone imagery can be current, repeated at regular or specific intervals, and used to chart progress during development.

Quadcopter drone systems specialized for mapping, available for under \$10,000, provide affordable aerial photographic imagery.

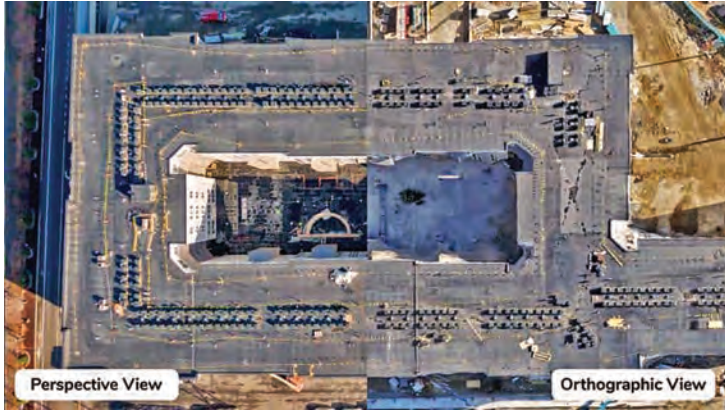


DRONEBASE

Photogrammetry captures a large number of overlapping high-resolution photos and uses triangulation to generate a 3-D map. By contrast, a LIDAR sensor emits pulses of laser light and measures the exact time it takes for these pulses to return, thereby generating precise measurements. It can capture building structure and helps in wetland and brownfield delineations.



WINGTRA



DRONEBASE

Drone imagery can produce surveys and contour overlays and may be combined to produce panoramic images and ortho-mosaics, which are corrected for lens distortion, camera tilt, perspective, and topographic relief to achieve a uniform scale across the image, as shown above comparing perspective and orthographic views.

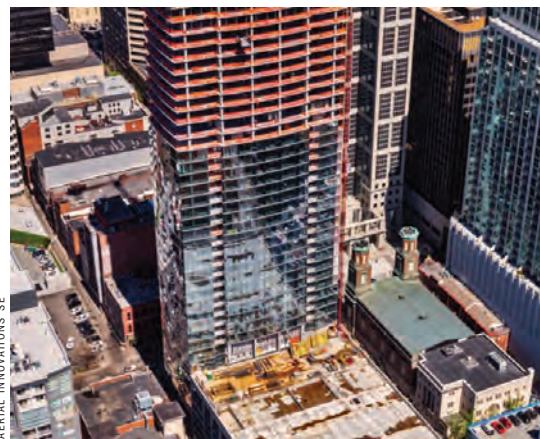
Repetition at specific intervals can reveal a time-based series of patterns that are difficult to produce by other means. The aerial images can be at higher resolution than satellite photography and they may be combined with a variety of sensors, such as passive thermal and active infrared sensors, telescopic zoom cameras, and pulsed laser LIDAR (light detection and ranging) to make very specific measurements of property conditions. In addition, the images may be combined with artificial intelligence systems to read, compare, analyze, and pinpoint anomalies and to identify changes in conditions over time. The imagery can produce surveys and contour overlays and may be combined to produce panoramic images and orthomosaics (those that are corrected for lens distortion, camera tilt, perspective, and topographic relief to form a uniform scale across the image). Such imagery can provide survey-level data at a fraction of the cost of using on-ground crews.

Site Selection

Developers contemplate the wide range of uses of drones to rationalize and improve the development process, especially in the wake of the pandemic, which has created considerable distress in many property sectors. Since surface parking is

still predominant and easily visible, and since the pandemic has diminished public transit ridership in favor of cars as protected spaces for mobility, traffic and parking patterns may reveal relative strengths and weaknesses among property competitors for different markets. And since quantitative market research is more time-consuming than visual imagery and deals with lagging indicators compiled over time, drone imagery may be a faster and more intuitive way to reveal changing patterns.

For example, many retail centers have suspended operations,



AERIAL INNOVATIONS SE

Drones can be particularly useful in monitoring progress in construction of high-rises. In the early stages of design, viewshed studies can greatly influence floor plate design, showing which views to optimize and which to avoid. Accurate views at specific elevations can show where to place windows and balconies, which, in turn, can be reflected in projected price and rent levels.



ID-LIDAR-CR-XI LI-UNIV. OF TOLEDO

Drone aerial images can be combined with a variety of sensors, such as passive thermal and active infrared sensors, telescopic zoom cameras, and pulsed laser LIDAR, to make very specific measurements of property conditions. This helps in wetland and brownfield delineations. In addition, the images may be combined with artificial intelligence systems to read, compare, analyze, and pinpoint anomalies and to identify changes in conditions over a series of images.

deferred rents, and lost tenants due to sudden and massive changes in consumption patterns. To gain a comprehensive overview of the current condition of multiple competing centers, the most effective way may be to compare and contrast such centers in real time, comparing actual use patterns that can be revealed through traffic and

parking patterns at similar times of the day, week, or season.

While assessing multiple retail sites at different times might be the most obvious use of drones, observing office locations, especially office parks, could be effective to the extent that traffic and parking patterns reveal which office parks retain and attract larger



DRONEGENUITY

Aerial views of retail centers can yield comprehensive images of traffic capacity and congestion, entrance locations, parking demand and supply, roof conditions, and neighborhood context.



DRONEGENUITY

The combination of drone imagery with artificial intelligence and data analytics can be used to calculate capacity for solar arrays.



DRONEGENUITY

Drones can monitor and inspect solar arrays on large industrial buildings.



DRONEGENUITY

Once construction has begun, stockpiles of materials and equipment can be stored on site in a way that can be accurately monitored with drone images, helping ensure security and reduce pilferage and waste. Progress on large-scale projects, like this tilt-up industrial building, can be captured and communicated quickly.

numbers of users. Suburban hotels, which exhibit daily occupancy fluctuations, also could be good candidates.

Traffic to industrial sites may show which locations experience greater use as distribution centers for increased rapid individual package delivery of goods. For example, demand has increased for refrigerated warehouses closer to denser populations that have surge capacity to accommodate food deliveries to homes.

Since housing occupancy fluctuates less rapidly, multifamily

projects' parking variation could be less dramatic. But the ability to show differences among competing projects, with different local and neighborhood amenities, could reveal residential tenants' preference patterns. With increased migration away from cities to suburban areas stimulated by widespread remote working, drone imagery of competing neighborhoods can reveal changing growth patterns.

Planning

Since the predominant pattern for land use permitted by planning and zoning codes is still single-use districts, one might expect less variation to be revealed by drone imagery. However, progressive planning changes are beginning to change that. With a 2019 statute, Oregon became the first state to require cities with populations greater than 10,000 to allow duplexes on lands

zoned for single-family, and in those with populations greater than 25,000, to allow townhouses, cottage clusters, duplexes, triplexes, and quadplexes on lands zoned for residential uses within urban growth boundaries. Drone imagery could be the most effective way to identify promising locations in which to plan and develop higher-density housing that provides more privacy than multifamily projects, while eliminating shared spaces that have been spurned during the pandemic.

While such legislation is still restricted to residential uses, recent preference patterns of millennials for walkable mixed-use environments have spurred substantial changes in formerly suburban communities for larger scale "suburban" mixed-use development. (See "Shared Parking Leads to Creative Solutions," *Urban Land*, Summer 2020, pages 70-75.)

Drone imagery can reveal which larger sites, such as retail centers or office parks, could be attractive locations for suburban development that is close enough to urban amenities to integrate into walkable environments that can build on the gridded infrastructure of the original towns and villages that were absorbed into metropolitan areas. When such projects are commenced, drone imagery can be used to update a wide variety of stakeholders, investors, owners, contractors, lenders, insurance companies, and municipalities interested in these projects, which often involve public/private partnerships.

Parking and Traffic Analysis

Use of drone imagery is ideal for parking and traffic analyses. Unlike the static aerial images that show parking supply and demand at a single time, the ability to undertake



DRONEGENUITY

Impediments imposed by the pandemic to traditional travel to multiple locations for on-site human inspection by various parties have accelerated the need for technological solutions that drones can provide.



DRONEGENUITY



DRONEBASE

In the pandemic age, drone imagery can serve to verify social distancing, the wearing of masks and helmets, and other procedures intended to protect construction workers.

Designers can use these images as base maps upon which to model alternative project designs. Viewshed studies can greatly influence floor plate design showing which views to optimize and which to avoid. Accurate views at specific elevations can show where to place windows and balconies, which, in turn, can be reflected in projected price and rent levels. Shadow mapping from surrounding buildings and from proposed designs can influence where to place public outdoor spaces. And drone imagery can be critical to identify optimal

multiple images correlated to time of day, week, or season creates both a visual and quantitative tool to measure actual patterns of parking supply and demand. These can function as a kind of time-lapse imagery of project operation. Some drone services, like Toronto-based SkyDeploy, integrate artificial intelligence software to measure and quantify changes over time.

Such patterns can also reveal how much parking area could be reused for different purposes without adversely affecting existing operations. Different uses can be integrated into the site that can take advantage of shared parking, which, in turn, can maximize synergies, land use productivity, and profitability while expanding municipal tax bases. Visual evidence of empty parking spaces can be compelling evidence for developers trying to convince officials and lenders to reduce parking requirements.

In more urban situations, drone imagery can be used to show use patterns of on-street parking that can lead to parking management policy changes to increase use to support surrounding land uses, thereby freeing up off-street parking lots for more productive purposes. Since the public is the largest owner of parking spaces through its on-street parking network, comprehensive analysis and surveillance can lead to far more efficient use of public resources.

Denser cities explore real-time efficiency solutions. To stimulate solutions to reduce urban traffic congestion, Siemens Mobility solicited proposals in 2015 to use “quadcopters to find free spots, the shortest path to those spots, and finally [to] guide the driver to the best spot.”

Drones can also track and reveal traffic congestion flow patterns specific to time and location that can reveal better sites upon which to develop potential projects. They may also suggest the most appropriate locations for entrances to projects, road conditions that may need to be improved, lane capacity, or traffic light locations and sequencing that can be optimized.

Project Design

Drone imagery is particularly helpful in project design. Visualizing the whole site, as well as its constituent parts, from different perspectives is difficult with an in-person, on-the-ground site visit. The sophistication of current cameras and software enables detailed site-mapping and the ability to export contour maps and three-dimensional (3-D) imagery. Service companies like Santa Monica, California-based Drone-Base use LIDAR and photogrammetric aerial data to produce mapping accuracies to the centimeter level. Photogrammetry captures a large number of overlapping high-resolution photos and uses triangulation to generate a 3-D map. By contrast,

a LIDAR sensor emits pulses of laser light and measures the exact time it takes for these pulses to return, thereby generating precise measurements. It can capture building structure and helps in wetland and brownfield delineations.

Unlike static aerial images that show parking supply and demand at a single time, multiple images correlated to time of day, week, or season create both a visual and quantitative tool to measure actual patterns of parking supply and demand. This can function as a kind of time-lapse image of project operation. Some drone services integrate artificial intelligence software to measure and quantify changes over time.



DRONEGENUITY



DRONEGENUITY



DRONEGENUITY

Many retail centers have suspended operations, deferred rents, and lost tenants due to sudden and massive changes in consumption patterns. To gain a comprehensive overview of the current condition of multiple competing centers, the most effective approach might be to compare and contrast such centers in real time, comparing actual use patterns that can be revealed through traffic and parking patterns at similar times. Such images also can reveal portions of the site that could be redeveloped.

sites on which to place solar arrays for maximal insolation.

Such specific data are also critical for site design, erosion control, slope measurement, and drainage patterns, and give the most accurate assessment of current vegetation. Jake Fingert, general partner at New York- and Washington, D.C.-based Camber Creek venture capital firm, which invested in property technology companies, notes that such terrain data “can help potential purchasers evaluate challenging issues, like how the property would fare in a flood.”

Construction

Engineers and contractors involved in design-build projects can model alternative solutions to problems

raised during design that are revealed using drone imagery. As a project reaches construction staging, such data can be used to calculate quantities of material that need to be removed from or brought to a site. Once construction has begun, stockpiles of materials and equipment can be stored on site in a way that can be accurately monitored with drone images, which can help ensure security and reduce pilferage and waste. “Now, construction teams use drones to monitor supply inventory across large project sites, so they can better manage delivery of new bricks, steel, or other supplies,” Fingert says.

Perhaps the most critical function during construction is to record progress on a regular basis,

thereby reducing the number of people who need to visit a site, such as lenders verifying construction loan draw applications. In the pandemic age, such imagery can also serve to verify social distancing, the wearing of masks and helmets, and other labor use procedures intended to protect construction workers. Service companies, like Hudson, Massachusetts-based Dronegenuity, monitor construction projects nationwide. Houston-based SiteAware provides real-time digital verification using digital twinning photogrammetry to compare actual construction against design documents. That can be particularly useful for proper installation of glazing systems, some of which have generated considerable construction defect litigation.

Finance, Appraisal, and Insurance

Although visual data are most valuable for areas of development that deal daily with its physical characteristics, the data produced by drone imagery can also be used for finance, appraisal, insurance, and litigation.

Using drone imagery to search for properties distressed by the pandemic may equip investors in private-equity funds to identify and

capitalize on opportunities before others do. Hedge fund operators have already used aerial imagery to assess parking lot traffic at retail sites to identify—before quarterly reports—which retailers’ sales might advance, and which might decline, in order to optimize buy/sell decisions. With such foreknowledge, developers and redevelopers of distressed properties may be able to generate predevelopment equity that might otherwise be unavailable. Construction lenders may more efficiently monitor loan draw applications to verify that supplies and equipment have been attached as fixtures and generate a time-stamped visual record. Permanent lenders could use drone imagery to verify stages of pre-takeout commitment construction, completion, and stabilized leasing.

Appraisers can use drone imagery to identify, locate, and describe the most comparable properties to proposed projects using current images of conditions at each comparable to update market database information. With the pandemic causing large-scale disruptions in a wide variety of property types, an appraiser of retail, hotel, or office sites would want to have more timely, accurate, and contactless indications of actual traffic to assess potential income streams.

Inspection of both development sites and completed projects is critical to property and casualty insurers. Continual activity at construction sites creates conditions that may result in serious collapses and other accidents. A continual visual record of conditions may help prevent such casualties, or to identify conditions that may have caused them, thereby improving risk management. Similarly, following casualties caused by hurricanes, floods, windstorms, fires, and earthquakes, it may be difficult and dangerous to deploy inspectors to large numbers of properties. However, speed and safety are necessary to



DRONEBASE

Terrace housing projects, usually built on steeper slopes, are ideal candidates for drone inspection and monitoring.

Hedge fund operators have already used aerial imagery to assess parking lot traffic at retail sites to identify—before quarterly reports—which retailers' sales might advance, and which might decline, in order to optimize buy/sell decisions.

mitigate damages. Drone imagery may be the fastest as well as the most cost-effective way to identify and prioritize critically needed repairs at the lowest risk. Such imagery also can help document timely repairs.

Litigation

Even without the pandemic, development of condominiums has generated large backlogs of litigation by condo associations against developers, architects, engineers, and others seeking redress for construction defects. Perhaps the best antidote to such defects—and the best defense against them—could be real-time visual records of the construction process obtained through drone imagery that documents construction sequence, inspection, and timing showing adherence to professional norms.

Marketing and Leasing

The most prominent initial use of drone imagery has been to market properties. The power of an aerial image of an entire property in context has promoted sales of properties over their competition. Contextual visualization through multiple views of not only the individual property, but also of the neighborhood in which it is located, is particularly important to millennial buyers concerned with proximity and walkability to schools, markets, restaurants, and other amenities. With the preeminence of the internet as a delivery mechanism of four-color imagery,

drone photography is accessible, easily incorporated into websites, and affordable. With the pandemic limiting on-site project visits, such imagery has become even more important to marketing and leasing and gives a competitive edge to those who include it. Recent reporting suggests that apartments are being leased online without the tenants visiting the project in person, particularly when they are moving from urban areas to more remote ones.

Property and Asset Management

With accelerating consolidation of the management of multifamily projects by regional and national property management companies, the ability to monitor the management of diverse locations is increased using drone imagery as a comparison tool. Public spaces, swimming pools, rooftop decks, and parking areas are easily visualized. Hard-to-reach building environments, particularly roofs, are more difficult and dangerous to access and assess in person by maintenance personnel. Drones make no-contact inspections possible during the pandemic and increase worker safety.

The flat roofs of office and retail buildings are subject to cracking and leaking under increasingly warmer climate conditions. Drone imagery easily identifies water ponding, which may lead to roof leaks. Green roofs are particularly subject to harsh microclimatic



The use of drones is ideal for inspecting rooftop and HVAC conditions on high-rise buildings in dense cities.

conditions, and regular monitoring of the condition of plant material can prevent more serious problems from developing.

Drone services now use thermal sensors to display actual heat loss radiation, which could be reduced to make buildings more energy efficient and comfortable. Since most heating, ventilation, and air conditioning (HVAC) compressors and other equipment are roof-mounted on commercial buildings, drone imagery can be used to monitor condition and performance. Raleigh, North Carolina–based PrecisionHawk uses multiple sensors for its thermography. Drones can also be equipped with infrared-based optical gas leak sensors to identify hazardous situations. Proper inspection of solar array conditions is also essential for effective operation.

Property management security has become more important for large and critical industrial, infrastructure, and sensitive government sites. Drone monitoring may help increase surveillance while reducing costs, notes Fingert, who formerly was appointed by President Barack Obama as a senior adviser to the U.S. General Services Administration on operation of its infrastructure and real estate portfolio.

Repositioning and Resale

Drone imagery can help portfolio managers assess when to reposition

or resell a property and to make easy comparisons with the competition. For example, a retail center that was average before the pandemic may have become marginal during and after it. Yet, it may be located in an area where the addition of other uses might revive it. Comparison with other centers can be useful to decide what might be undertaken and to use imagery to tell more compelling stories about the improved project. Or if it is more appropriate to sell the property, a visual record of continual maintenance and improvements might assist in realizing a better price.

As with so many real estate trends, such as the shift to online retail, that have been augmented by the response to the pandemic, the multiple development and other real estate uses for drones—and their availability—are on an accelerating trajectory. **UL**

WILLIAM P. MACHT is a professor of urban planning and development at the Center for Real Estate at Portland State University in Oregon and a development consultant. (Comments about projects profiled in this column, as well as proposals for future profiles, should be directed to the author at macht@pdx.edu.)



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Email: chedc@cedarhilltx.com

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MARTA SCHANTZ

How a Real Estate Portfolio Achieves Net Zero

A mix of technologies helps energy-saving pioneers drive down their carbon profiles.



KILROY REALTY CORPORATION

A rooftop solar installation by Kilroy Realty Corporation in Los Angeles.

WHEN ULI GREENPRINT set a goal of net zero carbon by 2050 for its collective membership, it was clear that to meet that goal, a real estate portfolio would need to employ a combination of technologies and innovations.

Two ULI Greenprint members have already met the net-zero-carbon goal—Hudson Pacific Properties, a real estate investment trust (REIT) with over 19 million square feet (1.8 million sq m) of office and studio properties, and Kilroy Realty Corporation (KRC), a West Coast REIT with over 14 million square feet (1.3 million sq m) of office and life science space. This is how they did it.

Hudson Pacific

- ▷ Energy efficiency: Real-time monitoring systems, LED lighting, variable-frequency drives, and equipment retrofits improve efficiency.
- ▷ On-site renewables: Traditional rooftop solar panels are used where possible, as is piloted technology such as building-integrated photovoltaics—solar panels built directly into the facade.
- ▷ Off-site renewables: Many properties purchase carbon-free electricity from local utilities such as CleanPower SF, Hetch Hetchy Power, Peninsula Clean Energy, and Silicon Valley Clean Energy.
- ▷ Renewable energy credits (RECs): By purchasing credits from a wind farm in Texas, the company converted all electricity used by properties it owns and manages to 100 percent renewable sources.
- ▷ Carbon offsets: The remainder of the company's greenhouse gas emissions are offset by verified emission reduction credits from a landfill gas-to-energy project in Illinois; the resulting carbon offsets are Verra Verified Carbon Standard (VCS) certified.

Kilroy Realty Corporation

- ▷ Energy efficiency: The company has reduced the energy use of its assets by about 18 percent from 2010 levels, partly as a result of efficiency projects conducted through the Kilroy Innovation Lab.
- ▷ On-site solar and batteries: Kilroy installed solar photovoltaics at 15 of its properties totaling 5.6 megawatts, accounting for about 2 percent of the total energy

consumed by the KRC portfolio in 2020. KRC has eight battery storage installations totaling four megawatts of capacity.

- ▷ Off-site renewables: KRC entered an agreement for a large off-site solar array under development that will, when complete, fully address the electricity consumption of its directly managed properties. Also, KRC procures 100 percent Green-e certified power (determined by the Center for Resource Solutions) for certain properties from several of its energy providers, including the Clean Power Alliance, San Diego Gas & Electric, and Peninsula Clean Energy.
- ▷ RECs: Though not completed, KRC's off-site solar project purchases RECs on the company's behalf, allowing KRC to convert to 100 percent renewable electricity across all properties.
- ▷ Carbon offsets: The remaining greenhouse gas emissions are offset by various emission reduction credits. The resulting carbon offsets are VCS certified.

Innovation in Building Operations

The Kilroy Innovation Lab pilots innovations to improve the portfolio's performance and rapidly transform the larger commercial real estate market; KRC anticipates a return on its investment through reduced operating costs. The firm partners with accelerators like Elemental Excelsior to reduce the risk involved in technology selection, identify the best companies to implement pilots, and scale the technologies throughout the portfolio.

Hudson Pacific plans to expand its use of sustainable technologies to further reduce carbon emitted through operations, in part through its existing partnership with Fifth Wall, the largest venture capital firm focused on technology-driven innovation for global real estate. Fifth Wall's real estate investors adopt new technologies and benefit from partnerships, integration, contracts, and distribution deals.

As the cost and effectiveness of renewable energy systems improve, the price of green utility power declines, and technology advances, the market is poised for an increased appetite for carbon-neutral portfolios. **UL**

MARTA SCHANTZ is senior vice president of the ULI Greenprint Center for Building Performance.

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Nature Works

For forward-thinking companies like PayPal, the integration of outdoor work spaces offers employees a welcome sensory contrast to online overload as well as a healthy opportunity to reconnect with nature and each other. Improvements to PayPal's global headquarter campus introduce outdoor social and meeting spaces characterized by a native planting palette that is at once high in amenity and low maintenance. A shaded outdoor amphitheater accommodates seating for 250+ employees for all-hands gatherings. Outdoor "pod" spaces offer informal meeting spaces to supplement high-demand interior conference rooms.

Client: PayPal

Services: Master Planning and Landscape Architecture

Landscape Features: Outdoor café. 250-seat amphitheater and outdoor meeting pods that accommodate 6-8. Game space.

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INTRODUCTION

This annual supplement provides detailed academic, tuition, demographic, and campus information for participating schools that offer graduate, undergraduate, and certificate programs in real estate, urban planning, design and development, and other land use disciplines.

We would like to thank the colleges and universities that supported the 2021 guide, which we hope will be a valuable resource in your search for programs that will advance your educational and career objectives.

CONTENTS

UNIVERSITY PROGRAMS

Arizona State University's W. P. Carey School of Business	2
Auburn University	4
Clemson University	6
Columbia University GSAPP	8
Florida International University College of Business	10
Florida State University College of Business	12
Georgia State University	14
Georgia Institute of Technology	16
MIT Center for Real Estate	18
Texas A&M University	20
Thomas Jefferson University	22
Tulane University	24
University of Cambridge	26
University of Miami	28
University of Washington	30
Virginia Tech	32

TO PARTICIPATE IN THE 2022 GUIDE, CONTACT:

MARY SUMNER

ULI Senior Manager, Global Advertising
mary.sumner@uli.org
(202) 753-4777

A new future demands new leaders.

What is the future of business? Uncertainty rules the day, and the road ahead requires strategic and critical thinkers, making this the best time to learn.

The Master of Real Estate Development (MRED) program at Arizona State University teaches the business of real estate in real time with real projects that reflect current and future business challenges.

A unique transdisciplinary partnership between ASU's highly regarded colleges of business, law, design, and construction, the nine-month MRED program creates pathways for your immediate success through synthesis development projects, a powerful alumni network, and a real-world capstone.

The next development is yours. Join us, at the nation's most innovative university — six years in a row!

Your career. **Redefined.**



Apply today:

wpcarey.asu.edu/mred



PROGRAM CONTACT INFORMATION

GRADUATE PROGRAMS

McCord Hall
450 E. Lemon St.
Suite 150
Tempe, AZ 85287-4906
(480) 965-3332
wpcareymasters@asu.edu

ANNUAL TUITION AND FEES

Resident: \$38,858

Nonresident: \$58,538

International: \$60,738

NOTE: All amounts shown in the Tuition and Fees Schedules or in other university publications or web pages represent tuition and fees as currently approved. However, Arizona State University reserves the right to increase or modify tuition and fees without prior notice, upon approval by the Arizona Board of Regents or as otherwise consistent with board policy, and to make such modifications applicable to students enrolled at ASU at that time as well as to incoming students. In addition, all tuition amounts and fees are subject to change at any time for correction of errors. Finally, please note that fee amounts billed for any period may be adjusted at a future date.

PROGRAM TITLE AND OVERVIEW

Master of Real Estate Development

In only nine months, the transdisciplinary W. P. Carey Master of Real Estate Development (MRED) program prepares you to lead real estate development projects that are environmentally respectful, socially responsible, and artfully designed. Small class sizes provide opportunities for peer interaction and a number of synthesis projects cover the entire spectrum of development, preparing you for roles throughout the industry.

The MRED program is a transdisciplinary partnership among four highly regarded schools within Arizona State University:

- The W. P. Carey School of Business
- The Sandra Day O'Connor College of Law
- The Herberger Institute for Design and the Arts
- The Del E. Webb School of Construction

In addition to the credibility of earning a transdisciplinary ASU master's degree, a recent \$15 million investment by the W. P. Carey Foundation in career services will provide you with more opportunities to meet with a broader range of employers and have better access to career coaching and tools to help you succeed in your career.

DEGREE REQUIREMENTS

Develop your critical thinking about real estate development. In the nine-month, 16-course Master of Real Estate Development (MRED) program, you will learn side-by-side with peers from various backgrounds, deepening your understanding of the development process.

ADMISSION REQUIREMENTS

To complete the ASU online application, you will need to provide the following information:

1. Personal information—contact details, birth date, citizenship, Social Security number.
2. Current résumé and essay question responses.
3. Recommender's/recommenders' contact information: name, affiliation, and work email address of an individual who can answer questions about your personal qualities, professional success, career aspirations, and ability to perform in a graduate program.
4. Application fee—\$70 for domestic students; \$115 for international students.

Applications will not be processed until the fee is received; fees are nonrefundable.

In addition to the above materials, official transcripts and test scores must be submitted to ASU Graduate Admissions.

International students may also need to submit proof of English proficiency.

STUDENT DEMOGRAPHICS

CLASS AVERAGES

Age	31.5
GPA	3.2
Work Experience (in years)	3.75

DIVERSITY

Male	92%
Female	8%

UNDERGRADUATE MAJOR

Business	34%
Economics	4%
Social Sciences	4%
Science/Math	4%
Other	54%

Demographics based on estimated fall 2020 enrollment data.

See what others don't.

Auburn's Master of Real Estate Development program will sharpen your vision and enhance your skills. We've designed a unique mix of distance education, campus residencies, and field studies that will let you continue to work full time. We'll expose you to the most innovative projects, the most talented developers, and equip you with the knowledge to build your future.

Build what others can't.



AUBURN

MASTER OF REAL ESTATE
DEVELOPMENT PROGRAM



Auburn University is an equal opportunity
educational institution/employer.

Learn more at:
MREDauburn.info



PROGRAM CONTACT INFORMATION

JOE COLLAZO

Assistant Director
Graduate Executive Programs
(334) 844-5078
joecollazo@auburn.edu

ANNUAL TUITION AND FEES

The total program cost is \$58,500 for students entering Fall Semester 2021. This covers tuition, fees, books and course materials, professional memberships, and lodging and most meals during residencies and field studies. Financial aid is available.

PROGRAM TITLE AND OVERVIEW

Master of Real Estate Development Program

Our AACSB-accredited Master of Real Estate Development program is a collaboration between the College of Architecture, Design and Construction and the Harbert College of Business. It provides experienced professionals with the theoretical, technological, and practical knowledge necessary to produce real estate development projects that emphasize best practices related to sustainability, economic resilience, social responsibility, and design excellence.

This blended program utilizes innovative distance-learning technologies, campus residencies, and domestic and international field studies to provide a robust educational experience that can be completed without career interruption.

DEGREE REQUIREMENTS

The program launches each fall semester and runs for five consecutive semesters, in which students complete 39 semester hours. A majority of lectures are delivered through our online learning platform, but students also attend six residencies and participate in one international and three domestic field studies during the course of the program.

ADMISSION REQUIREMENTS

Minimum requirements are a four-year degree and either five years of professional experience or three years' real estate experience in the fields of accounting, appraisal, brokerage, construction, design, development, engineering, or law.

No GRE or GMAT entrance exam required.

STUDENT DEMOGRAPHICS

Eleven states and two foreign countries are represented in our current cohort of 29 executive students. Seventy percent are male and thirty percent are female, and they average 16 years of professional work experience. Seventeen percent have military experience.

ADDITIONAL PROGRAM/CAMPUS DETAILS

We are a University Fast Track Partner with CCIM, and we partner with the Appraisal Institute in its Master's Degree Program to offer students who enroll in the institute's program a unique path to the prestigious MAI-designated membership.

In 2020, the Auburn program ranked #5 among the Best Online Master's in Real Estate Programs by Intelligent.com and #25 for the Best Master's in Real Estate Degrees by CollegeChoice.

Tomorrow's best places start with today's inspiration.

APPLY NOW

FOR SUMMER 2021

CLEMSON[®]
REAL ESTATE DEVELOPMENT

The Clemson University Master of Real Estate Development Program helps you become a visionary for crafting sustainable community growth. Our small class sizes and field learning opportunities offer distinct experiences in the development industry.

The program's prime location in Downtown Greenville connects you to 250+ international firms in the Upstate of South Carolina — the region holding the highest international investment per capita in the nation.

clemson.edu/mred





PROGRAM CONTACT INFORMATION

DR. BARRY NOCKS, FAICP

Interim MRED Program Director
nocks2@clemson.edu
(864) 656-2476

AMY MATTHEWS HERRICK, M.ED.

Assistant Director of Student Services
matthe3@clemson.edu
(864) 656-4257

CHELSEA SIAR, MBA

Program Coordinator
csiar@clemson.edu
(864) 656-3903

ANNUAL TUITION AND FEES

Please refer to the Clemson University Student Financial Services website for all current tuition and related university fees: clemson.edu/finance/student-financials

18-Month Sequence: \$55,000.

The Minimester Tour class requires an additional \$500 for travel expenses.

12-Month Sequence: \$49,000.

The Minimester Tour class is optional at an additional \$2,000 for travel expenses.

PROGRAM TITLE AND OVERVIEW

Clemson University Master of Real Estate Development Program

The Clemson University Master of Real Estate Development (MRED) program is a full-time, 56-credit program that can be completed in 18 months for Entry Level/Early Career students, or 12 months for Experienced Development Professionals, with 15 credits of pre-approved exemptions. Experienced Development Professionals have the opportunity to exempt 15 credit hours through an interview, transfer courses, and portfolio documentation prior to admittance.

The MRED program is a joint program between the College of Business and the College of Architecture, Arts, and Humanities, housed in the Department of City Planning and Real Estate Development. MRED is an applied, interdisciplinary professional program with classes in MBA/Finance, Construction Science, Architecture, City Planning, Law, and RE Development. This interdisciplinary approach ensures that Clemson MRED graduates become visionaries who guide the multiple perspectives that converge during the building and development process.

The Clemson MRED program closely follows the principles of the Urban Land Institute, which believes development is a public/private partnership and quality development requires integrating the perspectives of community, environment, and economics.

DEGREE REQUIREMENTS

Bachelor's degree from a four-year accredited university.

Entry Level Early/Career Student, 18-Month Sequence: 56 credit hours

Experienced Development Professional, 12-Month Sequence: 41 credit hours*

Applicants for the 12-month sequence are candidates with a minimum of three years, full-time direct experience in the private real estate development process.

**This sequence allows for up to 15 credit hours of pre-approved exemptions based on portfolio submission during the admissions process.*

ADMISSION REQUIREMENTS

Learn more at clemson.edu/mred.

- Completed Graduate School Application and fee(s).
- Official transcripts from all degree-granting universities/colleges.
- Three letters of recommendation.
- Résumé
- Personal Statement.
- Official GRE or GMAT scores recommended for students with a GPA below 3.0. For international students: Official TOEFL or IELTS scores or completion of ELS level 112 at an ELS Language School is also required.
- Portfolio—only required for 12-month sequence students.*
*Portfolio may include examples such as market analyses, feasibility studies, case studies, investment committee submittals, architectural portfolio, project administration reports, and other relevant documentation indicating direct level of involvement.
- Interview—in person, by phone, or by video.

STUDENT DEMOGRAPHICS

Average cohort size is about 15 to 20 students. Median student age is 26. Average undergraduate GPA is 3.22. Eighty percent of students enroll as Entry Level/Early Career students.

Prior undergraduate degrees: approximately 28 percent have design/construction degrees, 48 percent from business/finance, and 24 percent from planning/government/social science. Most students have some level of real estate experience or knowledge prior to enrolling in the program.

ADDITIONAL PROGRAM/ CAMPUS DETAILS

The Clemson MRED Program is located in downtown Greenville, South Carolina, with programming opportunities in Charleston, South Carolina. MRED students tour Atlanta, Charlotte, Nashville; attend the ULI Fall Meeting in Tier One markets; and a 10-day Minimester tour studying premier coastal developments. The Capstone Practicum Course typically has student teams competing with a complete feasibility package presented to a jury for a site; these are typically mixed-use sites in Atlanta, Charlotte, Columbia, Charleston, Greenville, Asheville, or other regional locations. All 18-month students have required, typically paid 10-week summer internships.

Clemson University is ranked as the 29th best national public university by *U.S. News & World Report*.

STUDY REAL ESTATE
DEVELOPMENT
AT COLUMBIA GSAPP
IN NEW YORK CITY



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REAL ESTATE
DEVELOPMENT

PROGRAM CONTACT INFORMATION

JESSICA STOCKTON KING

GSAPP-MSRED Program
411 Avery Hall MC 352
1172 Amsterdam Ave.
New York, NY 10027
(212) 854-3524
realestate@arch.columbia.edu
<https://www.arch.columbia.edu/programs/8-m-s-real-estate-development>

ANNUAL TUITION AND FEES

For the 2020–2021 academic year, tuition and fees add up to \$98,799 for the three-semester, one-year program. More information may be found here: <https://www.arch.columbia.edu/admissions/tuition-aid>.

PROGRAM TITLE AND OVERVIEW

Columbia University GSAPP, Columbia MSRED Program

The Columbia MSRED Program is a one-year, three-semester program that combines the fundamental skills of professional real estate with a holistic approach to urban development as a creative act. The program is cross-disciplinary, drawing on its proximity to other modes of practice at the school, and is grounded in the three core tenets of global urban real estate development: the financial, the physical, and the social, arming students with the full range of professional and intellectual skills needed to tackle the complex demands of global urban real estate development. Many students are drawn to learning from professors who work full-time in the real estate industry in New York City, creating a club around affordable housing or design and development, networking within their full-time cohort, and setting up building tours and mentorship by engaged and experienced alumni. The Columbia MSRED Program was started in 1985, and you will find Columbia MSRED alumni in every area of real estate development and real estate finance.

DEGREE REQUIREMENTS

Three consecutive semesters of full-time study (summer, fall, and spring) are required, as well as a minimum of 45 credits, though many students choose to take more. Required classes include, but are not limited to: Real Estate Finance I, II, and III, Underwriting, Construction Management and Technology, Real Estate Law, Market Analysis, the Architecture of Development, Development Analysis: Urban Planning, the Value of Design, and Capstone.

Recent electives have included Development by Design, Underwriting II, Private Equity Development: Hotels Focus, Hotel Transactions, Public-Private Partnerships in Real Estate Development, Architect and Developer Dialogues, Affordable Housing Finance, Developing Affordable Housing, Capital Markets: REIT Analysis, Real Estate Portfolio Management, Fund Management and Capital Raising, Construction Law, Advanced Seminar in Commercial Leasing, International REITs, Global Real Estate Investing, Comparative Global Real Estate, Intro to PropTech VC, Risk and Portfolio Management, Tax Issues in Acquisitions and Development, Residential Development and Asset Strategy, Residential Investment and Development, Entrepreneurship in Buying and Selling Real Estate Assets, the Real Estate Entrepreneur's Process, Asset Management, Capital Markets: Debt, RE

Transactions Law, Real Estate PE: Acquisitions Analysis, Hotel Development and Investment, RE Entrepreneurialism, Building Adaptation and Reuse, Real Estate Economics and Market Metrics, Project Management, RE Media and Marketing, and Alternative and Distressed Investing Strategies.

ADMISSION REQUIREMENTS

Applications are accepted September 15th–January 15th every year for a June start. The Columbia MSRED Program has a summer start for all incoming students, and it is a cohort program. In order to apply, the online application form, the \$75 fee, all college and university transcripts, three reference letters, a résumé or CV, the GRE or GMAT, a personal statement, and the TOEFL (for some international applicants) are required. The GRE or GMAT requirement will be waived for the 2020–2021 cycle.

STUDENT DEMOGRAPHICS

The most common backgrounds are architecture, finance, and real estate, but we have also had people with planning, construction management, legal, consulting, and engineering backgrounds do well in the program. This year, we had domestic students from California, Colorado, Connecticut, Florida, Georgia, Illinois, Louisiana, Maryland, Massachusetts, Michigan, New Jersey, Nevada, New York, North Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Texas, Virginia, Washington, D.C., and Wisconsin, and international students from Argentina, Australia, Azerbaijan, Bahrain, Brazil, Canada, Chile, China, Colombia, Dominican Republic, France, Greece, Hong Kong, India, Indonesia, Iran, Iraq, Jordan, Kenya, Mexico, Oman, Philippines, Russia, South Korea, Taiwan, Thailand, Turkey, U.A.E., and the U.K. It is always a diverse class, and we have had many student-led trips over the years to locations outside the NYC area. Some recent student clubs with MSRED members have included the Design Driven Development club, the East Asia Real Estate club, the International Real Estate club, LatinGSAPP, QSAPP, the Real Estate Private Equity club, the Sustainable Development club, and the Women in Real Estate Development club.

ADDITIONAL PROGRAM/ CAMPUS DETAILS

The Columbia MSRED Program is located at Columbia University's beautiful Morningside Campus in New York City. Prospective students are encouraged to sit in on a class or two, chat with current students, and set up an appointment with the MSRED Program office.

Tower

above the competition.



Master of Science in International Real Estate



FIU | Business
FLORIDA INTERNATIONAL UNIVERSITY

Downtown Miami | Fully Online | 10 months

msire.fiu.edu

PROGRAM CONTACT INFORMATION

FEDERICO ABREU
(305) 779-7969
fabreu@fiu.edu
msire.fiu.edu

ANNUAL TUITION AND FEES

Tuition for the MSIRE program is \$28,000 for Florida residents and \$30,000 for nonresidents.

ULI members may qualify for a scholarship of up to \$5,000. Please contact the program advisor for more information.

PROGRAM TITLE AND OVERVIEW

Master of Science in International Real Estate

Florida International University (FIU) is the fourth-largest public university in the United States and is located in Miami and serves a culturally diverse student body of nearly 58,000 students. Known for being the home of one of the top business schools in the nation, accredited by the AACSB, we now have the largest real estate program in Florida.

The M.S. in International Real Estate (MSIRE) is the only program inspired by and developed with leading members of South Florida's international real estate community. It was created to meet the emerging need of real estate professionals for a high-caliber and flexible education covering all facets of this dynamic industry—locally and globally.

The MSIRE is an accelerated degree program with a high-level investment real estate transaction focus – along with an international scope. The program provides real-world knowledge in the areas of valuation, investment analysis and performance measurement, corporate asset management, financing techniques, law, technology, and accounting.

Our degree is taught by one of the largest numbers of full-time Ph.D. faculty in the nation – ranked No. 1 in the United States and No. 2 globally for real estate research. Graduates also earn substantial course credits toward various industry designations and licenses.

DEGREE REQUIREMENTS

The MSIRE degree can be completed in 10 or 12 months. Classes can be taken fully online or in person at our FIU Downtown on Brickell location with the option of live streaming or on-demand recordings for additional flexibility.

Our 30-credit curriculum includes:

- Real Estate Markets, Institutions, and Practices
- Real Estate Finance
- Advance Real Estate Investments and Valuation
- Seminar in International Real Estate
- Real Estate Law
- Real Estate Development
- Real Estate Market Analysis
- Corporate Real Estate Management
- Corporate Financial Management
- Global Real Estate Capital Markets

Courses are subject to change.

ADMISSION REQUIREMENTS

1. Hold a bachelor's degree from an accredited college or university (a business degree is not required).
2. Have a 3.0 grade point average (GPA) or better on upper-division coursework.
3. Show high promise of success in graduate studies as determined by the faculty based upon a minimum score of 500 on the Graduate Management Admission Test (GMAT) or equivalent score on the Graduate Record Exam (GRE).
 - No GMAT/GRE required with four years of business-related work experience OR
 - An undergraduate degree (business, economics, engineering, construction management, or architecture) with a GPA of 3.25 or higher OR
 - A graduate degree with a minimum 3.0 GPA
4. Official transcripts, a current résumé, and a statement of purpose must all be submitted to be considered.
5. Applicants whose studies were completed in a country whose official language is not English must demonstrate English proficiency by taking either the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

STUDENT DEMOGRAPHICS

Demographics (based on previous four cohorts)
Min Age 21; Max Age 64; Median Age 28.

Residency: 77% domestic; 23% international.

ADDITIONAL PROGRAM/CAMPUS DETAILS

- One of only four programs in the United States accredited by the Royal Institution of Chartered Surveyors (RICS).
- Assignments incorporate live data from the real estate market.
- Students earn substantial credit toward the Certified Commercial Investment Member (CCIM) designation, the MAI designation, and exemption from respective Florida Real Estate Commission (FREC) courses to receive state licensing.
- Receive hands-on training on software applications currently being used in the industry, including CoStar, Argus Enterprise, Microsoft Excel, Geographic Information Systems (GIS), Site To Do Business (STDB), and @Risk Analytical Financial Software.
- Mentorship program with our advisory board members.
- Networking and educational events providing career development.
- Scholarships and other financial aid are available.

It's not business as usual.



FLORIDA STATE
UNIVERSITY
COLLEGE OF BUSINESS

**Neither
are we.**



Elevate your career

Turn these challenging days into new professional opportunities with a Top 10 real estate specialization from Florida State University's College of Business. The world may have slowed down, but the financial markets have not. Now is a smart time to stop, take stock of your skill set and move forward.

Degree opportunities

- Online Master of Business Administration (MBA) with Real Estate Specialization for working professionals
- Master of Science in Finance (MSF) with Real Estate Specialization for full-time graduate students on campus

Now waiving the GMAT for highly qualified applicants!

graduatebusiness.fsu.edu



FLORIDA STATE
UNIVERSITY
COLLEGE OF BUSINESS

PROGRAM CONTACT INFORMATION

FOR GENERAL INFORMATION AND INQUIRIES:

business.fsu.edu/ree
(850) 644-4070
ugprog@business.fsu.edu

FOR GRADUATE PROGRAMS INFORMATION, INQUIRIES, AND ADMISSIONS:

graduatebusiness.fsu.edu
(850) 644-6458
gradprograms@business.fsu.edu

ANNUAL TUITION AND FEES

UNDERGRADUATE PROGRAM:

Florida Residents (\$215.55/credit hour)
and Non-Florida Residents
(\$721.10/credit hour)

ON-CAMPUS MBA AND MSF PROGRAMS:

Florida Residents (\$479.32/credit
hour; MBA total \$18,693.48; MSF total
\$15,338.24) and Non-Florida Residents
(\$1,110.72/credit hour; MBA total
\$43,318.08; MSF total \$36,543.04)

ONLINE MBA PROGRAM:

Florida Residents (\$780.18/credit hour;
total \$30,427.02) and Non-Florida
Residents (\$810.24/credit hour;
total \$31,599.36)

PROGRAM TITLE AND OVERVIEW

FSU Real Estate Program

Established in the early 1970s in response to the rapidly growing employment opportunities in real estate, Florida State's Real Estate Program is among the most successful in the nation. Our faculty members are among the most prominent in their field—collectively receiving high rankings for their research productivity. FSU offers the following degrees:

Master of Business Administration (MBA) with Real Estate Specialization – Our MBA specialty in real estate ranks among the top 10 public programs nationwide, according to *U.S. News & World Report's* 2021 list of “Best Graduate Schools.” Offered in our online and on-campus MBA formats, the rigorous set of elective courses prepares students to effectively master the ever-changing real estate markets while advancing their management skills.

Master of Science in Finance (MSF) with Real Estate Specialization – Our one-year, lockstep master's program runs from June to May on campus and focuses on developing applied real estate finance and investment skills, increasing student earnings potential and opportunities in a competitive and highly rewarding industry.

Bachelor of Science in Real Estate (BS-RE) – Ranked No. 5 among all public schools in the country, our undergraduate program is one of the few nationwide to offer a Bachelor of Science in Real Estate. Our graduates are always in high demand by employers.

Combined Pathways – Undergraduate real estate majors now have the opportunity to get a jump-start on an MBA or MSF degree by streamlining coursework.

Ph.D. in Business Administration – The Real Estate faculty also provides support for our Ph.D. Finance Major.

DEGREE & ADMISSION REQUIREMENTS

Graduate Programs: Nine credit hours of real estate finance and investment are built into the curriculum as a specialization for the MBA (39 total credit hours) and MSF (32 total credit hours).

FSU accepts applications for its online MBA program by March 1 for summer entry, June 1 for fall entry, and Oct. 1 for spring entry. Part-time, on-campus MBA applications are due by June 1 for fall entry. Full-time, on-campus MBA applications are due June 1 for fall entry. Online and part-time MBA programs can be completed in seven semesters.

The full-time MBA is one accelerated year of study. Learn more at mba.fsu.edu.

Applications for the one-year MSF program are due March 1. Classes begin each June. Learn more at business.fsu.edu/MSF.

Admission to FSU's graduate business programs is highly competitive. The decision is based on a portfolio of qualifications, including prior academic performance, work experience, entrance exam scores (such as the GMAT or GRE), and letters of recommendation. The entrance exam is a university requirement that may be waived if an applicant meets certain criteria. For more information, see business.fsu.edu/waive.

Undergraduate Program: Real estate majors must complete courses in real estate principles, law, finance, investment, valuation, and market analysis. An elective course in urban planning and development is also available. Graduates have satisfied or partially satisfied the educational requirements to sit for Florida's professional real estate sales licensing and real estate appraisal certification exams. Learn more at business.fsu.edu/ree.

STUDENT DEMOGRAPHICS

Overall enrollment at FSU in fall 2020 was 43,953. The enrollment in the FSU College of Business was 6,816, and 353 of these students (233 undergraduate and 120 graduate) major or specialize in real estate.

ADDITIONAL PROGRAM/ CAMPUS DETAILS

The FSU Real Estate Center (fsurealestate.com) serves to enhance the real estate program by expanding student learning opportunities; supporting faculty initiatives; and engaging the program's alumni, academic, and professional constituencies. The center organizes and funds student and faculty activities that improve learning and discovery. This includes student and faculty involvement in conferences, forums, professional meetings, and case competitions; the administration of student scholarships and awards; the facilitation of mentoring, internships, and placement opportunities; and the support of research. More than 2,000 industry professionals, faculty members, and students attend events organized by the center each year. The center maintains a policy of political non-advocacy. The FSU College of Business is accredited by the Association to Advance Collegiate Schools of Business (AACSB International).

Earn a top-ranked master's degree in commercial real estate from anywhere in the world.

#7 graduate real estate program in the U.S.

(U.S. News & World Report, 2021)

Boost your career with a 12-month Master of Science in Commercial Real Estate taught by senior industry leaders. Our experiential learning-based curriculum is conveniently delivered in-person or online, allowing you to work full time while enrolled. Build a modern, specialized skill set that is highly sought after by employers.

Earn ARGUS certification and complete most of the courses required for Certified Commercial Investment Member (CCIM) designation as part of the program.

Find out more at robinson.gsu.edu/mcre

GEORGIA STATE UNIVERSITY URBAN STUDIES INSTITUTE



PROGRAM CONTACT INFORMATION

JON WILEY
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LYNN McKEE
lmckee@gsu.edu

ANNUAL TUITION AND FEES

\$37,500 In State

\$43,500 Out of State

PROGRAM TITLE AND OVERVIEW

Master of Science in Commercial Real Estate

The Robinson College of Business offers the only master of science degree program focused entirely on commercial real estate. The degree can be completed in person or online, from anywhere in the world.

Program features:

- Learn from seasoned CRE professionals and world-renowned research faculty.
- Build a modern skillset for the CRE industry.
- Analyze integrated case studies.
- Connect with CRE C-Suite executives and top industry leaders.
- Complete your degree in one year of twice-weekly evening classes.
- Learn to think like an owner of commercial real estate!
- Available via in-person or online formats.

Rankings (graduate real estate program, *U.S. News & World Report*, 2021):

- Fourth among public university programs.
- Seventh among all university programs.
- First in the U.S. South.

DEGREE REQUIREMENTS

- Satisfactory completion of 30 credit hours (10 classes in mini-semester format).
- No thesis or comprehensive exit exam.

ADMISSION REQUIREMENTS

- Undergraduate degree (preferred in business or other technical field, but not required).
- Acceptable GRE or GMAT scores (may be waived with five years of CRE experience).
- Prior CRE experience is desired, but not required.

STUDENT DEMOGRAPHICS

31% Women

48% Minorities

2% International

31 Years Average Age

5 Years Average Work Experience

*Incoming fall 2020 class.

ADDITIONAL PROGRAM/CAMPUS DETAILS

Located in Atlanta, which is one of the most dynamic commercial real estate markets in the United States. In-person classes are held at the Buckhead Graduate Center in the heart of the Buckhead business district.

Can the built environment be

EXCITING?



We think so.
design.gatech.edu

- » MRED
- » MSUD
- » M.Arch
- » MCRP

The Georgia Tech College of Design delivers your vision through collaboration.

THERE'S A PLACE FOR YOU ON OUR TEAM.





PROGRAM CONTACT INFORMATION

SCHOOL OF BUILDING CONSTRUCTION

Tia Jewell – Graduate Recruitment
bc@design.gatech.edu

SCHOOL OF ARCHITECTURE

Robin Tucker – Academic Advising Manager
robin.tucker@design.gatech.edu

SCHOOL OF CITY & REGIONAL PLANNING

Johnnie Sawyer – Academic Adviser II
scarp@design.gatech.edu

ANNUAL TUITION AND FEES

Tuition and fees vary by program.

For a complete list visit:
<http://www.bursar.gatech.edu/content/tuition-fees>

PROGRAM TITLE AND OVERVIEW

Master of Science in Commercial Real Estate

The College of Design at Georgia Tech offers graduate students a collaborative educational experience to further careers in architecture, construction and facility management, industrial design, music technology, planning, real estate development, and urban design.

SCHOOL OF BUILDING CONSTRUCTION

- Master of Real Estate Development (MRED)
- Master of Science in Building Construction and Facility Management (MSBCFM)
- Professional Master's in Occupational Safety and Health – Online (PMOSH)
- Doctor of Philosophy with a Major in Building Construction (Ph.D.)

SCHOOL OF ARCHITECTURE

- Master of Architecture (M.Arch)
- Master of Science (M.S.) in Architecture
- Master of Science in Urban Design (MSUD)
- Dual MCRP + M.Arch (with the School of City & Regional Planning)
- Ph.D. in Architecture

SCHOOL OF CITY AND REGIONAL PLANNING

- Master of City and Regional Planning (MCRP)
- Master of Science in Geographic Information Science and Technology (MS-GIST)
- MCRP + M.Arch (with the School of Architecture)
- MCRP + MS-PP (with the School of Public Policy)
- MCRP + MS-CE (with the School of Civil Engineering)
- MCRP + Juris Doctor (with Georgia State University)
- Ph.D. in City and Regional Planning

ADMISSION AND DEGREE REQUIREMENTS

Applications for graduate study require supporting materials, including three letters of recommendation (provided online) and other documents such as transcripts, test scores, and verification of lawful presence. To view a complete list of requirements for each degree program, visit: <https://design.gatech.edu/schools>.

ADDITIONAL PROGRAM/CAMPUS DETAILS

Atlanta has the fifth-largest concentration of higher education activity in the United States, and among the most diverse and rapidly growing metropolitan areas in the country, affording our students direct access to a vibrant laboratory for urban planning, building construction, and real estate development, along with a rich menu of prospective employment opportunities.

Because we are a part of Georgia Tech, technology is an essential part of our work, as is research. We use the design process to develop new technologies, anticipate the future of buildings and environments, and change the way people experience their immediate surroundings.

Apply to one of our signature degree programs and join one of the world's premier research universities. The Georgia Institute of Technology consistently ranks among the top 10 public universities in the country by *U.S. News & World Report*, and the top five technological universities in the United States by *Times Higher Education World University Rankings*.

OFFICE OF GRADUATE STUDIES

On the About Tech page for Graduate Studies, learn how "Tech is a top-ranked research university committed to improving the human condition through advanced science and technology, and is home to a community of more than 20,000 graduate students."

Visit grad.gatech.edu to learn why you should choose Georgia Tech.



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VISIT [MITCRE.MIT.EDU](https://mitcre.mit.edu) FOR INFORMATION ON
THE PROGRAM AND HOW TO APPLY



Center for
Real Estate

PROGRAM CONTACT INFORMATION

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ANNUAL TUITION AND FEES

Tuition for 2020–2021 is approximately \$72,000 for fall, spring, and summer terms.

Estimated living costs for a single student are a minimum of \$18,000 in the Boston area.

PROGRAM TITLE AND OVERVIEW

Master of Science in Real Estate Development (MSRED) Program

The one-year MSRED Program prepares men and women for rewarding, responsible leadership positions in the real estate industry. The course of study is rigorous, balanced, and grounded in professional practice to help students achieve a broad understanding of all aspects of real estate. Small class sizes and an emphasis on team projects help students with differing levels of experience and expertise learn from one another. The curriculum is a demanding course of study that balances theory with practice and focuses on the real and practical needs of the industry, a defining characteristic of an MIT education. The program also benefits from MIT's interdisciplinary tradition, which encourages academic work that transcends departmental boundaries.

DEGREE REQUIREMENTS

Students must successfully complete seven core courses, required elective units, and a thesis. Students are required to maintain a 4.0/5.0 GPA. Core and elective courses include topic areas such as: finance, economics, development, engineering, mixed-income housing, leadership, entrepreneurship, negotiation, securitization, innovation, and international housing.

ADMISSION REQUIREMENTS

The MSRED Application Deadline is January 15. A complete application package consists of:

- Online Graduate Application form with application fee
- Statement of Objectives
- 3 Letters of recommendation: 2 professional, 1 academic
- Official academic transcript(s)
- GMAT or GRE Score
- TOEFL or IELTS Score (as applicable)
- Professional Résumé (3–5 years' experience in a real estate related field required)
- Financial Aid Application
- Optional Portfolio/Work Sample

Since 2017, the MSRED Program has offered the Young Leaders Program. Participants make up, at most, 10% of the student cohort each year. Exceptional individuals with fewer than three years of experience in the real estate industry may be invited to the MSRED Program as a Young Leader. Young Leader applicants must:

- Demonstrate exceptional academic performance
- Perform exceptionally on requisite exams

- Provide in their Statement a rationale for their candidacy and interest in the Young Leaders Program
- Indicate on the online application their intention to be considered for the Young Leaders Program

For Young Leaders, variances from required application materials may include:

- Letters of recommendation may instead be: 2 academic, 1 professional
- Professional Résumé – required if the applicant possesses professional work experience

STUDENT DEMOGRAPHICS

The Typical Class Profile of an MSRED cohort:

- 25–30 men and women; average age of 30
- Geographically diverse, 30 to 60% international
- Diverse professional backgrounds (planning, development, finance, construction, architecture, construction management, design, law, consulting, brokerage, etc.)

ADDITIONAL PROGRAM/ CAMPUS DETAILS

Financial Assistance is available in the form of Fellowships and Fellow Programs. The MSRED Program participates in the Yellow Ribbon Award in conjunction with the Office of Veterans' Affairs.

The 2020–2021 application cycle is the inaugural year of the Graduate Application Assistance Program (GAAP), Closing the GAAP. Closing the GAAP is a volunteer-based, student-run program that provides assistance to applicants from communities historically underrepresented in higher education and the real estate industry. Please visit: mitcre.mit.edu for more information.

Traditionally an 11-month program, students have the option to defer completing the summer thesis until the following fall term for a 16-month program option.

The MSRED Program offers an internship elective during the summer term, which meets Curricular Practical Training (CPT) requirements.

The CRE, through its professional partnerships, has a robust program offering of high-quality career development and experiential learning opportunities. MSRED student participate in experiential learning through: winter externships, summer internships, and project-based learning. Career development opportunities include: skills workshops, individual counseling, industry presentations, access to alumni network, networking contacts, and panel and conference events.



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Master of Real Estate
MAYS BUSINESS SCHOOL

PROGRAM CONTACT INFORMATION

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ANNUAL TUITION AND FEES

Please refer to the Texas A&M Tuition Calculator, <https://tuition.tamu.edu>, for all tuition- and university-related fees.

Total Resident Program Cost (fees and tuition): \$32,500

PROGRAM TITLE AND OVERVIEW

Master of Real Estate

The Master of Real Estate (MRE) is an industry-renowned, cohort-based program designed to prepare undergraduates from many disciplines for the multifaceted world of commercial real estate.

The curriculum provides students with a solid foundation in valuation, Excel modeling, finance, economics, market analysis, and development. By participating in real estate organizations, pursuing professional internships, and interacting with executive speakers and members of the Mays Real Estate Advisory Board, students will develop a fundamental knowledge of commercial real estate to immediately add value in the marketplace.

Ranked #2 Globally by Best Masters for Real Estate Management, 2019.

PROGRAM HIGHLIGHTS

The 16-month MRE program draws upon its strong ties to the professional real estate community, as well as the powerful Aggie Network, to successfully place their students in industry positions. Graduates have built successful careers at companies as diverse as CBRE, Deloitte, Goldman Sachs, JPMorgan Chase, LaSalle Investments, MetLife, USAA, and Valbridge.

Stellar Job Placement Record – 95–100% within 90 days of graduation for over 40 years

- 16 months including three semesters and a summer internship
- Spring and Fall admission
- Access to the latest research through the nationally recognized Texas A&M Real Estate Center
- Membership in the Aggie Real Estate Network
- In-depth coursework in Excel modeling and ARGUS

PROFESSIONAL DESIGNATIONS

Coursework in the MRE program is accepted toward professional designations at many organizations, enabling graduates of the program to obtain credentials and establish themselves more quickly as commercial real estate experts.

Designations include:

- Member of the Appraisal Institute (MAI)
- Certified Commercial Investment Member (CCIM)

DEGREE REQUIREMENTS

The Master of Real Estate is an interdisciplinary, nonthesis graduate program that delivers 36 credit hours of curriculum over 16 months. Students are required to maintain a 3.0/4.0 GPA and successfully complete a professional internship.

ADMISSION REQUIREMENTS

MRE features both fall and spring start dates. Application deadlines:

- Fall start: March 15
- Spring start: October 15

Admission requirements include:

- Minimum 3.0 GPA on last 60 credit hours
- Official GRE or GMAT score
- Application, essays, résumé, and references
- Interview
- Please see our website for a complete list of requirements and international application information.

STUDENT DEMOGRAPHICS

Average cohort size is 15 to 25 students, with total program enrollment of 65 to 70.

The majority of students apply directly after completing their undergraduate degree. Average GPA on last 60 hours is 3.40.

ADDITIONAL PROGRAM/CAMPUS DETAILS

The Master of Real Estate program is located on Texas A&M's main campus in College Station, Texas, within the Mays Business School, Department of Finance. Prospective students are encouraged to tour the program, visit a class, and meet current students.

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PROGRAM CONTACT INFORMATION

OFFICE OF ADMISSIONS

enroll@jefferson.edu
(215) 951-2800
Jefferson.edu/JoinCABE

PROGRAM TITLE AND OVERVIEW

College of Architecture and the Built Environment

The mission of the College of Architecture and the Built Environment at Thomas Jefferson University is to educate the next generation of architecture, design, and construction professionals to create an equitable and sustainable future. Our curricula emphasize specialized knowledge unique to each discipline, paired with interdisciplinary collaboration that prepares students for practice in the global market.

Our graduate programs include the following:

- Master of Architecture
- MS in Architecture
- MS in Construction Management
- MS in Geospatial Technology for Geodesign
- MS in Historic Preservation
- MS in Interior Architecture
- MS in Real Estate Development
- MS in Sustainable Design
- Master of Urban Design

We also offer dual-degree programs, graduate certificates, and online classes for some graduate-level programs.

DEGREE REQUIREMENTS

Degree requirements vary by program.

ADMISSION REQUIREMENTS

Our graduate programs require the following:

- All official undergraduate transcripts (including proof of degree)
- Résumé or CV
- Personal essay
- Two letters of recommendation
- Some programs also require or encourage a portfolio for advanced standing placement.

STUDENT DEMOGRAPHICS

Our student body is as unique as our program offerings. We host graduate students from across the region, the nation, and the world. They tend to be recent college graduates or professionals who are eager to advance or change their careers.

ADDITIONAL PROGRAM/CAMPUS DETAILS

Our lush, green campus, adjacent to the historic Fairmount Park system, is just minutes from Center City, Philadelphia. With its thriving design and construction industries, Philadelphia serves as our urban lab, furnishing students with professional experiences in a vibrant metropolitan area. Our college partners with the top global architecture and design firms, local communities, and nonprofit organizations, supplying a broad range of real-world projects and networking opportunities. Our dynamic approach to education and emphasis on social equity, sustainability, and design excellence equip our graduates with a competitive edge, poising them to become innovative leaders in sustainable practice.

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architecture.tulane.edu/msred



PROGRAM CONTACT INFORMATION

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ANNUAL TUITION AND FEES

**Total program cost (2020–2021):
\$74,950**

Summer: \$16,000, incl. fees and Urban
Field Study + Fall/Spring: \$29,475
per semester, incl. fees and ULI trip
(subject to public health protocols)

PROGRAM TITLE AND OVERVIEW

Master of Sustainable Real Estate Development (MSRED)

The Master of Sustainable Real Estate Development (MSRED) degree is an interdisciplinary one-year graduate program that prepares students from diverse backgrounds to become effective and influential participants in the fields of real estate finance, design, and development. We equip our graduates with a blended education in business, economics, sustainable design, urbanism, and legal issues. The MSRED degree is practice-oriented and emphasizes opportunities for students to gain experience and build a professional network in innovative for-profit, nonprofit, and public settings.

DEGREE REQUIREMENTS

Core required courses include:

- SRED 6100 Introduction to Real Estate Finance & Economics
- SRED 6140 Introduction to Real Estate Finance Products
- SRED 6210 Legal Issues in Real Estate Development
- SRED 6220 Sustainable Urbanism
- SRED 6230 Real Estate Finance
- SRED 6240 Applied Urban Economics
- SRED 6740 Directed Research (capstone)

In addition, students choose two to three elective courses to enhance their understanding of specific topics, including:

- SRED 6510 Climate Change Resilience & Adaptation
- SRED 6520 Infrastructure, Planning & Finance
- SRED 6540 Building Performance & Energy Benchmarking
- SRED 6550 Community Development Finance
- SRED 6560 Business of Real Estate

ADMISSION REQUIREMENTS

- Applications open **September 15**; first-round applications close **January 15**; decision letters sent by **March 1**.
- Required materials: completed online application, current résumé, statement of interest, two letters of recommendation or mentor interviews. International students + TOEFL and online interview.
- Application fee: \$0.

STUDENT DEMOGRAPHICS

Student demographics for the 2020–2021 academic year (19 students enrolled):

36% female; 33% students of color; 27 years old average age; 50% from outside Louisiana; 5% international students.

3.32 undergraduate GPA. Approximately 40% of our students come from design/planning backgrounds, 40% from business/management, and 20% from other liberal arts.

ADDITIONAL PROGRAM/CAMPUS DETAILS

Located in New Orleans and the heart of the Gulf Coast, Tulane's MSRED program includes two domestic field study trips (summer and fall, subject to public health protocols), an optional fall semester paid internship with local firms, and a final capstone research project in coordination with an external partner. Two-year dual-degree programs exist with both the MBA and M.Arch degree programs, and part-time enrollment in MSRED is possible. Classes are held on Tulane's historic Uptown campus, across the street from the 350-acre Audubon Park and with easy access to the St. Charles Avenue streetcar.



**UNIVERSITY OF
CAMBRIDGE**
Real Estate Research Centre



Real Estate Masters Programme: MSt in Real Estate 2021-2023

"A fantastic course with a great balance of industry professionals and leading academics taught in an internationally-minded classroom in the heart of Cambridge" Rosemary, MSt graduate 2019

The **University of Cambridge's** Department of Land Economy is a leading international centre providing a full programme of taught courses within an intensive, research-oriented environment. In the 2014 Research Excellence Framework (REF) assessment 50% of the Department's research work was described as "World Leading" and a further 38% as "Internationally Excellent".

Our aim for this Masters programme is for it to be recognised as the top "leadership in real estate" programme in Europe, building on the research strength, international reach and multi-disciplinary breadth of the Department (and wider University) to push forward a challenging agenda for long-term, strategic thinking about real estate.

The course also aims to ensure that students have a solid understanding of the end-to-end processes in real estate investment and finance, whilst promoting innovation in real estate through highlighting some of the trends influencing the industry and the opportunities that this will bring.

"The residential requirement excelled this course above others as not only do you experience the incredible learning environment of Cambridge, you get to do this with a fantastic cohort of like-minded industry professionals. The professors and external speakers are, as you would expect, experts in their fields and the course helped me progress both my knowledge and my career to new levels."

"It goes without saying I would highly recommend this course to anyone with a passion for real estate."

Theo, MSt graduate from cohort 2017-19



PROGRAM CONTACT INFORMATION

BARBORA SAJFRTOVA

MSt Course Administrator
mstrealestate@landecon.cam.ac.uk

ANNUAL TUITION AND FEES

Course fees 2021–2023

£15,000 per annum U.K./E.U. and overseas.

Students are also required to pay their residential College fees, about £2,240 over the two years.

PROGRAM TITLE AND OVERVIEW

Master of Studies (MSt) in Real Estate

The MSt is a two-year part-time Master of Studies course offered by the department of Land Economy drawing on the multidisciplinary strength of the department and the university. It is aimed at experienced professionals and those identified as future leaders in the real estate industry and combines academic rigour with significant industry input.

The course format enables students to continue with their professional career whilst studying and aims to equip participants with a broader knowledge of all aspects of the real estate industry, insight into a range of long-term themes and strategic issues in the market as well as developing a range of research and other skills.

“This course is unique in the way that it brings challenge, enjoyment, and diversity together. You’re part of a cohort of individuals from across the world being stretched academically beyond what you thought you were capable of. You’re learning from multiple spheres of influence; each other, academics, and industry, and you are developing an invaluable network of individuals and knowledge that will stay with you throughout your career.”
— Hannah, MSt student cohort 2017–2019

DEGREE REQUIREMENTS

Applicants for this course should have achieved a U.K. first-class or 2:1 Honours degree or the overseas equivalent, e.g., a bachelor’s degree with an overall GPA of 3.5/4; 4.3/5 or 3.8/4.3.

ADMISSION REQUIREMENTS

Application is via the Institute of Continuing Education’s (ICE) online form:

1. Two references: one academic and one professional
2. Degree transcript/s
3. Curriculum Vitae
4. Professional qualifications
5. Personal statement
6. A brief research proposal
7. Letter of support from your employer

Applicants are expected to have a minimum of three years’ professional experience in a relevant industry, and there are language requirements for applicants from countries where English is not the first language.

STUDENT DEMOGRAPHICS

We always seek to ensure that each cohort is varied in work background, age/gender, geographical location, and experience. We aim for a small group (e.g., 16 to 20 students), which allows for a deeper interaction both within the group and with our guest speakers.

Students have varied in age from 25 through to early 50s and come from a wide range of professional backgrounds: analysts, lawyers, bankers, consultants, real estate specialists (e.g., leasing, operations, and asset management), surveyors, architects, project managers, and investment managers.

ADDITIONAL PROGRAM/ CAMPUS DETAILS

“The residential requirement excelled this course above others as not only do you experience the incredible learning environment of Cambridge, you get to do this with a fantastic cohort of like-minded industry professionals.”
—Theo, MSt student cohort 2017–2019

The programme includes seven weeks of residential sessions across the two academic years. These are an important aspect of the course and are held in the historic city of Cambridge, where students stay in one of the university’s famous colleges and teaching is held in a variety of locations within the university departments and beyond.

Students also get to enjoy varied extra-curricular activities such as dinner in College Formal Hall and punting on the Cam. There is the opportunity to go on field trips to do site or property visits to cities such as London, Birmingham, and even Madrid. The Course Team see these trips and the socialising as an important and valuable aspect of the course.

“In a typical week, we would spend a couple of days in the classroom and then a couple of days we would spend going to see sites. The practical combined with the academic was really valuable.”
— Elizabeth, MSt graduate 2018

“The MSt Real Estate degree was definitely worth all the travel back and forth! A wellrounded course that prepares people from different backgrounds to Real Estate. I was personally amazed by the amount of different topics covered via leading experts and professionals in their respective fields.”
— Sarper, MSt student cohort 2017–2019

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Master in Construction Management and Real Estate Development

Master in Architecture and Real Estate Development

for more
information
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scholarships:
miami.edu/mredu



UNIVERSITY
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MRED+U

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For more information, visit our website: miami.edu/mredu

Follow us on social media
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ANNUAL TUITION AND FEES

For current tuition and fees, please refer to the Office of Student Account Services website: <https://osas.miami.edu/>.

The MRED+U program offers competitive tuition scholarships to full-time students admitted to the MRED+U program. Scholarships vary in amount and are awarded based on the qualifications of applicants and the recommendations of the MRED+U Admissions Committee. Priority will be given to applications received prior to the December 1 deadline.

All full-time students are also eligible for Graduate Assistantships, which provide experience in the form of teaching assistantships, research initiatives, publications, or other program activities.

PROGRAM TITLE AND OVERVIEW

Master of Real Estate Development + Urbanism (MRED+U)

The Master of Real Estate Development + Urbanism is an immersive one-year interdisciplinary graduate program that blends the fundamentals of real estate development with livable community design. The curriculum draws on the strengths of the University of Miami's Schools of Architecture, Business, Engineering, and Law, combining coursework and case study projects in real estate development, finance, market analysis, construction, architecture, urban design, law, and entrepreneurship. The MRED+U faculty includes distinguished academic leaders and seasoned real estate professionals. The curriculum is relentlessly updated, keeping pace with the fast-moving trends and opportunities in every real estate sector including property tech, where multiple alumni have launched successful innovative firms.

Students are immersed in one of the world's most dynamic real estate markets through a rigorous curriculum enriched by a wide range of events and initiatives, including speaker series, study tours, the annual Real Estate Impact Conference, research initiatives, and networking events. The prestigious MRED+U Advisory Board connects students with 60 industry leaders who are directly engaged in the program as lecturers, mentors, and advisers, providing access to dozens of cutting-edge projects from every real estate sector, as well as to internship and employment opportunities.

DEGREE REQUIREMENTS

- Full-time Fall Start—11 Months, 3 semesters, 36 credits
- Part-time (Fall or Spring) Start—1.5–2 Years, 36 credits
- Dual-Degree and Certificate Options: Architecture, Urban Design, Construction Management

ADMISSION REQUIREMENTS

- Completed application form with an application fee.
- A letter or statement expressing your interest in the program and reasons for applying.
- A bachelor of arts or equivalent degree with a 3.0 cumulative grade point average. Official transcripts of all college and university courses taken.
- Two letters of recommendation (at least one academic and one professional).
- Current résumé.
- International students are required to submit a TOEFL score of a minimum of 80 or IELTS of 6.5.

STUDENT DEMOGRAPHICS

On average, 74% of incoming MRED+U students are from the United States, with the remaining 26% from South America, Asia, and Europe. Approximately 33% of our students and alumni are women.

MRED+U students come from a variety of educational and professional backgrounds, including business, finance, law, architecture, planning, and related fields. All have a keen interest in real estate development and the challenges and opportunities for creating livable communities.

ADDITIONAL PROGRAM/CAMPUS DETAILS

The MRED+U Program is based in the School of Architecture on the beautiful University of Miami campus in Coral Gables, celebrated as “the City Beautiful.”

The MRED+U Mentorship Program provides students with a one-on-one advisory relationship and dialogue with senior industry professionals.

The MRED+U Internship Program provides students with opportunities to explore different areas of the real estate industry while gaining valuable, practical experience. With the active support of the MRED+U Advisory Board, the internship program provides a high-quality, structured experience for students.

MRED+U students are presented with an extensive range of opportunities to participate in major conferences, events, and networking opportunities made possible through the MRED+U Advisory Board. Students have the opportunity to meet one-on-one with Advisory Board members, their colleagues, and our extensive network of alumni through office and site visits, in-class lectures, and the MRED+U Lecture Series.

MRED+U Program alumni benefit from an excellent placement record upon graduating with support from a dedicated professional staff member who works with the Program Director, Advisory Board members, and other leading real estate industry firms to identify career opportunities for our graduates and alumni.

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PROGRAM CONTACT INFORMATION

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ANNUAL TUITION AND FEES

MSRE—Regular standing
Resident: \$36,824
Nonresident: \$73,648

MSRE—Advanced standing
Resident: \$18,412
Nonresident: \$37,630

PROGRAM TITLE AND OVERVIEW

Master of Science in Real Estate

The Master of Science in Real Estate prepares students for future leadership roles within the real estate industry with an emphasis in **Corporate Real Estate, Portfolio Management, Development or Housing Studies**. The program combines academic rigor with industry relevance and is taught by leading real estate faculty and accomplished affiliate instructors with significant professional experience. We accept students under two different standings, with those with a qualitative undergraduate degree entering under the Regular Standing, while those with a quantitative under the Advanced standing (Regular Standing: 12-month, 70 credits and Advance standing: 9-month, 41 credits). Small class sizes allow for heightened interaction with faculty and classmates.

Bachelor of Science with a Major in Real Estate

The Bachelor of Science with a Major in Real Estate is designed to provide students with a comprehensive exposure to the field of real estate. It will prepare students for careers in real estate finance, asset management, brokerage, urban and real estate development, or housing, among many other potential career paths. The Real Estate Major requires the completion of 50 credits of approved courses. This includes 30 credit hours of core real estate courses, and a total of 20 credits of interdisciplinary electives.

Undergraduate Minor in Real Estate

The Real Estate Minor is open to all undergraduate students across the University of Washington. Students in the Real Estate Minor will acquire knowledge covering multiple aspects of the real estate industry such as different asset classes, finance, development, transactions, and accounting. The minor requires the completion of 25 credits of approved courses, including a minimum of 16 credits in undergraduate real estate courses. The other nine credits can come from other real estate courses or related interdisciplinary electives.

DEGREE REQUIREMENTS

	MSRE Regular standing	MSRE Advanced standing
Admission qualifications	Non-quantitative bachelor's degree	Quantitative bachelor's degree
Length	2 years (6 quarters)	1 year (3 quarters)
– Full-time	Adviser/student coordination	2 years (6 quarters)
– Part-time		
Total Credits	70	41
Curriculum groups (credits):		
– Business skills	15	6
– Technical & software skills	14	4
– Real Estate Core	27	17
– Capstone course*	4	4
– Electives	10	10

*Select a course in: Corporate Real Estate, Portfolio Management, Development or Housing Studies.

ADMISSION REQUIREMENTS

MSRE Admission Requirements

Our admission decisions are based on a comprehensive review of all the material provided by an applicant (transcripts, goal statement/statement of purpose, letters of recommendation, résumé, and work experience if they have been in a relevant industry) and not exclusively on their transcript. GPA>3.0, TOEFL iBT – 92 or higher recommended, GRE – minimum score is not set, but consistency and above average-scores across all subject areas are recommended.

Undergraduate Program Admission Requirements

University of Washington students who have completed RE 250: Introduction to Real Estate and are in good academic standing can declare the major at any point. Students who have declared a major can declare the minor at any point.



PAMPLIN COLLEGE OF BUSINESS
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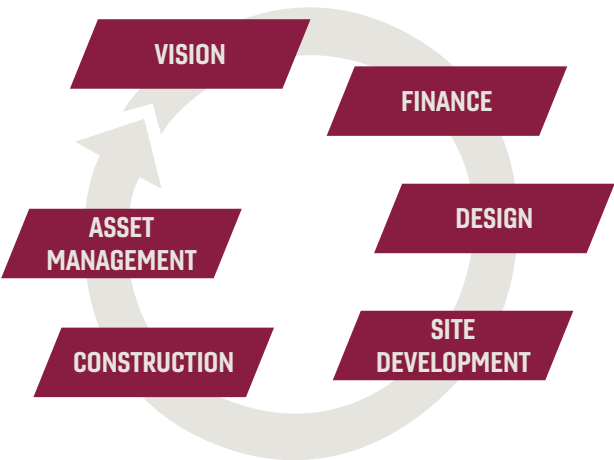


BEST REAL ESTATE DEGREE PROGRAM NATIONWIDE

www.GreatBusinessSchools.org



The **B.S. degree in Real Estate at Virginia Tech** is a comprehensive, interdisciplinary academic program that builds on existing strengths in five colleges. Students will take courses in finance, law, property management, and more to gain practical experiences that will apply to their career.



Graduates will be prepared to:

- ▶ Lead complex real estate projects.
- ▶ Analyze financial feasibility and market conditions.
- ▶ Develop knowledge of Excel, ARGUS, and other relevant software.
- ▶ Motivate and lead employees and teams.
- ▶ Communicate effectively with clients.

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www.realestate.vt.edu
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realestate@vt.edu

ANNUAL TUITION AND FEES

Tuition and fees vary by credit hour taken and whether you are an in-state or out-of-state student. For a complete list, visit: <https://www.bursar.vt.edu/tuition-fee-rates/tuition-fees.html>.

For a full-time in-state student, the combined fall and spring semesters 2020–2021 is \$13,749. For an out-of-state student, the combined fall and spring semesters are \$32,893. These numbers do not include room and board expenses.

PROGRAM TITLE AND OVERVIEW

Virginia Tech Program in Real Estate

Bachelor of Science in Real Estate

The B.S. degree in real estate at Virginia Tech is a comprehensive, interdisciplinary academic program that builds on existing strengths in five colleges. The major offers real estate courses that integrate the material that students learn in disciplinary courses such as finance, law, and property management through practical experiences within the academic program. The integration occurs through a university/industry partnership where real estate professionals are actively involved in students' education through guest lectures and mentoring experiences and by providing internship opportunities.

DEGREE REQUIREMENTS

Students are required to complete a minimum of 120 credit hours of their real estate major and an accompanying double major or minor related to real estate. Required classes include but are not limited to: Principles of Real Estate, Careers in Real Estate, Real Estate Data Analysis, Professional Development in Real Estate, Applied Real Estate Development, Real Estate Market Analysis, Financing Real Estate Projects, Real Estate Studio, Real Estate Law, and Managing and Leasing Commercial Properties. Other courses available for students to take include Real Estate Appraisal, Building Construction Principles, Real Estate Marketing, Business Writing, and Multifamily Property Management and Operations.

ADMISSION REQUIREMENTS

Virginia Tech admission requirements and deadlines can be found at <https://vt.edu/admissions/undergraduate.html>.

Applications include self-reported grades, SAT or ACT scores, essays, academic interests, and building a profile through our application platform. Letters of recommendation are not required or reviewed.

STUDENT DEMOGRAPHICS

The following information reflects the fall 2019 undergraduate student body unless otherwise noted.

Institution Type: Public

Undergraduate Students: 29,300

Graduate Students: 7,083

Total Students: 36,383

Women: 43% of total enrollment

Men: 57% of total enrollment

10% Asian

4% Black/African American

7% Hispanic/Latino

5% Multiracial (not Hispanic/Latino)

64% White

2% Not Reported

More demographic information can be found at <https://nces.ed.gov/collegenavigator/?q=Virginia+Poly&s=all&id=233921#programs>.

ADDITIONAL PROGRAM/CAMPUS DETAILS

Top Benefits of the Virginia Tech Program in Real Estate:

- **Jump-Start Your Career:** Average starting salary for the Class of 2018 was \$62,500.
- **Experiential Learning:** Workshops, site visits, and more in cities across the region.
- **Study Abroad:** Visit Dubai with the program or take advantage of Virginia Tech's Global Education Office.
- **Industry Networking:** Meet some of the industry's most influential leaders, many of whom are on our Industry Advisory Board.
- **Hands-On Education:** Complete a Senior Capstone project that encompasses all aspects of developing a property.
- **Real-Life Application:** Succeed in a competitive market by applying your knowledge daily.
- **Real Estate Club:** A club for students majoring and minoring in real estate, as well as those who are interested in the real estate industry as a whole. The club often hosts guest speakers and tours various sites.

Virginia Tech is in Blacksburg, a small town located in the beautiful mountains of southwest Virginia. Founded in 1872, Virginia Tech pushes the boundaries of knowledge by taking a hands-on, transdisciplinary approach to preparing students to be leaders and problem-solvers. Virginia Tech offers about 280 undergraduate and graduate degree programs to more than 34,000 students and manages a research portfolio of more than \$521 million. Through experiential learning, future-focused research, and an inclusive, spirited culture, Virginia Tech strives to accomplish the charge of its motto *Ut Prosim* (That I May Serve).

MKSK

Landscape Architecture | Urban Design | Planning



Mirror Lake Enhancement and Pomerene Hall Renovation, The Ohio State University, Columbus, OH

HIGHER EDUCATION DESERVES HIGHER DESIGN

“Higher education transcends time spent inside the classroom. It’s the spaces in between where big ideas are born – where we connect, share ideas, and interact with others. We design those places.”

Columbus | Atlanta | Cincinnati | Detroit | Greenville | Indianapolis | Lafayette | Louisville

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