

# MASTERS OF TALL BUILDINGS AND VERTICAL URBANISM

(M.TBVU)

ILLINOIS INSTITUTE OF TECHNOLOGY  
College of Architecture



# A NEW URBAN FUTURE

The Illinois Institute of Technology (IIT) and the Council on Tall Buildings and Urban Habitat (CTBUH) are pleased to announce the Masters of Tall Buildings and Vertical Urbanism (M.TBVU); the world's first multi-disciplinary advanced degree focused specifically on the building type that more than any other, in an age of rapid urbanization, holds the key to sustainable existence for humanity on this planet – the high rise. This new, design- and research-based program brings together students and professionals from architecture, real estate, engineering, urban design, construction management, finance, and other backgrounds in a unique learning environment built to foster interdisciplinary research and experience. Students will work with a remarkable roster of industry leaders to discover innovative approaches to vertical density and city-making.

“Future generations must design responsive, high-density cities that support both human and environmental health.”

**HIS EXCELLENCY, MOHAMED ALI ALABBAR**  
*Founder and Chairman, Emaar Properties, Dubai*

ADVISORY AND TEACHING PANEL MEMBER;  
SEE PAGE 10

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Students display their final work in Crown Hall at IIT.

## DEAN'S STATEMENT

With more than a million people projected to move into cities every week for the next 25 years – and in the face of major climate change – there is perhaps no greater challenge for humanity than creating humane, equitable, exciting, healthy urban centers. And there is no single building type more important to, or emblematic of, modern cities than skyscrapers. Moreover, there is no school of architecture with a stronger pedigree in tall buildings than Illinois Institute of Technology (IIT). After all, skyscrapers were invented in Chicago, just blocks from our campus. Many structural, formal, and organizational innovations in tall building design began as projects here at IIT. Our renowned faculty and advisory council enable our students to engage directly with the most influential experts in the field. Our fabrication center, one of the largest in the country, offers hands-on, at-scale project development. And you will study in Crown Hall, one of the most important works of modern architecture in the world (and the only purpose-built architecture school designed by Mies van der Rohe). This is a chance to develop expertise in a subject that is vital to our common future, and to do that in a setting that is unparalleled. Join us!



**REED KROLOFF**

*Dean, IIT College of  
Architecture*

## PROGRAM DIRECTOR'S STATEMENT

In order to ensure that cities are places where people can thrive, we must do more than simply increase density. This program looks to position its graduates at the nexus of how future cities develop. We need to integrate tall buildings more thoughtfully into both our urban and social fabrics. To accomplish this, we need to create a new cohort of professionals trained specifically to engage in the sustainable design, construction, operation, and management of tall buildings in the context of a comprehensive understanding of cities – a sustainable, vertical urbanism. Our new Masters program brings together the great strengths and diversity of Illinois Institute of Technology and the global Council on Tall Buildings and Urban Habitat – an unparalleled combination of academic and professional resources. CTBUH has a unique, 50+ year history of research, documentation, and advocacy; the only organization of its type in the world. Our 2 million+ members include virtually every world leader in the realm of tall buildings, from architects and engineers to developers, financiers, and public servants. Together, we offer students an opportunity that is simply not available elsewhere. As a graduate of this program, you will enter the field with a unique set of knowledge, skills, and connections, prepared to create positive, sustainable outcomes for future societies.



**DR. ANTONY WOOD**

*Director, M.TBVU, IIT;  
President, CTBUH*



# PROGRAM HIGHLIGHTS

Students in the “Towards Zero-Carbon Cities” studio visit Shenzhen, China, here at Tencent Seafront Tower (see page 20 for more).



## HELP DETERMINE THE FUTURE OF HUMANITY ON THIS PLANET

This program seeks to explore nothing less than the most sustainable solutions for an urban future, in the increasing global emergencies of climate change; health and wellness; population growth; and mass urbanization. See how the constituent courses contribute to this on page 6.



## EXPERIENCE THE LEARNING LABS OF CHICAGO & IIT

Chicago – and IIT – were the first crucibles for the skyscraper, and continue to be driving forces for the evolution of cities. Study in, and experience, the high-rise learning laboratories that are Chicago and the home of Mies van der Rohe: IIT (see page 14).





### WORK IN A MULTIDISCIPLINARY SETTING

The program brings together students and early-career professionals of myriad backgrounds, to work with experts of all disciplines in multi-perspective collaboration, to determine the most viable and sustainable way forward for cities (see page 10).



### CAREER OPPORTUNITIES

Many of the renowned firms supporting this program offer a paid one-year internship, pending an application process, after successful graduation (see page 12), or you can pursue a PhD or career in research (see page 18).



### FUNDING AND TRAVEL OPPORTUNITIES

Sponsored programs through CTBUH – as well as potential paid internships – support research, international travel, and other opportunities (see page 16).



### BEYOND THE TROPHY BUILDING

The program focuses beyond the tall building as a singular icon, to considering the three-dimensional vertical city as a whole (see past studio outputs on pages 20–27).

# PROGRAM PATHWAYS

Please note: All pathways below, whether M.TBVU or MS ARCH, and whether design- or research-focused, can be undertaken in two semesters, two semesters plus a summer, or spread over two years for those continuing to work in industry.

	FOUR PATHWAYS	SEMESTER 1: FALL	CREDITS
<p>TERMINAL DEGREE OPTION 1</p> <p><b>MASTERS OF TALL BUILDINGS AND VERTICAL URBANISM (M.TBVU)</b></p> <p>Most students, especially those from non-architecture undergraduate backgrounds, will likely see the “Masters of Tall Buildings and Vertical Urbanism (M.TBVU)” as the most appropriate – and differentiating – terminal degree.</p>	<p><b>1: M.TBVU DESIGN PATHWAY</b></p> <p>The core of the design pathway is the design studio in each semester. The first semester project is often set overseas (see more on page 16).</p>	<p>ARCH 545 Tall Building Studio</p> <p>ARCH 570 Seminar: Talking Tall I</p> <p>ARCH 572 Tall Building Technologies I</p> <p>Approved Elective</p> <p><b>TOTAL CREDITS:</b></p>	<p>6</p> <p>3</p> <p>3</p> <p>3</p> <p><b>15</b></p>
	<p><b>2: M.TBVU RESEARCH PATHWAY</b></p> <p>Students on the research pathway increasingly focus on a research output as the course progresses, rather than design studio.</p>	<p>ARCH 601 Research Methodologies</p> <p>ARCH 570 Seminar: Talking Tall I</p> <p>ARCH 572 Tall Building Technologies I</p> <p>Approved Elective</p> <p><b>TOTAL CREDITS:</b></p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p> <p><b>12</b></p>
<p>TERMINAL DEGREE OPTION 2</p> <p><b>MASTERS OF SCIENCE IN ARCHITECTURE (MS ARCH)</b></p> <p>Those students specifically envisaging a career in architecture might see benefit in a wider “Masters of Science in Architecture, with an emphasis on Tall Buildings and Vertical Urbanism (MS ARCH)” as the terminal degree.</p>	<p><b>3: MS ARCH DESIGN PATHWAY</b></p> <p>Students on this pathway undertake a distinct Masters Design Project during the summer to culminate their degree.</p>	<p>ARCH 545 Tall Building Studio</p> <p>ARCH 570 Seminar: Talking Tall I</p> <p>ARCH 572 Tall Building Technologies I</p> <p>ARCH 591 Research &amp; Thesis MS (Part I)</p> <p><b>TOTAL CREDITS:</b></p>	<p>6</p> <p>3</p> <p>3</p> <p>3</p> <p><b>15</b></p>
	<p><b>4: MS ARCH RESEARCH PATHWAY</b></p> <p>All students, irrespective of the design or research pathways, collaborate with others in the multi-disciplinary design studio course, taken in second semester (ARCH 546).</p>	<p>ARCH 601 Research Methodologies</p> <p>ARCH 570 Seminar: Talking Tall I</p> <p>ARCH 572 Tall Building Technologies I</p> <p>ARCH 591 Research &amp; Thesis MS (Part I)</p> <p><b>TOTAL CREDITS:</b></p>	<p>3</p> <p>3</p> <p>3</p> <p>3</p> <p><b>12</b></p>

SEMESTER 2: SPRING	CREDITS	SEMESTER 3: SUMMER	CREDITS	TOTAL CREDITS
ARCH 546 Multidisciplinary Studio	6			30
ARCH 571 Seminar: Talking Tall II	3			
ARCH 573 Tall Building Technologies II	3			
Approved Elective	3			
<b>TOTAL CREDITS:</b>	15			
ARCH 546 Multidisciplinary Studio	6	ARCH 592 Masters Project (Research)	6	30
ARCH 571 Seminar: Talking Tall II	3			
ARCH 573 Tall Building Technologies II	3			
<b>TOTAL CREDITS:</b>	12		6	
ARCH 546 Multidisciplinary Studio	6	ARCH 591 Research & Thesis MS (Part II)	5	32
ARCH 571 Seminar: Talking Tall II	3			
ARCH 573 Tall Building Technologies II	3			
<b>TOTAL CREDITS:</b>	12		5	
ARCH 546 Multidisciplinary Studio	6	ARCH 591 Research & Thesis MS (Part II)	5	32
ARCH 571 Seminar: Talking Tall II	3			
ARCH 573 Tall Building Technologies II	3			
Approved Elective	3			
<b>TOTAL CREDITS:</b>	15			



# PROGRAM COURSE DESCRIPTIONS

## **ARCH 545: TALL BUILDING DESIGN STUDIO**

(6 credits, Semester One)

The Tall Building Design Studio is the core of the design pathway through both the M.TBVU and MS ARCH terminal degree routes. Students work collaboratively in small groups (typically 2–4 students) on a real-world design problem and site, usually of some complexity and on an urban – as opposed to a single tall building – scale. This first semester project is often set overseas, with a travel stipend offered to help support the international site visit and cultural experience. (Note: All students in the program, irrespective of design or research pathway, can join this overseas study – see more on page 16). The studio typically meets with professors to conduct “desk crits” on two afternoons per week, with a weekly “pin-up” setting the overall pace. In addition, an interim mid-term review, and final review, provides feedback for refinement, and assessment from professors and distinguished invited guest critics. Examples of past studio subjects and outputs are shown on pages 20–27 of this brochure.

## **ARCH 546: MULTIDISCIPLINARY DESIGN STUDIO**

(6 credits, Semester Two)

The Multidisciplinary Design Studio occurs in semester two, following on from the Tall Building Design Studio of semester one (ARCH 545). All students undertake this core course, irrespective of whether on the M.TBVU or MS ARCH, and design or research pathways. Students work in collaboration with other students, professionals, and professors on a real-world design project. Each student group (typically 3–4 students per group) brings together different disciplinary backgrounds and unique perspectives on the

design approach. Thus students of architecture, business, engineering, communications, real estate, management and other backgrounds work together to determine the future of the typology. The design exercise itself often flows from the Tall Building Design Studio (ARCH 545), transitioning from the urban scale of semester one, to a specific building scale in semester two. The Tall Technologies II course (ARCH 573), is assessed through a developed technical aspect of the design project undertaken in this studio. Examples of past studio subjects and outputs are shown on pages 20–27 of this brochure.

## **ARCH 570: TALKING TALL I** (3 credits, Semester One)

## **ARCH 571: TALKING TALL II** (3 credits, Semester Two)

Whereas the “Tall Technologies” course (see next description) explores the technical / engineering aspects of Tall Buildings, the Talking Tall course is focused on the “softer” side of tall buildings and cities, and examines the physical, environmental, and social sustainability implications of urban density at human, architectural, and urban scales. Sub-topics include: appropriateness to context / a new skyscraper vernacular; big data; design principles; economics and cost; energy consumption; evolution of density; façades; a history of the skyscraper; life-cycle considerations; natural ventilation; new typologies; the rise of an environmental consciousness; skybridges; urban trends, drivers, and challenges; vertical greenery; and vertical urbanism vs. suburban sprawl. All of this is undertaken with a view to a discourse on what should constitute a holistic vision of “sustainable vertical urbanism.” The course is largely delivered by the program director, Dr. Antony Wood, with some guest lecturers, and also includes some key office visits and tall building tours. The course is convened as a seminar course, with three distinct aspects each week; (i) a presentation on a particular subject; (ii) a reading related to that subject; (iii) a comprehensive discussion around that subject.

**ARCH 572: TALL TECHNOLOGIES I** (3 credits, Semester One)  
**ARCH 573: TALL TECHNOLOGIES II** (3 credits, Semester Two)

This lecture/seminar course provides students with an understanding of the technologies that enable tall buildings and dense future cities, especially cutting-edge and emerging technologies. The technologies examined will embrace both the building and urban (infrastructure) scales. Sub-topics include; artificial intelligence (AI); building automation control systems; building information modeling (BIM); building maintenance; construction; energy conservation and generation, environmental engineering; environmental protection; façade engineering and systems; fire and life safety engineering; geo-technical / foundations; MEP engineering; project and property management; renovation & retrofit; security; seismic engineering; structural engineering; sustainability; transportation; urban infrastructure; vertical transportation; and wind engineering. Sustainability and energy/carbon implications serve as a consistent theme across all topics. The course will be delivered through weekly lectures, typically delivered by a high-profile subject expert from the field of practice, together with further research and discussion.

**ARCH 601: RESEARCH METHODOLOGIES**  
(3 credits, Semester One)

This course – undertaken with other research-focused students in the College of Architecture at IIT – provides a foundation for advanced students in the diversity of research paradigms in architecture. The first component is an introduction to the philosophy of knowledge with an emphasis on architecture. The second component entails a critical review and evaluation of diverse research methodologies in current doctoral architectural research. It is intended to provide substantial information on research methodologies not covered in undergraduate and graduate education.

In this course students will write a series of papers that critically review the course readings and discussions.

**ARCH 591: RESEARCH & THESIS MS, I & II**  
(8 Credits, Yearlong)

**ARCH 592: MASTERS PROJECT**  
(6 Credits, Yearlong or Summer)

The Research & Thesis MS, and the Masters Project, both involve the synthesis of architectural study into an independent project. The Project most commonly embraces either the design of a tall building, or in-depth research about a specific aspect of tall buildings or cities. Students work one-on-one with a supervisor and outputs might include traditional forms such as a design project or written thesis, but also non-traditional forms such as a website, video or exhibition. The area of focus for the Masters project is often an extension of a previous study undertaken through other classes. The key differences between ARCH 591: Research & Thesis MS and ARCH 592: Masters Project, is that ARCH 591 requires a specific written component to the final output (hence the extra two credits for this course), and the process – including meetings with the project supervisor – start earlier in the year, in semester one.



The Chicago Architecture Foundation exhibit “Unseen City: Designs for a Future Chicago,” which featured work produced in the IIT-CTBUH Tall Building Studio course.

# ADVISORY AND TEACHING PANEL

The high-profile, multidisciplinary Advisory and Teaching Panel meets once per year to review outputs and the direction of the course. In addition, each member – who is appointed for a three-year term initially – is committed to a significant involvement in the course during their appointment. That involvement might embrace tutorials and studio reviews; presentations to the group; hosting office visits; and other initiatives.

Companies designated with an asterisk (\*) have also committed to supporting a paid internship following graduation from the program, pending an application process.



**HIS EXCELLENCY,  
MOHAMED ALI  
ALABBAR**

*Founder and Chairman,  
Emaar Properties\*, Dubai*

Global entrepreneur and head of most renowned Middle Eastern property developer, owner of Burj Khalifa, Dubai.



**WILLIAM BAKER**

*Consulting Partner,  
Skidmore Owings and  
Merrill\*, Chicago*

Structural engineer for the world's tallest building, the Burj Khalifa, and many other notable projects.



**STEFANO BOERI**

*Founding Partner,  
Stefano Boeri Architetti\*,  
Milan*

Architect for Bosco Verticale, Milan and numerous other vegetated high rise buildings.



**MELISSA BURTON**

*Director, Arup\*,  
Toronto*

Leader of planning, advisory and technology services, and an Arup Fellow, with a background in wind engineering and a focus on environmental and urban realm impacts.



**ALBERT CHAN**

*Director Of Development  
Planning And Design,  
Shui On Land\*, Shanghai*

Leads the master planning, sustainability efforts and design of large mixed-use developments in China, including the world-renown Xintiandi in Shanghai.



**NATHALIE DE VRIES**

*Founding Partner,  
MVRDV\*, Rotterdam*

Architect, urbanist and lecturer; head of one of Europe's most experimental architectural practices.



**JEANNE GANG**

*Founder, Studio Gang\*,  
Chicago*

Chicago-based architect known for several seminal tall buildings such as Aqua and Vista Towers, Chicago.



**OUSSAMA KABBANI**

*Advisor to His Excellency,  
CEO, Royal Commission for  
Riyadh City, Saudi Arabia*

Urban Development specialist, Harvard graduate, former chief planner for Beirut, and current advisor on the urban expansions of Riyadh.



**JAMES VON  
KLEMPERER**

*President, Kohn Pedersen  
Fox\*, New York City*

Leader of one of the world's most famous architectural practices for tall buildings, designers of Shanghai World Financial Center, Shanghai, among others.





## VIVIANA MUSCETTOLA

*Director, Zaha Hadid Architects\*, London*

Italian architect and director at ZHA, working on numerous high rise projects globally.



## LYNN OSMOND

*President & CEO, Chicago Architecture Center, Chicago*

Long-standing leader of one of the world's most significant architecture centers / cultural organizations.



## JAMES PARAKH

*Program Manager of Urban Design, City of Toronto Planning Division, Toronto*

Award-winning architect and Chair of the CTBUH Urban Design Committee.



## GREGG PASQUARELLI

*Founding Principal, SHoP Architects\*, New York City*

Architect for world's "most slender" tall building, 111 West 57th Street, as well as American Copper, both in New York City, and other notable high-rises.



## ROBERT PRATT

*Managing Director, Tishman Speyer\*, New York City*

MD of one of the world's largest real estate development firms, with projects in over 30 countries, and an alumni of IIT's College of Architecture.



## BENJAMIN ROMANO

*Founding Partner, LBR&A Arquitectos\*, Mexico City*

Prominent Latin American architect, developer and educator; previous Harvard expert-in-residence; designer of Mexico's seminal Torre Reforma.



## MOSHE SAFDIE

*Founder, Safdie Architects\*, Boston*

Architect, urban planner, and theorist rethinking connected vertical urbanism with projects such as Marina Bay Sands, Singapore.



## SASKIA SASSEN

*Professor, Columbia University, New York City and London School of Economics, London*

Sociologist and foremost thinker on globalization and future cities; Coined the term "global city."



## MARTHA SCHWARTZ

*Founding Principal, Martha Schwartz Partners\*, New York City*

One of the world's foremost landscape architects, and professor at Harvard University.



## WERNER SOBEK

*Founder, Werner Sobek Ingenieure\*, Stuttgart*

Famous engineer of numerous high-rise buildings, as well as founder of the Institute of Lightweight Structures, Stuttgart.



## CHARU THAPAR

*Executive Director, Property and Asset Management APAC, JLL\*, Mumbai*

Responsible for the asset management of over 240 million square feet of office space in the Asia Pacific region.



## SHAOFENG WANG

*CEO, International Operations, China State Construction Group, Beijing*

Head of the overseas arm of the world's largest construction firm, with projects in over 40 countries.



## MIKE WELLS

*Co-Founder, Biodiversity by Design, London*

Ecologist and eco-urbanist, with 40 years experience in ecological science.



## CAROL WILLIS

*Founding Director and Curator, The Skyscraper Museum, New York City*

Architectural historian and author of seminal texts such as "Form Follows Finance: Skyscraper and Skylines in & New York & Chicago."



## MUN SUMM WONG

*Founding Partner, WOHA Architects\*, Singapore*

One of the most progressive practices designing environmental high-rise buildings today.

## Alumni Reflections



"Coming from Thailand, it was my dream to work at KPF after graduation from IIT."

**PIM SUNSANEEVITHAYAKUL**

*Architectural Designer, KPF,  
New York City*



"After my PhD on Urban vs. Suburban Sustainability at IIT in 2015, I worked for CTBUH and am now Director of the Master of Urban Design Program at Thomas Jefferson University, Philadelphia."

**DR. PENG DU**

*Director of Master of Urban Design  
Program, Thomas Jefferson University*



"After the IIT-CTBUH Tall Building Program, I was assisted with a placement in the Gensler Shanghai Office, where I have been since 2018, now an associate."

**JARED DAVIS**

*Designer, Gensler, Shanghai*



"I continued one of the themes from the tall building course into a PhD study, and now also have a teaching position at IIT."

**ZAHIDA KHAN**

*Adjunct Professor and  
PhD Candidate, IIT*

## INTERNSHIP OPPORTUNITIES

The companies listed here have committed to supporting a paid internship following graduation from the program, pending an application process.

**ARUP**

**BOERI**  
STEFANO  
BOERI  
ARCHITETTI



**JLL**

**KPF**

**LBR&A**  
L. Benjamin Romano  
arquitectos

**Martha  
Schwartz  
Partners MSP**

**MVRDV**

**SafdieArchitects**

**sh p**



**SOM**

**Studio Gang**



TISHMAN SPEYER

**WRNRL SOYML .**

**W O H A**

**Zaha Hadid Architects**

# STATEMENT ON STEM

The M.TBVU program is officially approved as a STEM (science, technology, engineering, and mathematics) designated field of study in Architectural and Building Sciences/Technology within the U.S. Department of Homeland Security's STEM designated fields list. International students who have earned degrees in STEM fields in the US, may apply for a 24 month extension of their post completion Optional Practical Training (OPT) employment for a total of 36 months, a significant benefit for international students who wish to stay and work in the US, post-graduation.



Students work in Crown Hall.



## ABOUT IIT

The Illinois Institute of Technology is a venerable, research-driven technological university located in Chicago. With more than 5000 students (from nearly every country in the world), 1000 faculty and staff, and a history of breakthrough developments (the cell phone was invented here, as was design-thinking), IIT has been an important center for education and research in the Midwest for more than 100 years.

IIT's campus, designed by renowned architect Ludwig Mies van der Rohe, is located just south of Chicago's vibrant and architecturally rich downtown. Our proximate and collaborative relationship with the nation's third-largest city provides both inspiration and a fertile testing ground for research and practice, as students learn from, and work, in a global metropolis. As such, many of IIT Architecture's students and faculty have left their mark on Chicago in the high-rise realm, including Bruce Graham and Fazlur Khan's Sears (now Willis) Tower and the John Hancock Building (now 875 North Michigan Avenue), among many others.

To learn more about IIT, visit **IIT.edu**.



The College of Architecture is housed in Mies van der Rohe's masterpiece at IIT, Crown Hall.

“The supertall building was invented in the basement of IIT’s Crown Hall, through the work of Fazlur Khan, David Sharpe, and others.”



**WILLIAM BAKER**  
*Consulting Partner, Skidmore  
Owings and Merrill, Chicago*  
ADVISORY AND TEACHING  
PANEL MEMBER;  
SEE PAGE 10

## SUPPORT OPPORTUNITIES THROUGH IIT

IIT offers a full program of student support, ranging from financial aid to health care to teaching opportunities. Nearly all IIT students are eligible for aid through the university (Federally supported programs are limited to US citizens). The College also offers a range of scholarships, internships, and work opportunities. As graduate students, participants in the program are also eligible to apply for teaching assistantships in the University, as well as the College of Architecture. For more information on all these programs, please see: **IIT.edu**.

# ABOUT CTBUH

The Council on Tall Buildings and Urban Habitat (CTBUH), founded in 1969 and with offices in Chicago, Shanghai and Venice, is the world’s leading non-profit organization for all those interested in the future of cities.

We explore how increased urban density and vertical growth can support more sustainable and healthy cities, especially in the face of mass urbanization and the increasing effects of climate change. The relationship between policy, infrastructure, buildings, people, space, and place is key.

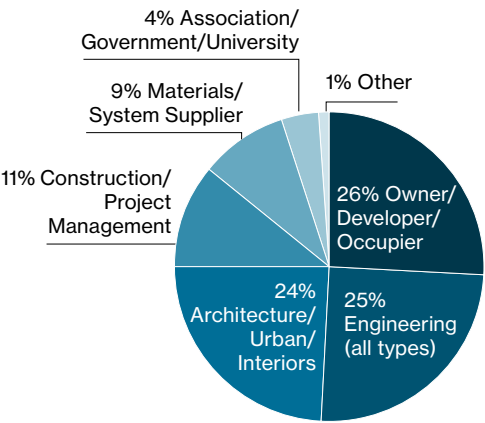
Students taking the M.TBVU program will benefit from CTBUH initiatives directly, including opportunities for internships, sponsored research, design, conference, and travel programs (see more on this on page 16). In addition, students will gain unparalleled access to the CTBUH global network of multi-disciplinary professionals. Key office visits, building tours, industry internships and future career opportunities will be an integral part of the program. For a glance at some of the high-profile CTBUH members who are part of the M.TBVU Advisory and Teaching Panel, see page 10.

To learn more about the Council, visit [CTBUH.org](https://www.ctbuh.org).

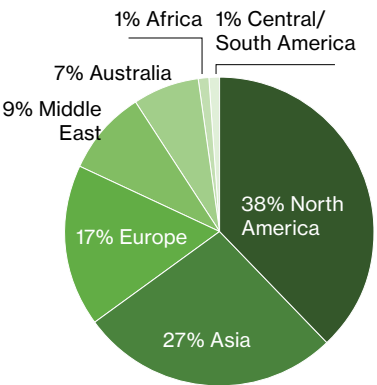


Bjarke Ingels, of Bjarke Ingels Group (BIG) addresses 1,000 of the top international decision-makers at the CTBUH 2019 10th World Congress.

“The CTBUH organizational member network embraces over 2 million individuals, working in 10,000+ offices, in more than 100 countries around the world.”



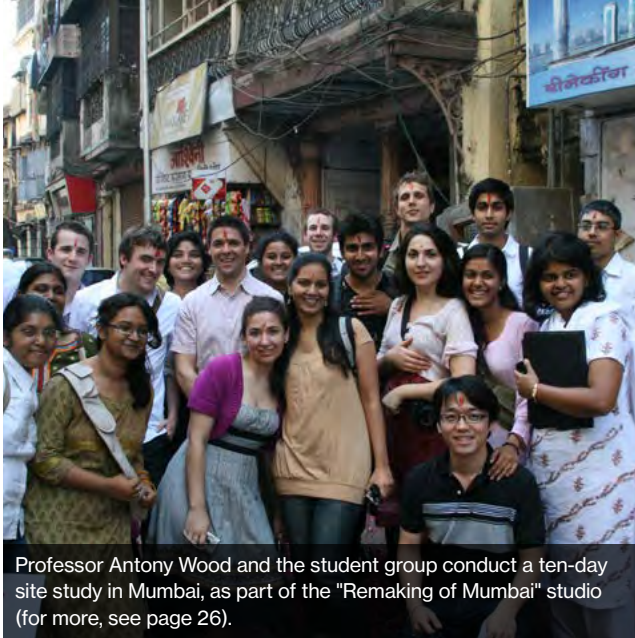
CTBUH Members by Profession



CTBUH Members by Region

# UNIQUE SUPPORT OPPORTUNITIES THROUGH CTBUH

In addition to internship and career opportunities, students in this degree program can benefit from the following specific academic programs convened by the CTBUH:



Professor Antony Wood and the student group conduct a ten-day site study in Mumbai, as part of the "Remaking of Mumbai" studio (for more, see page 26).

## INTERNATIONAL TRAVEL PROGRAM

Every student in the program will have the opportunity to join an overseas study visit in semester one, receiving a travel stipend (usually around US\$1,000) to help offset expenses. The destination for this study visit is usually driven by two, typically aligned, influences: (i) the location of the CTBUH Annual Conference, and (ii) the location of the site that serves as a vehicle for the Tall Building Design Studio (ARCH 545).

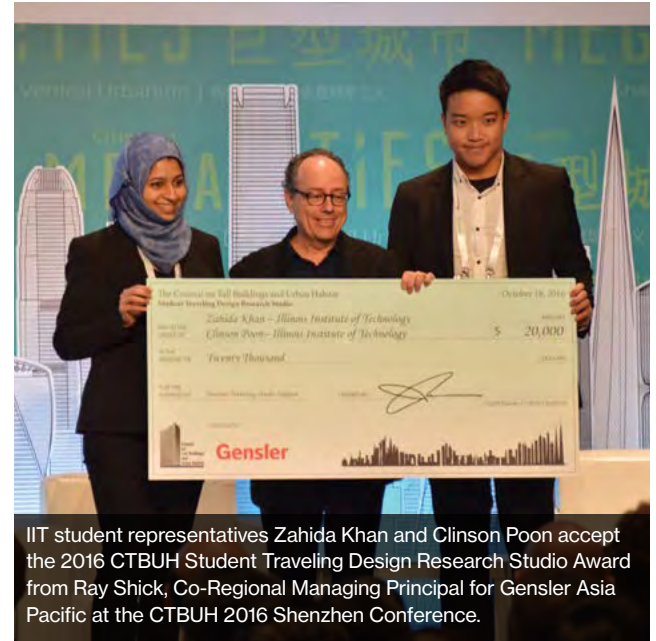


A finalist in the International Student Design Competition presents their work to a jury of distinguished industry professionals at the CTBUH 2017 Australia Conference, Sydney.

## INTERNATIONAL STUDENT DESIGN COMPETITION

The CTBUH Student Tall Building Design Competition champions site-specific urban responses to global issues, while giving top students the chance to showcase their work. Finalists are selected to present their proposals to a jury of experts at the CTBUH International Conference, where an overall winner is selected. Winning students receive cash prizes, as well as complimentary conference registration and travel/accommodation costs.





## CONFERENCE ATTENDANCE

The Council holds two major international conferences per year; its Tall & Urban Innovation Awards Conference in the spring (held in Chicago), and its Annual Conference held in a high-rise city somewhere around the world each fall. All students in the program receive complimentary registration at both conferences (typically around US\$1,500). Locations of CTBUH conferences in the past ten years include Abu Dhabi; Dubai; Hong Kong; London; Mumbai; New York City; Seoul; Shanghai; Shenzhen; and Sydney.

## STUDENT RESEARCH COMPETITION

The goal of the annual Student Research Competition is to assist talented students, working in groups under the guidance of a professor, to focus on a relevant research question, and create an engaging output as a response. The competition typically culminates with an award of US\$10,000–\$20,000, recognized on stage at the CTBUH International Conference, and promoted through CTBUH channels and platforms. The project often also leads to a publication or other substantial output.

# PHD AND RESEARCH OPPORTUNITIES

The program is an excellent feeder into three different types of career: professional practice, further advanced study at the PhD level, or even a career in research. There are opportunities for internships at CTBUH during the program itself, as well as the possibility of appointment as a research assistant after graduation. The following studies are examples of industry and federally-funded research projects at CTBUH in the past few years.

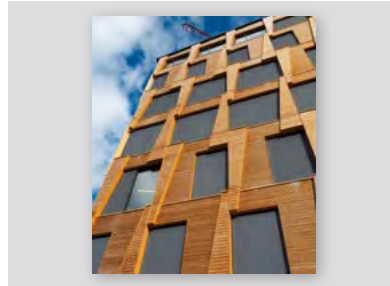


## A Comprehensive Study on Tall Building Damping Technologies

Project Completion: October 2017  
Project Duration: 2 years

Funding Sponsor: Bouygues Batiment International

Produced a comprehensive study of the damping technologies available for tall buildings, describing their function and relationship to other building components.



## Future Timber City: An Awareness and Educational Program for Future, Sustainable, Dense Cities

Project Completion: July 2022  
Project Duration: 2 years

Funding Sponsor: USDA Forest Service and Binational Softwood Lumber Council

Provides a framework for better understanding the character and dimensions of a future mass timber city.



## The Space Between: Urban Places, Public Spaces & Tall Buildings

Project Completion: October 2017  
Project Duration: 2 years

Funding Sponsor: CTBUH

Investigated the importance of publicly accessible spaces surrounding tall buildings, and how they impact the quality of life for those that live, work, and visit tall building neighborhoods.



## Robotics in Tall Building Construction

Project Completion: November 2020  
Project Duration: 2 years

Funding Sponsor: Schindler

Identified the incentives for, and obstacles to, the adoption of robotics in the construction industry.



## A Study of the Sustainability Implications of Differing Urban + Suburban Locations in Chicago

Project Completion: February 2016  
Project Duration: 2 years

Funding Sponsor: CTBUH and Illinois Institute of Technology

A comprehensive real-data study on all factors that contribute to "sustainability" in an urban vs. suburban context.



### **Skybridges: Bringing the Horizontal into the Vertical Realm**

Project Completion: August 2020

Project Duration: 2 years

Funding Sponsor: TK Elevator GmbH

Succinctly captured the state-of-the-art in skybridge design, as well as puts forward a set of principles for future development.



### **The Space Within: Skyspaces in Tall Buildings**

Project Completion: November 2018

Project Duration: 2 years

Funding Sponsor: CTBUH Urban Habitat Committee

Identified and addressed the missing technical requirements for green living technologies (for roofs and façades) in existing international standards.



### **A Study on the Design Possibilities Enabled by Ropeless, Non-Vertical Elevators**

Project Completion: September 2018

Project Duration: 2 years

Funding Sponsor: TK Elevator GmbH

Investigated how technological innovation in elevators, specifically ropeless non-vertical cabins, could impact the design outcomes of tall buildings and cities.



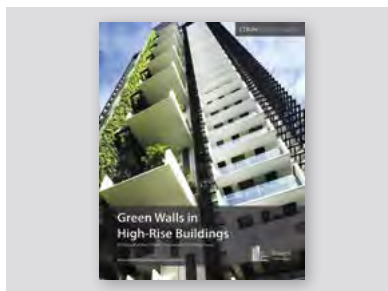
### **Life Cycle of Tall Building Structural Systems**

Project Completion: January 2015

Project Duration: 2 years

Funding Sponsor: ArcelorMittal

Established a definitive comparison of the life-cycle carbon implications of steel, concrete, and composite structural systems in tall buildings.



### **Green Walls in High-Rise Buildings**

Project Completion: October 2014

Project Duration: 1 year

Funding Sponsor: Arup

Set out recommendations for selecting, implementing, and maintaining green walls in high-rise buildings.



### **CIB, CTBUH & UNESCO Research Roadmap**

Project Completion: January 2014

Project Duration: 2 years

Funding Sponsor: CTBUH; International Council for Research and Innovation in Building and Construction; UNESCO

Identified priority research topics and gaps in the field of tall buildings, and created a guide to assist professionals in the planning of future research and funding.

# SELECT PAST STUDIO COURSES

The following pages show a selection of IIT-CTBUH studios in recent years, where the emphasis on considering connected urbanism on a city scale – as opposed to a single tall building – will be apparent.

## TOWARDS ZERO-CARBON CITIES

Shenzhen, China

The United Nations forecasts that 70 percent of the world's projected nine billion population will be urbanized by the year 2050, creating one million new urban inhabitants per week for the next several decades<sup>1</sup>. At the same time, the planet is rapidly experiencing climate change, and every indication is that there is an urgent need to slow the rate of planetary warming within less than a decade to avert catastrophic consequences, especially with respect to coastal cities<sup>2</sup>.

This year-long studio conducted research in order to develop a typology of possible sustainable vertical cities that *integrate the maximum number of relevant sustainable design strategies and technologies*, not only in terms of carbon, but also in terms of internal environment, building community, and the impact of the building on the physical, social and cultural realms.

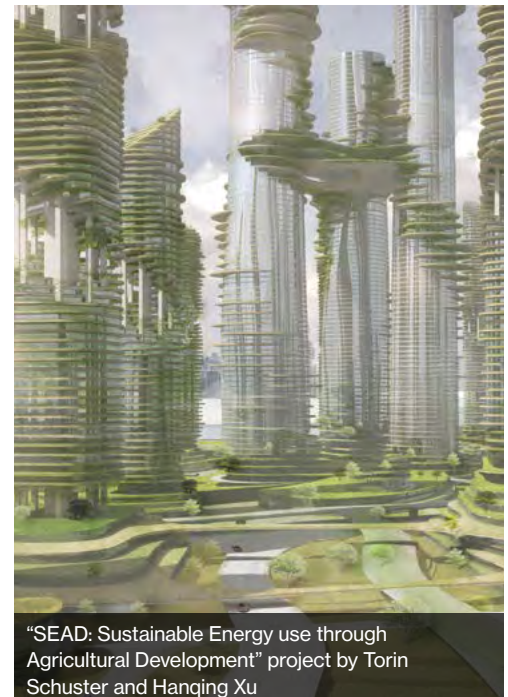
In the fall semester, students focused on the urban scale, in the context of the Qianhai area of Shenzhen, China – which they visited. They researched and designed a zero-carbon city, which was expected to run entirely on renewable energy. In the spring semester, the students focused on a zero-carbon cluster of skyscrapers – specifically developing the design within the urban design developed in the previous semester. The final designs took into consideration the cultural, climatic, and physical aspects of the location, and focused on net-zero carbon technologies and systems within the design proposals.

<sup>1</sup>United Nations Department of Economic and Social Affairs, Population Division, 2018; <https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html>

<sup>2</sup>Global Warming of 1.50C. Summary for policymakers. Intergovernmental Panel on Climate Change, 2018.

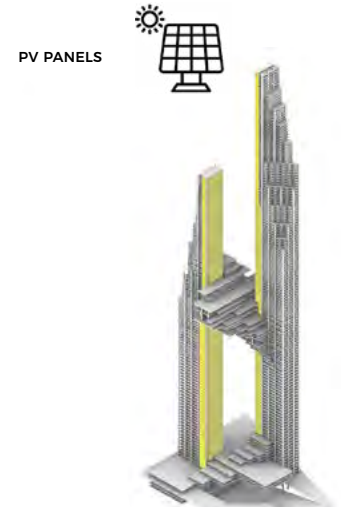
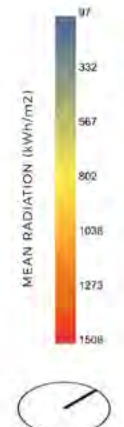
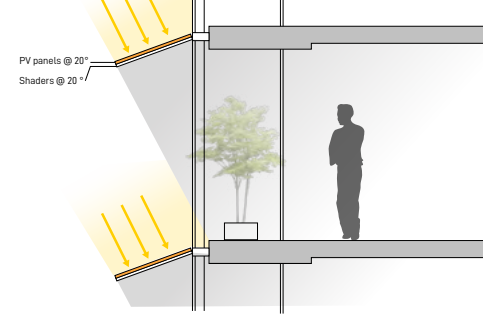
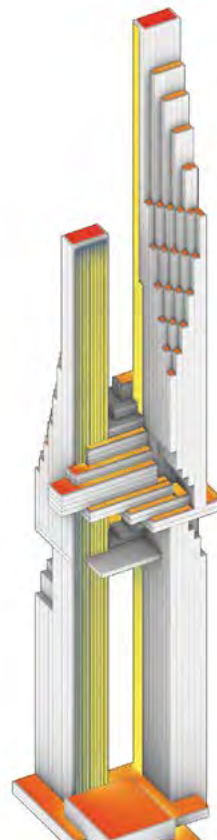


"Vertical City" project by Andrea Fernandez, Qin Lu, and Yilie Wang

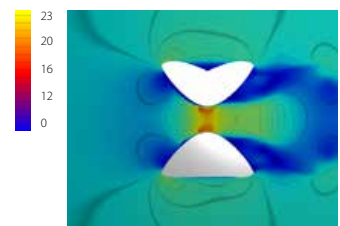
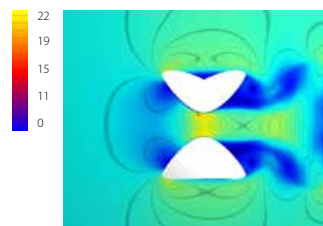
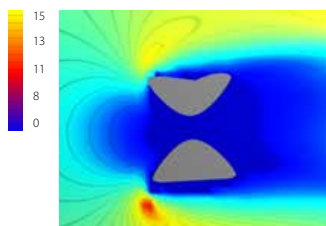
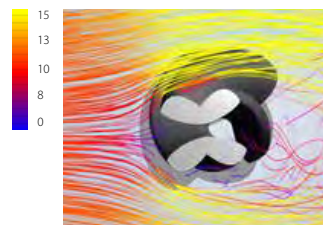
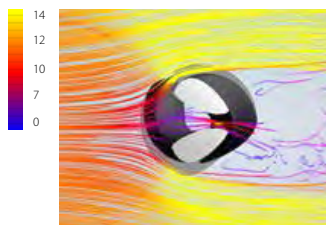


"SEAD: Sustainable Energy use through Agricultural Development" project by Torin Schuster and Hanqing Xu





"Solar Strip" by Deniz Demir, Pim J. Sunsaneevithayakul, and John Paul



"Anemoi Towers" by Efrain Juarez, Ankhbayar Dalanjin, Mateusz Dmowski. Left: Model; Right: Initial wind flow simulations from prevailing winds on early planar design iterations.

## SUSTAINABLE VERTICAL URBANISM: TOWARDS 2050

Global Studio

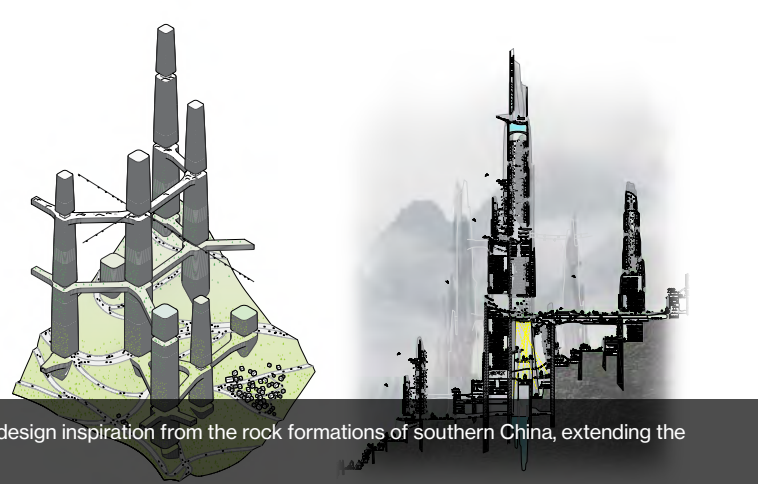
In this year-long studio, students were presented with the following scenario: The year is 2050 and, after five decades of attempting to adapt cities to cope with “natural” disasters of increasing frequency and severity in the face of accelerating climate change, humanity has come to accept a simple truth: that many existing cities – especially coastal cities – are no longer viable into the future. The United Nations has thus established a task force to address the needs of our cities. Students were asked to determine the most sustainable global locations for new cities, and determine how these cities can maximize environmental and cultural symbiosis with both terrain and climate.

In the fall semester, students conducted research in order to determine where these new cities would be best located, relative to; current population densities; the impact of climate change; and the inherent sustainability opportunities of climate and resources locally. Student groups developed the outline strategies for cities in radically different terrains and climates; the hot Saharan desert of north Africa; the mountainous Himalayas; a deforested region of the Amazon; the increasingly flooded Ganges delta of Bangladesh; the grasslands of south Sudan; the melting Arctic; and the middle of the South China Sea.

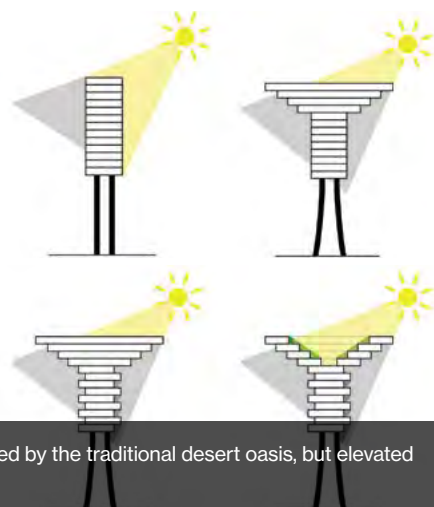
In the spring semester, students developed their strategic urban designs into the detailed design of a cluster of buildings. Students determined the size, height, function, accommodation, and responsibilities of the building(s), according to their strategic urban plan and a consideration of urban life in the future.



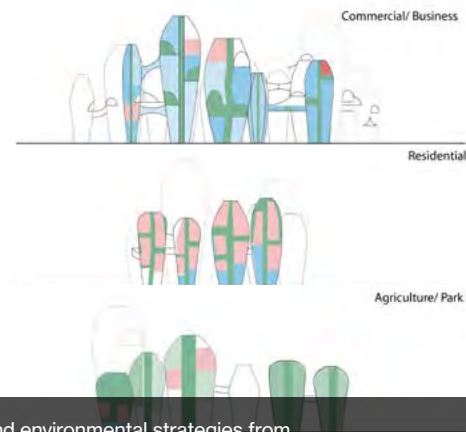




"The Mountain City" by Jared Davis and Drew Armetta, Himalayas, took its design inspiration from the rock formations of southern China, extending the city into mountainous vertical form.



"The Desert City" by Kristen Barrett, Olumurewa Oguntade, and Ernesto Zuniga Jr, Algeria, was influenced by the traditional desert oasis, but elevated to a datum of 500–1,000 meters, harvesting water from high-level cloud and fog.



"The Grasslands City" by Arlene Hayes and Tra Nguyen, Sudan, studied and replicated both form and environmental strategies from African termite mounds.

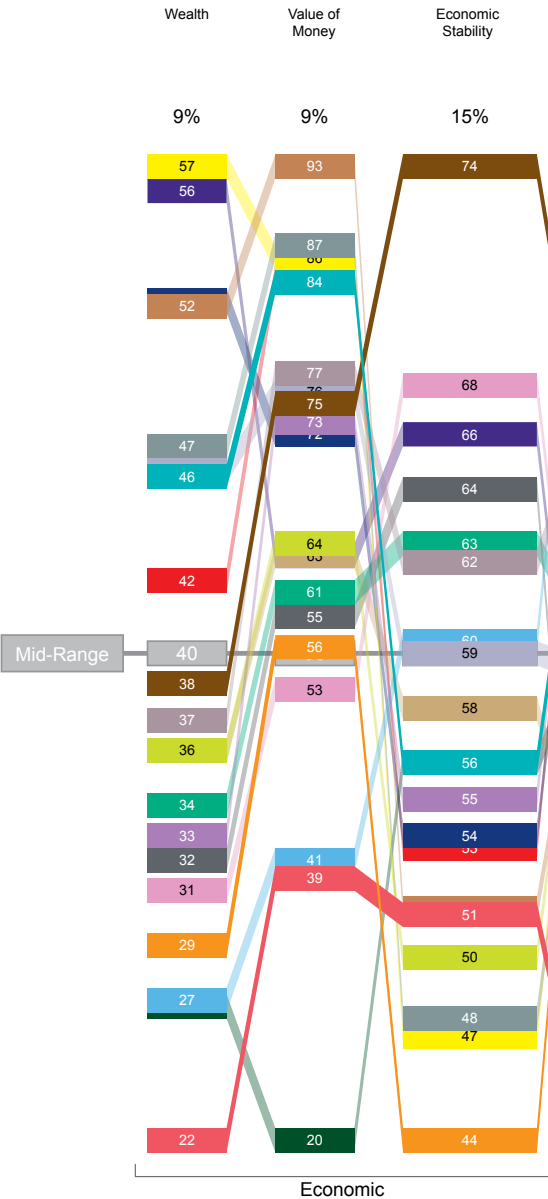
URBAN SUSTAINABILITY INDEX PROJECT

Global Studio

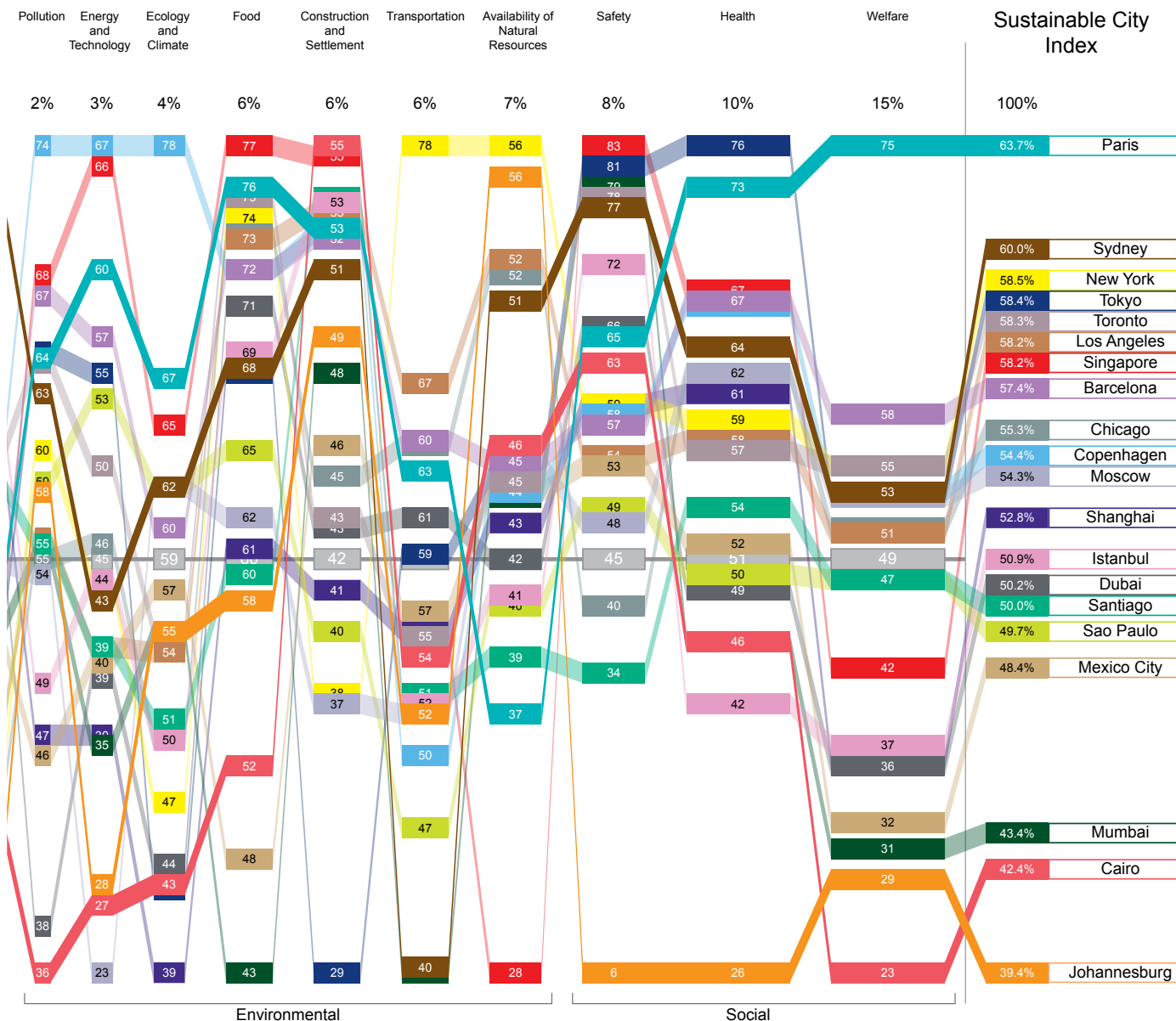
This semester-long studio took a break from designing sustainable skyscrapers, to step back and examine what the term “sustainability” really means, on an urban scale. A simple question was posed: “What contributes most to the sustainability of cities?” If one considers only the environmental sustainability of cities, then the most sustainable city is most likely that which consumes fewer resources and emits fewer pollutants per capita. However, “sustainability” is the equilibrium point of three different aspects: social, economic, and environmental.

The studio thus started from this point, investigating 20 cities across the world in order to understand “where they are” and “where they are going” in their path toward sustainable development. Each student explored a number of “parameters” that might contribute to the social, environmental and economic wellbeing of the 20 cities. Eventually a set of 13 “parameters” was identified across the group: three parameters related to the economic characteristics of the cities, three related to their social qualities, and seven for their built and natural environment.

Twelve “indicators” were then determined and researched within each of these parameters, with data found or calculated using the most reliable, publicly-available sources. Weighting systems were agreed on by the group, in consultation with the group, to create a ranking system, which determined a final “urban sustainability index” score for each city. The 20 cities were thus ranked from the least sustainable to the most sustainable.







The final collective output of the studio shows the parameters that were studied and weighted so as to obtain a sustainability score for each of the 20 cities.

## THE REMAKING OF MUMBAI

Mumbai, India

For two years running, the studio traveled to Mumbai and worked with the community-based Remaking of Mumbai Federation (RoMF). The project was based on the very real situation that is the C-ward district of Mumbai – a dense, historic district that had seen no investment and is largely dilapidated. RoMF, a private/community-based organization in Mumbai, had been established with the sole aim of improving the urban standards of Mumbai, with a focus on the C-ward. The students developed a collective urban vision for how the C-ward could develop a vertical urbanism, whilst bringing the social and cultural aspects that make that area unique – as well as a better quality of life – up in to the sky. Each student pairing then worked up a detailed design of a skyscraper within the cluster/collective urban vision.



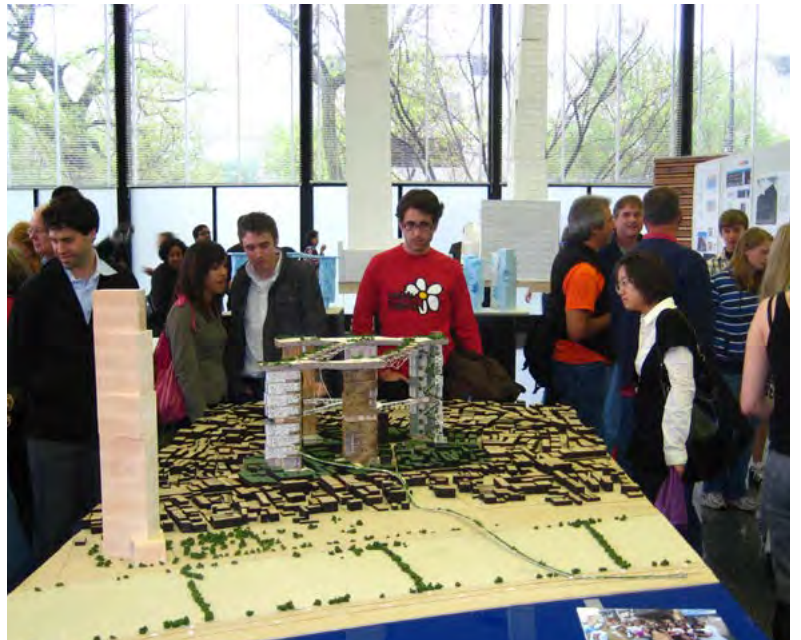
The final scheme as designed, with each student group working on a different tower within the collective urban vision. Project by Ketki Bhadkamkar, Pallavi Bondre, Prajakta Girkar, Harshavardhan Jatkar, Swapnil Kangankar, Apeksha Kore, Bharat Lohar, Darshan Maru, Amey Panchal, Anuja Panchal, Pooja Parchure, Dwitiya Patil, Sonam Patil, Priyanka Raut, Vaibhav Shelar, Sayali Shringarpure, Priyanka Talreja, and Neha Therade



This design combines residential units and a school within the same vertical tower. External escalators provide vegetation while linking the ground with the high-level urban plane, allowing for the circulation of people and migration of plant species. They also link a series of communal skygardens which perforate the residential part of the building.



The Swadeshi Tower recreated the huge, outdoor "dhobi ghat" laundry areas that exist in the C-ward in the vertical realm, with the tower façade being the drying interface (and solar shade) for the residential spaces behind.



The professional community surveys the final results at the IIT School of Architecture 'Open House' exhibition. The planned India Tower, by Foster + Partners, can be seen at left.



# ADMISSION REQUIREMENTS

The Masters of Tall Buildings and Vertical Urbanism (M.TBVU) program is open to all applicants with a bachelor's degree and a strong interest in this field. The MS ARCH program requires a specific undergraduate degree in architecture. The following items are required to apply for the program:

- Application letter, explaining your interest and background in this field.
- Official transcripts
- Two letters of recommendation
- Portfolio

# INTERNATIONAL STUDENTS

International applicants must meet all of the general requirements listed above as well as the following additional requirements.

- English proficiency exam (TOEFL/IELTS) scores
- Financial affidavit of support form (FAS)
- Copy of passport identity page
- School transfer form (international transfer applicants only)

# WANT TO KNOW MORE?

For detailed information on deadlines and admission requirements, please visit:

[arch.iit.edu/study/mtbvu](http://arch.iit.edu/study/mtbvu)

For more info, contact Program Director Dr. Antony Wood at: [awood@ctbu.org](mailto:awood@ctbu.org)



Front cover image: Project titled "CO<sub>2</sub>ngress Gateway Towers," created by Kyle Bigart and Peter Binggeser as part of the IIT-CTBUH Tall Building Studio, and featured in the Chicago Architecture Foundation exhibit "Unseen City: Designs for a Future Chicago."