President's Report 2024

MIT Center for Real Estate

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I. Introduction

The strategic vision of the MIT Center for Real Estate (MIT/CRE) is centered on bolstering the Master of Science in Real Estate Development (MSRED) program and expanding research capacity in critical areas such as climate resilient real estate, housing and equity, and real estate technology. We are not only broadening our global strategy in areas of education and research collaboration, but also working across departments on campus. In early 2024, leadership initiated a joint effort between MIT/CRE and the MIT Sloan School of Management, with the support of the Deans from both schools, to explore potential collaborations. A joint committee, comprising members from both MIT Sloan and MIT/CRE was established to facilitate this partnership, which will yield meaningful outcomes in the coming years.

MIT/CRE is made up of a diverse and distinguished faculty, 30 industry members, and over 1200 alumnae/i, who are leading major development companies and innovative projects on every continent. Our mission is to work collaboratively with these groups to enhance the quality of real estate investment and the built environment industries through innovative development and research practices centered on financial, social, and environmental performance and responsibility.

II. Activities and Achievements

The MIT/CRE has consistently demonstrated a commitment to advancing real estate thought leadership and fostering global collaboration. Through a series of milestone events, partnerships, and new initiatives, the Center has extended its influence across continents and disciplines. The past year has been particularly momentous, with achievements that present the Center's tangible commitment to addressing pressing issues in real estate, from climate resilience to equitable urban development. The diversity of programs, including symposiums, competitions, and new educational offerings, showcases the Center's drive to inspire transformative change within the industry.

Conferences & Academic Symposia

During summer 2023, the Center hosted the inaugural MIT Asia Real Estate Symposium on July 31- Aug. 1, 2023 – the 2-day event brought 40 researchers, scholars and industry leaders together to engage research focused in Asia's developing economies. The committee received an overwhelmingly large number of full-paper submissions, from which they were able to select 12 high quality papers into the program. Keynote speakers included many colleagues in academia such as, Professor Edward Glaeser, Matthew Kahn, Sumit Agarwal, and Susan Wachter.

Following the symposium, MIT/CRE held a first-of-its-kind collaboration with industry in October 2023. Together with Finvest, we organized the conference, "Climate Change and the Decarbonization of Real Estate" at the Museum of Tomorrow (Museu do Amanhã) in Rio de Janeiro, Brazil. The event brought together real estate industry and finance leaders from Brazil and around the globe, to share insights into the Brazilian real estate industry, revealing its potential for building decarbonization, carbon credit markets, climate tech innovations, and more. Coinciding with this conference, MIT/CRE and Insper hosted an international seminar on climate resiliency and low-carbon accessibility on October 27, 2023 in São Paulo, Brazil.

Professor Albert Saiz served as 2nd Vice President of the American Real Estate and Urban Economics Association (AREUEA) and organized the 2024 AREUEA-ASSA Conference, January 5–7, 2024 in San Antonio, Texas. The conference had 88 presentations and over 23 sessions encompassing various topics on real estate and urban economics.

In a major collaboration with Harvard University, MIT/CRE contributed to two panels at the April 2024 US-Asia Sustainable Development Summit. Steve Weikal MSRED '08, participated in the "Green Technologies and Industrial Development" panel, emphasizing green technologies' role in shaping industrial practices and transitioning to a low-carbon economy. Additionally, Siqi Zheng led the "Green Cities and Buildings" panel, focusing on strategies for creating resilient urban spaces alongside Jonathan Buonocore from Boston University School of Public Health and Holly W. Samuelson from Harvard Graduate School of Design.

The MIT/CRE Climate and Real Estate Consortium launched a paper development mini-fund for research papers on subjects related to climate policy, economic impacts, and industry trends. Papers selected will also be able to present at the Center's next Climate and Real Estate symposium in late 2024.

Launching the MIT Center for Real Estate's 40th Anniversary, the 2024 MIT World Real Estate Forum (June 17+18) brought together 300 industry leaders, policymakers, researchers, and academics to explore the future of real estate — offering inspiration and practical strategies for navigating an uncertain future. Remarking on the Forum's theme, "We're imagining a world where buildings, cities and entire regions seamlessly blend sustainability, innovation, and social equity," says Kairos Shen, Associate Professor of the Practice and former Executive Director of MIT/CRE, "Where the built environment is not just functional but a catalyst for positive change". With 30+ speakers, 4 keynote addresses, 8 panel discussions, and a robust Tech & Alumni Lightning Showcase – the Center's bold vision revealed itself throughout the Forum.

Educational Programming

In July 2023, MIT/CRE held the 4th annual Real Estate Exchange (REEX) Jumpstart summer highschool program for minority and underrepresented groups. MIT/CRE's team earned 1st place in the final competition against Harvard, Cornell, Howard and New York University. Students were tasked with developing a 400,000 sqft commercial-industrial site in the Seaport District of South Boston. The MIT/CRE team, MARS Enterprises, named after its members, Madison, Ashley, Rebeca, and Sir Rahn – won the judges over in the final round of presentations on October 21, 2023.

MIT/CRE launched a new online course in 2024: Sustainable Real Estate Analysis and Investment that focuses on green building practices, technology trends for sustainability and their practical applications for real estate. Sharing research and expertise on the subject matter as course Faculty Directors are Siqi Zheng, Juan Palacios, and Zhengzhen Tan.

In 2024, MIT/CRE launched the Global Real Estate Leaders Program – a new executive program in partnership with Maastricht University (the Netherlands) and supported by three leading associations in real estate: Pension Real Estate Association (PREA), National Association of Real Estate Investment Trusts (NAREIT) and Urban Land Institute (ULI). This program is designed for an international group of professionals with seasoned real estate industry experience looking to lead the industry forward. The program consists of courses taught over four week-long modules on two continents (Europe and America). This program's first cohort includes 15 participants from Europe, Asia, Africa and North America.

Fostering Student and Alumnae/i Community

Each year, MIT/CRE invites distinguished guest speakers from academia and industry to enrich our students' learning and engage the broader community beyond the classroom. Our cornerstone events include the Thought Leader Lecture (TL2) Series, organized by Career Development Officer Kelly Cameron, and the CRE Research Seminar Series, led by Postdoctoral Researcher Simon Buchler. Over the past year, TL2 hosted eight prominent figures in commercial real estate, from the Head of Real Estate at Fidelity to the CEO of Timberline Construction, who provided unique insights into key industry trends. Additionally, the CRE Research Seminar welcomed 13 esteemed scholars from institutions such as Harvard, Sloan, USC, the University of Michigan, and Georgetown. The seminars offer a dynamic platform for rigorous discussion, featuring leading experts in real estate finance and economics who contribute significantly to the field's research landscape.

In 2024 MIT/CRE revived the Spaulding Award – the first since before the pandemic at the MIT/CRE / AACRE "Back to School" event on May 4, 2024 at Rockefeller Center in New York. The Center announced the 2024 Spaulding Award winner – Mecky Adnani '00 the SVP, Acquisitions at The NHP Foundation – for her leadership, energy, and vision in bringing about affordable housing projects. Mecky joins an elite group of Spaulding Award winners, becoming the 11th recipient in the Center's 40-year history and one among 14 exceptional 2024 nominees. The event brought together MIT/CRE alums, faculty, students and NYC practitioners for a day of reunions and educational presentations.

At the beginning of Spring 2024, MIT/CRE launched its student-led podcast series as an opportunity for our Master's students to engage with leaders in industry through interviews. The series, MIT/CRE Meet the Visionaries: Solutions and voices for real estate's evolution, showcases the insights, strategies, and stories depicting how industry is adapting and succeeding to the evolving business climate of real estate. In our first season of 8 episodes, the series earned 100+ followers and over 1550 streams. Season one participating students: Daniela Morales MCP '25, Jason Ng MSRED '24, Viet Nguyen MSRED '24.

The CASE Competition was held in London, UK this year for the first time – led by Lecturer, Tod McGrath, Professor Kairos Shen and Lecturer, James Scott MSRED '16. Founded by the Alumni Association of the Center (AACRE), and now organized and hosted by MIT/CRE – the CASE is an annual real estate competition that provides current graduate student teams an opportunity to compete, showcase their knowledge, and learn from each other through the analysis of a complex real world development site. This year's site focused on the redevelopment of One Undershaft (formally known as the Aviva Tower) in the City of London and was graciously hosted by MIT/CRE alumnus Jason Blank '00 and David Marks '01 of Brockton Everlast, together with Alex Knapp of Hines. Since the inaugural competition in 2009, over 1200 participants from 35 graduate programs have participated, with Columbia University winning the Kent Roberts Trophy in the 2024 competition.

Impact

These achievements and events over the course of this past year, exemplify the Center's ongoing role as a pioneer in real estate education and research. By uniting academic excellence with practical application, the Center has not only strengthened its position within the global real estate community but also created platforms for impactful change. As the Center reflects on these activities and accomplishments, it remains poised to tackle emerging challenges, empower the next generation of industry leaders, and contribute to a more resilient and sustainable real estate landscape. Together, these initiatives forge a path toward a future where real estate professionals are better equipped to lead through innovation and social responsibility.

III. Administrative Initiatives

Technology Enhancements and Strategic Initiatives

Over the past two years, the MIT Center for Real Estate (CRE) has executed a series of strategic technology upgrades designed to enhance our operational efficiency, improve service delivery, and support our broader mission within the School of Architecture and Planning.

These efforts have leveraged key platforms provided by Information Systems & Technology (IS&T), enabling the development and integration of several critical systems across the Center. Key advancements include the adoption of Confluence for robust documentation management, the

implementation of ServiceNow for streamlined service request tracking, and the integration of Zoom for managing our phone systems, including call trees and employee communication services.

Our digital infrastructure has been significantly expanded with the hosting of WordPress sites and the migration to Amazon Web Services (AWS) cloud accounts, providing scalable and secure computing resources. Additionally, we have centralized device management using Jamf and Microsoft Endpoint Configuration Manager (MECM), enhanced our data analysis capabilities through the use of SuperCloud, transitioned our email services to Microsoft 365 (M365), and made substantial investments in audiovisual (AV) technology within the MIT/CRE Lecture Hall.

In parallel with these initiatives, MIT/CRE has independently implemented several key projects, including the deployment of Zoom Rooms, the creation of an internal staff intranet, the launch of a new public-facing website, and the establishment of preliminary virtual machine (VM) infrastructure.

Looking forward, we are planning further enhancements to our technological ecosystem. These include the expansion and refinement of our VM infrastructure, the introduction of a Customer Relationship Management (CRM) database, the deployment of hotdesking and room scheduling software, and the implementation of role-based access control systems. These initiatives are part of our broader strategy to foster increased collaboration across the diverse academic units within the School of Architecture and Planning.

While these technological improvements represent significant progress, we continue to encounter challenges related to the integration of MIT's legacy systems. Many of these systems are outdated, inadequately integrated, and present potential security vulnerabilities. These issues add layers of complexity to our operations and place additional demands on our staff, underscoring the need for ongoing investment in modernizing our technological infrastructure.

IV. Finances and Funding

As of June 30, 2024, the MIT Center for Real Estate had received $624,000 in donations, grants, and fellowships. This sum has increased just slightly from fiscal year 2023 and dropped from fiscal year 2022.

To support the Center's efforts in climate and real estate sustainability, the MIT Center for Real Estate established three funds to support students and lecturers. Our researchers and postdoctoral fellows also received funds from the Institute. These grants include scholarships for women and underrepresented professionals, financing for research to reduce water use in steel manufacture and identify toxic algal blooms in water, and research on public transit in Rio de Janeiro.

The David Geltner Catalyst Fund at the MIT/CRE was established to honor Professor Emeritus David Geltner's impact at MIT. It aims to support MIT/CRE lecturers, fostering research and teaching in

commercial property and real estate finance and provide fellowships for MSRED graduate students. This endowed fund was made possible by a generous $250,000 gift from Mr. Robert M. White Jr.

MSRED class of 2024 student, Peggy Ghasemaloh, has overcome adversity in seeking her Masters degree and she has risen above, earning two prestigious real estate scholarship awards: Goldie B. Wolfe Miller Women Leaders in Real Estate, the Commercial Real Estate Development Association (NAIOP) and Prologis Inclusion in CRE Scholarship for Women and Underrepresented Professionals. Peggy also received the Office of Graduate Education (OGE) fellowship, Neekeyfar Fund Award in Spring 2024.

Bram van der Kroft, a visiting researcher, has been awarded the prestigious Rubicon grant by the Dutch Government Science Foundation (NWO). This grant will fund his research salary for two years as he collaborates with Professor Siqi Zheng, Roberto Rigobon, and Juan Palacios to study the mechanisms and motives of sustainable investing. The Rubicon grant is highly competitive, with only about 40 recipients selected annually across all disciplines.

Sustainable Urbanization Lab (SUL) first-year PhD student, Ashley Vicary, was awarded the MIT Sloan Latin America Research Grant. Ashley is dedicated to studying public transportation using bus ridership data in Rio de Janeiro.

SUL researcher, Yichun Fan, has been selected by OGE for the competitive John S. Hennessy Fellowship for the 2024-2025 academic year. Yichun has already won two competitive fellowships in the past at MIT: The Tang Fellowship; The Martin Fellowship. This is her third grant award in a row.

V. Personnel Information

Professor David Geltner retired from teaching and is now Professor Emeritus of Real Estate Finance in the Department of Urban Studies & Planning. He has been at MIT since 2002 where he held the George Macomber Chair, served as Academic Director of MIT/CRE during 2003-08 and from 2008-14 as faculty chair of MIT/CRE's MSRED program. He is the lead author of the most widely-cited real estate investments textbook, "Commercial Real Estate Analysis & Investments", now in its third edition.

Postdoctoral Associate, Simon Buechler, accepted an Assistant Professor role at Miami University - Ohio. Simon has been a valuable part of MIT/CRE for over four years, contributing significantly to our research in economics and finance first with the Price Dynamics Platform under Professor David Geltner.

In July 2023, Professor Siqi Zheng was honored to receive the "Asia Real Estate Academic & Professional Women Achievement Award" at the 2023 Asia Real Estate Society (AsRES-GCREC) Joint International Real Estate Conference in Hong Kong.

Daniel Lee's (MSRED 2024) venture team was accepted into MITdesignX Accelerator's 2024 cohort. The company, Numanac, is a venture focused on food security, specifically U.S. federal agencies' food systems risk mitigation practices. Using data/AI-enabled CEA (controlled environment agriculture) the team aims to build a predictive production solution for food security.

In September 2023, MIT's Fast Forward Faculty Fund Grant Program (F^4) accepted Professor Siqi Zheng's cross-disciplinary team, including Professor Christopher Knittle (MIT Sloan), Professor Roberto Rigobon (MIT Sloan), and researchers in Siqi's Lab: Johnattan Ontiveros, Juan Palacios, and Bram V.D. Kroft. F^4 is a new initiative created under MIT Fast Forward and seeks to strengthen Institute-wide climate and sustainability research through cross-disciplinary innovation and collaboration. Professor Zheng joined five other MIT faculty as members selected for the cohort.

MIT/CRE Faculty Director, Siqi Zheng was elected and assumed the role of 2nd Vice President of the American Real Estate and Urban Economics Association (AREUEA) for 2024.

VI. Teaching and Curriculum

Master in Real Estate Development (MSRED) Curriculum Changes

The following courses were added as permanent courses to the MSRED curriculum as part of the suite of required electives.

11.428	Proptech Ventures
11.429/15.022	Real Estate Trends: Macroeconomics

Proptech Ventures was previously available as a special topic number for three semesters. Throughout the trial term, the course maintained a high enrollment rate. It is co-taught by lecturers James Scott and Steve Weikal. The goal of this course is to educate students about recent disruptions in the real estate business, to highlight the PropTech environment so that they can grasp what is available in the sector, and to build entrepreneurial ideas and skills to create the next generation of PropTech ventures.

Real Estate Trends: Macroeconomics was introduced in the spring of 2023 as an optional continuation of our course economics course 11.433 Real Estate Economics. Professor William Wheaton teaches the course, which applies the most recent economic thought and research to the challenge of analyzing aggregate real estate market time series, risk assessment, and forecasting. This boosts our advanced course offerings for our students.

The optional MSRED electives now include the following courses.

11.268 Laws of the Land: Property, Land Use, and Environment

Professor Justin Steil teaches Laws of the Land, which is open to undergraduate and graduate students. It examines the relevant topics of environmental justice and climate change, both of which will have an impact on the real estate industry's future. The course looks at the legal and social scientific aspects of environmental law and policy. The course was offered as a special topics course for several semesters before being assigned a permanent course number.

In response to student demand, the following courses were added as seminars to enhance the finance offerings of the MSRED curriculum.

11.S964 Real Estate Private Equity

Real Estate Private Equity was taught by Visiting Clinical Professor Manish Srivastava. The inclusion of this special topic was the outcome of student demand for instruction in this area. The course was introduced in H4 of the Spring 2024 semester and was widely popular and had high enrollments. Topics covered included the formation of real estate private equity funds, investor profiles, capital raising, partnership and fee structures, return allocation mechanisms, waterfall calculations, taxation, and approaches to solving complex situations encountered by owners of private equity assets and investing in private asset-backed companies.

11.S970 Real Estate Portfolio Management

Real Estate Portfolio Management, taught by visiting lecturer Jacques Gordon, exposed students to the ways that a portfolio-wide view applies to managing and investing in real estate and focused on real-world examples of portfolio construction, management, and decision-making.

Regional Treks

In February of 2024, the Real Estate Development (RED) Studio took their annual trip to NYC where they had the opportunity to tour the Rockefeller Center with Tishman Speyer, Deutsche Bank Center and Jazz at Lincoln Center with Related Companies, City Point with Arcadia Partners and the vibrant Essex Crossing/Seward Park with New York City Economic Development Corporation all showcasing the dynamic real estate landscape of NYC.

In May of 2024, many students attended the "Back to School" Alumni Event in NYC. This event also served as the awards ceremony for the Spaulding Award, a prestigious honor within our community, recognizing MIT Center for Real Estate alumni whose professional achievements significantly impact the field and demonstrate exemplary dedication to community engagement. Our students had the opportunity to mingle and network with our alumni community.

MSRED Students

In May 2024, students from the Class of 2023 and Class of 2024 graduated. Seven students from the Class of 2023 completed their thesis in September 2023. Fourteen students who started the program in Fall 2022 opted to stay for the 16-month program and graduated in 2024, along with one dual degree student Master of City planning (MCP) and 2 additional students who completed the degree after returning from medical leave.

Class of 2024 (Fall 2023 Entry)

- · There were 74 applicants to the Class of 2024.
- · 34 students were admitted (46% admittance rate)
- · 23 accepted admissions. (66% yield rate)
- · Due to extenuating circumstances, 2 students were offered deferral
- · 1 student (who was admitted the previous year) joined as a dual degree (MCP) student
- · 2 students returned from medical leave to complete the degree

Student Statistics

- · Total New Students: 23
  - o Female   8 (34%)
  - o Male   15 (66%)
- · Domestic Students   11 (48%)
- · International   13 (52%)
  - o Canada   (1)

- o China   (5)
- o Iran   (1)
- o Korea   (5)
- o UK   (1)
- · Identifying with an underrepresented racial or ethnic group:
- o 1 Black or African American student
- o 2 Asian American (Vietnamese, Southeast Asian)
- · Young Leaders   (2)
- · Duals   (1) Master in City Planning

Six students in the Class of 2024 completed their thesis in the summer of 2024.
The remaining students will continue on to complete the 16-month program and will be on the 2025 degree list.

Class of 2025 (Fall 2024 Entry)

In March 2024, the Center selected its 40th Class of MSRED students.

Total Applicants   97
Accepted Applicants   41 (42% acceptance rate)
Enrolled Students   29 (71% yield rate)
Deferrals/Medical Leave   3

Class Statistics
- · Total Students: 32
- o Female   11 (34%)
- o Male   21(66%)
- · Domestic Students   15 (47%)
- · International   17 (53%)
- o Australia
- o Canada
- o China
- o Costa Rica
- o Germany
- o Hong Kong
- o India
- o New Zealand
- o Nigeria
- · Young Leaders   7

- Dual Degrees 5
    - o Master in City Planning 3
    - o Architecture 2

Current Impact on Educational Trends

The Master of Real Estate Development program was established as an 11-month program that allows professionals to get their degree in the quickest period of time possible. Several years ago, the program created an extended option for students, allowing them to earn their degree in 16 months. Pre-pandemic, less than one-third of the class took advantage of this option. Following the pandemic, it has become a considerably more popular alternative, with one-half to two-thirds of the previous three cohorts continuing on for longer. The increased participation in the 16-month program has no negative impact on our resources and provides the added benefit of cohort building. Returning students play an active part in welcoming and acclimating new students to MIT, and the increased student population has been a net positive for the program as a whole.

The program remains non-STEM (Science, Technology, Engineering, Mathematics) certified which has put some stress on admissions. There are presently other equivalent STEM-certified programs, making them more appealing to overseas applicants. The new Harvard Graduate School of Design Real Estate program is STEM accredited and emerged as one of our main competitors during the last admissions cycle.

VII. Research Activities

MIT/CRE's fundamental research, including working papers, journal articles, and outputs from our research labs, forms the foundation of our contributions to real estate knowledge. In parallel, our applied research initiatives and focused research clusters aim to deliver actionable insights for advancing a profitable, sustainable, and just real estate industry. Supported by our accomplished research staff, we continue to uncover innovative pathways toward a commercial real estate sector that is sustainable, equitable, and technologically advanced.

Fabio Duarte

Fabio Duarte, Principal Research Scientist and Lecturer, earned the 2023 J-WAFS MIT Solutions Grant. Duarte's research with Andrew Whittle of MIT's Department of Civil and Environmental Engineering, is addressing the urgent issue of Harmful Algal Blooms (HABs), which pose a threat to bodies of water worldwide. The project will leverage spectrofluorometer technology for effective algal detection.

Fabio Duarte is the faculty co-advisor with Professor Siqi Zheng, for the Women In Real Estate (WIRE) club at MIT/CRE. WIRE aims to advance women's participation in the real estate field. The club released their inaugural report in December 2023 which highlighted the very real gender inequality in commercial real estate.

"Defining a city—delineating urban areas using cell-phone data" co-authored by Lei Dong (former SUL-SCL post-doc), Fábio Duarte, Paolo Santi, and Carlo Ratti debuted in *Nature Cities* in January 2024. When defining cities, researchers consider different factors like population density and traffic flows. They suggest that geolocated data from over 7 billion cellphone users could act as a proxy for understanding the connections that shape cities. This data reflects people's presence and movements, and when combined with computational methods, it can help create dynamic city delineations to meet various research needs and advance urban science efforts.

Urban greenery is vital for achieving Sustainable Development Goals, but is constantly facing threats to its health. Due to the expenses involved in monitoring, many local governments lack sufficient data to manage greenery effectively. In this paper recently published in Nature Sustainability, authors, including Sustainable Urbanization Lab's (SUL), Fábio Duarte, review multiple tools and methods to monitor the health of urban trees.

Fabio Duarte's paper, "Spatial Optimization of Circular Timber Hubs", is published in NPJ Nature Urban Sustainability and has been featured in MIT News. This research is part of a collaboration between the AMS Institute, in Amsterdam, and MIT/SUL.

Air pollution has been linked with premature mortality and a multitude of morbidities. Despite declines in overall outdoor particulate matter levels in the US, studies focus mainly on exposures at residential locations and miss a critical portion of people's exposure: the workplace. The paper, "Quantifying Disparities in Air Pollution Exposures across the United States Using Home and Work Addresses," published in *Environmental Science and Technology*, evaluates home-based and workplace-based exposures for workers across the US. The research sheds light on disparities in exposure based on race, ethnicity, education, income, age, and job type. The study, involving 128-144 million individuals over seven years, emphasizes the need to broaden environmental justice metrics and addresses the structural racism contributing to pollution disparities nationwide. Co-authors: Priyanka deSouza (PhD '21), Fabio Duarte, Carlo Ratti, Susan Anenberg, Carrie Makarewicz, Manish Shirgaokar, John Durant, Patrick Kinney, and Deb Niemeier.

Jacques Gordon

How do you prepare for climate risk in real estate investments to cope with rising insurance costs, business interruption, and asset resilience? In, "Climate Threat: Extreme Weather is the New Normal for Real Estate", MIT/CRE lecturer Jacques Gordon, PhD., shares his research on how planning is key to successful climate risk mitigation in real estate investment. AFIRE Summit Journal

Lecturer Jacques Gordon was one of the co-editors of the *Journal of Portfolio Management's* 2023 Special Real Estate Issue. He was a co-author of the lead article, "Twenty Years of the Real Estate Special Issue: What might the next twenty years bring?" Jacques also co-authored an article with Lionel Foster, Greg MacKinnon, and Rachel Mavrothalasitis: "Social Awareness in Real Estate Investment: What should Investors do about the 'S' in ESG?"

Juan Palacios

Visiting Assistant Professor Juan Palacios has been awarded a Veni Grant from the Dutch Research Council (NWO). This grant will provide him with up to $300,000 in funding over the next three years, enabling him to broaden his research scope and collaborate with other researchers and institutions across the world to better understand how decarbonizing housing markets impacts our society.

"Quantifying the financial value of building decarbonization technology under uncertainty: Integrating energy modeling and investment analysis," was accepted by the journal, Energy and Buildings. The paper demonstrates how research can tackle the question of whether developers should choose traditional gas-based heating or fully electric-based heating, or pursue a third option of flexible design. This paper is led by Sustainable Urbanization Lab (SUL) graduate researcher Alejandro Jose Valdez Echeverria. Co-authors: Carlos Cerezo Davila, Juan Palacios, and Siqi Zheng.

Albert Saiz

Professor Albert Saiz has produced nine papers in the Urban Economics Lab (UEL) over the last year. Highlighting the most consequential of them, "Immigrants and Native Flight: Geographic Extent and Heterogeneous Preferences" (2024), examines ethnic segregation and native flight in Denmark from 1987 to 2017, utilizing extensive administrative data. This study explores how the presence of non-Western immigrants affects native Danish residents' decisions to relocate, focusing on neighborhood and building-level impacts. The findings reveal a strong trend of native flight, especially among older residents and in dense urban multifamily buildings. Economic factors, more than cultural, appear to drive this response, particularly toward low-income immigrant populations. Additionally, the study notes that neighborhoods with higher immigrant shares attract other non-Western migrants and young, low-income Danes, while housing prices decline, dispelling theories of competition for prime locations. Saiz's research, funded by the Rockwool Foundation, was presented at the Universitat Autònoma de Barcelona in May 2024, with additional contributions from UEL researcher Vinicios Sant'Anna at Boise State University.

Another impactful research paper, "Fragmented by Nature: Metropolitan Geography, Urban Connectivity, and Environmental Outcomes" introduces three novel indexes to quantify the impact of geographic barriers on urban development, land use and environmental outcomes across over 37,000 global cities: share of natural barriers, non-convexity (measuring natural fragmentation), and average road detour. Using four global city boundary datasets, the research finds that natural barriers lead to more complex

transportation environments and are associated with higher urban densities, smaller urbanized footprints, taller buildings, and less pollution, but also with lower incomes and smaller populations. The study reveals that cities with higher non-convexity indexes tend to have smaller populations, higher densities, less built-up area, lower GDP per capita, taller buildings, and lower CO_2 emissions. The research demonstrates the importance of accounting for geographic constraints when comparing environmental, economic, and social outcomes across global cities, providing a comprehensive analysis of how physical geography shapes urban form, connectivity, and socioeconomic outcomes worldwide.

This year, the *Journal of Economic Perspectives* Recommendations for Further Reading included Albert Saiz's working paper "The Global Housing Affordability Crisis: Policy Options and Strategies" which looks at how global housing prices are outpacing income growth, worsening well-being and sparking social unrest. Governments must actively engage with housing policy, explicitly defining objectives and considering necessary trade-offs. Professor Albert Saiz argues that housing and land-use policies require bipartisan support to ensure lasting impact. To avoid negative economic effects and stretch limited resources, subsidies should be precisely targeted. Saiz outlines thirty key economic strategies that can shape effective housing policies, highlighting their pros and cons through global case studies. Successful programs must anticipate the behavioral responses of individuals, firms, and markets, with professional, nonpartisan implementation being essential for success.

Zhengzhen Tan

There are regulatory and technological barriers to monetizing real estate carbon value, how could Web3 applications help overcome this challenge? For one, they offer the unique capability to increase data transparency and align stakeholders via tokenization to unlock new sources of investment. Explore the research into Web3 from CRE lecturer Zhengzhen Tan and her coauthors, Alice Guo, and Naveem Arunachalam in the Association for International Real Estate Investors (AFIRE) *Summit Journal*.

Walter Torous

MIT/CRE lecturer Annie Thompson, and Senior Lecturer, Walter Torous, co-authored a chapter with William Torous (UC Berkeley) "What Causes Residential Mortgage Defaults?" was accepted for publication to the *Oxford Research Encyclopedia of Economics and Finance*. In the chapter, they assess the voluminous research investigating why households default on their residential mortgages. A particular focus is oriented towards critically evaluating the recent application of causal statistical inference to residential defaults on mortgages.

Senior Lecturer, Walter Torous gave the keynote address at the Crocker Liu Retirement Symposium recently held at the Cornell S.C. Johnson College of Business. His talk, "Real Estate Finance: Then and Now" will be published in the *Cornell Real Estate Review*.

Siqi Zheng

As part of a joint research project with Home Builders & Remodelers Association of Massachusetts (HBRAMA), MIT/CRE and Wentworth Institute of Technology researchers spoke in July 2023 at a Massachusetts State House Briefing. Researchers highlighted pathways to reduce the state's carbon emissions and improve housing affordability, based on findings in, "Public Policy for Net Zero Homes and Affordability" by Payam Bakhshi, John Cribbs, Afshin Pourmokhtarian, Justin Steil, Zhengzhen Tan, and Siqi Zheng.

The paper, "Twitter Sentiment Geographical Index Dataset" was accepted by the journal Scientific Data. MIT/CRE's Sustainable Urbanization Lab (SUL) in collaboration with Harvard Center for Geographic Analysis, have developed the Twitter Sentiment Geographical Index (TSGI), the first dataset of its kind in scope and detail. Authored by Yuchen Chai, Devika Kakkar, Juan Palacios, and Siqi Zheng.

"Transboundary Vegetation Fire Smoke and Expressed Sentiment: Evidence from Twitter", coauthored by Rui Du, Ajkel Mino, Jianghao Wang and Siqi Zheng, was accepted for publication in the *Journal of Environmental Economics and Management* (JEEM). The research delves into the impact of transboundary wildfire smoke on the real-time sentiment of Twitter users in Southeast Asia, revealing that cross-boundary air pollution significantly diminishes people's happiness. These findings highlight the psychological and social costs, as well as geopolitical tensions, linked to cross-border air pollution spillovers from wildfires. The paper is a new research outcome from the MIT Asia Real Estate Initiative and MIT/CRE's Climate and Real Estate Research Consortium.

How does connectivity between cities influence economic and innovative activities of a city? In a study recently published in, Computers, Environment and Urban Systems, Professor Siqi Zheng and coauthors examined intercity networks in the US and China, focusing on communication, human mobility, and scientific collaboration. Their analysis reveals that a city's position within these networks better predicts its innovation output than population alone, especially for newer and more intricate technologies. These findings show the importance of urban network dynamics in shaping cities' success in innovation. Coauthors: Xiaofan Liang, Jianghao Wang, Cesar A. Hidalgo, and Pierre-Alexandre Balland.

Siqi Zheng discusses her research impacting real estate in MIT's Spectrum: "My work focuses on how to accelerate the adoption of all the new decarbonization technologies and how to improve the resilience towards climate risks in the real estate industry, how to identify the barriers and create new policy or market mechanisms to speed up this sustainable transformation."

VIII. Looking Forward

MIT/CRE's strategic initiatives position the Center to be a leader in real estate education and research. Paired with the MITs tradition of excellence in technology, knowledge transfer, and global reach, MIT/CRE's research and education initiatives aim to train practitioners to build responsibly and profitably. By forging collaborations with MIT Sloan and strengthening our MSRED program, we're providing students and industry with the knowledge to address pressing challenges. The upcoming 40th

anniversary of our first graduating class in 2025, will culminate in a celebration of our legacy, foster stronger alumnae/i ties, and fuel support for the next generation of real estate innovators. Through programs like the MIT-Maastricht Global Real Estate Leaders and research initiatives in Asia and Latin America, MIT/CRE is not only expanding its international reach but also creating pathways for sustainable, inclusive growth in real estate worldwide. As we look to the future, MIT/CRE remains dedicated to driving industry innovation, supporting impactful collaborations, and preparing thinkers and leaders to shape the built environment for decades to come.