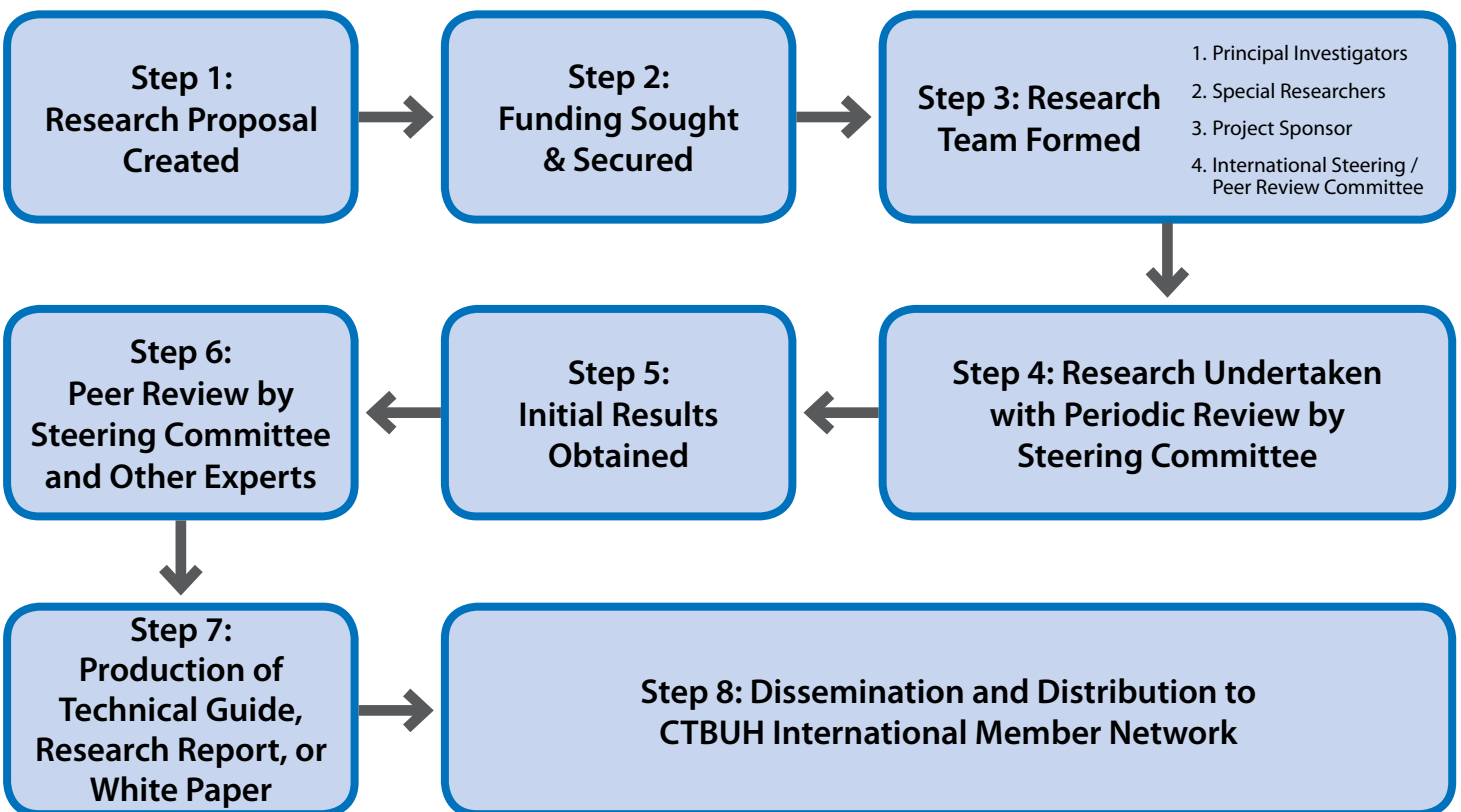


## Mission Statement

The CTBUH Research Division, which consists of research staff at both the CTBUH Headquarters in Chicago and the CTBUH Research Office at IUAV University of Venice, undertakes research into all aspects of tall buildings and sustainable cities. With a dedicated team of experienced research professionals and a vast network of members spanning all specializations in the industry, the Research Division drives critical investigations with profound impacts for the typology. It also assists researchers in their efforts to locate funding, information, technical expertise, and objective peer review.

## CTBUH Research Project Process



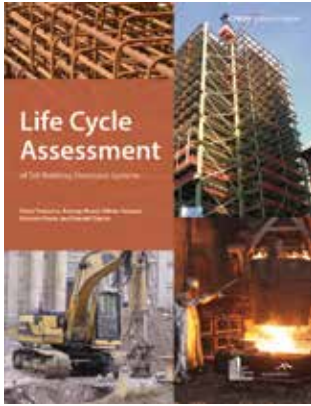
## Why Sponsor a CTBUH Research Study?

1. Promote your company as an expert and a driver of research throughout the tall building industry
2. Collaborate with top tier tall building researchers and other experts
3. Gain first access to the research results
4. Increase industry acceptance of the research by involving the vast CTBUH member network
5. Develop new partnerships and business opportunities
6. Include your logo on all research study documentation

Questions? Contact the CTBUH Research Division.

research@ctbuh.org

# Recently Completed Research Projects



## A Life Cycle Assessment of Tall Building Structural Systems

This study identifies and compares energy consumption and carbon emissions across numerous types of structural systems and structural materials found in 60- and 120-story buildings.

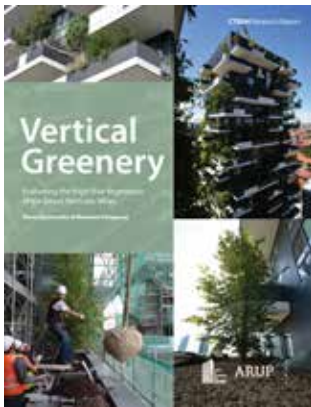
**Project Duration:** 2 years

**Dates of Research:** January 2013 – January 2015

**External Funding Amount:** \$300,000

**Funding Sponsor:** ArcelorMittal (Luxembourg)

**Research Team:** CTBUH + ArcelorMittal + International Steering Panel



## Vertical Greenery: Evaluating the High-Rise Vegetation of the Bosco Verticale, Milan

This study evaluates the health and effectiveness of the trees and other plants incorporated into the façade of Bosco Verticale; two 75- and 110-meter towers in Milan.

**Project Duration:** 12 months

**Dates of Research:** June 2013 – June 2014

**External Funding Amount:** \$20,000

**Funding Sponsor:** Arup (UK), via the CTBUH 2013 Research Seed Funding Program

**Research Team:** IUAV University of Venice + CTBUH



## Building Façade Retrofit: A Database of Completed Projects

This project catalogs façade-design optimization projects undertaken on existing tall buildings to date and organizes them into a new online database: [facaderetrofit.org](http://facaderetrofit.org).

**Project Duration:** 9 months

**Dates of Research:** October 2014 – July 2015

**External Funding Amount:** \$20,000

**Funding Sponsor:** ECADI (China), via the CTBUH 2014 Research Seed Funding Program

**Research Team:** University of Southern California + Facade Tectonics + CTBUH



## Roadmap on the Future Research Needs of Tall Buildings

This undertaking comprehensively identifies priority research topics and research gaps in the field of tall buildings, across all disciplines.

**Project Duration:** 17 months

**Dates of Research:** August 2012 – January 2014

**Funding Sponsor:** CTBUH and CIB (France)

**Research Team:** CTBUH + CIB + UNESCO

# Recently Completed Research Projects



## Designing Tall Buildings to Promote Physical Activity in China

This study looks at how the primary design elements and environmental characteristics of tall buildings and tall building districts impact walking and bicycling activities in China.

**Project Duration:** 15 months

**Dates of Research:** September 2012 – December 2013

**Funding Sponsor:** AECOM (US), via the CTBUH 2012 Research Seed Funding Program

**Research Team:** Polytechnic Institute of NYC + CTBUH



## Assessing Potential Development in South Korea's Supertall Building Technology

This research investigates and evaluates the status of the fundamental technologies necessary for the construction of supertall buildings in South Korea.

**Project Duration:** 20 months

**Dates of Research:** April 2011 – December 2012

**External Funding Amount:** \$87,600

**Funding Sponsor:** KOREA-RIST (Korea)

**Research Team:** KOREA-RIST + Arup + CTBUH



## Green Walls in High-Rise Buildings

This guide sets out recommendations for selecting, implementing, and maintaining green walls in high-rise buildings with added regard for local climatic factors.

**Project Duration:** 17 months

**Dates of Research:** May 2013 – October 2014

**Funding Sponsor:** CTBUH Sustainability Working Group (Volunteer-basis)

**Research Team:** CTBUH + International Steering Panel



## Wind Tunnel Testing of High-Rise Buildings

This guide sets forth general guidelines for wind tunnel tests as they apply to tall buildings, outlining best practices that standardize measurements in the field.

**Project Duration:** 17 months

**Dates of Research:** January 2012 – June 2013

**Funding Sponsor:** CTBUH Wind Engineering Working Group (Volunteer-basis)

**Research Team:** RWDI + Cermak Peterka Petersen + Laing O'Rourke + CTBUH

# Recently Completed Research Projects



## Natural Ventilation in High-Rise Office Buildings

This guide uses a case study format to recognize advances in the planning, construction, and operation of natural ventilation systems in tall commercial buildings.

**Project Duration:** 2 years, 3 months

**Dates of Research:** June 2010 – September 2012

**Funding Sponsor:** CTBUH Sustainability Working Group (Volunteer-basis)

**Research Team:** CTBUH + University of Nottingham, UK



## Outrigger Design for High-Rise Buildings

This guide details the impact of outrigger systems on tall building designs, and demonstrates ways in which technology is continuously advancing to improve the stability of skyscrapers.

**Project Duration:** 11 months

**Dates of Research:** October 2011 – September 2012

**Funding Sponsor:** CTBUH Outrigger Working Group (Volunteer-basis)

**Research Team:** Thornton Tomasetti + Arup + SOM + CTBUH

# Current Ongoing Research Projects



## A Comprehensive Study on Tall Building Damping Technologies

This research focuses on creating a comprehensive publication summarizing the state-of-the-art in tall building damping systems.

**Project Duration:** 18 months

**Dates of Research:** May 2015 – November 2016

**External Funding Amount:** \$230,000

**Funding Sponsor:** Bouygues Construction (France)

**Research Team:** CTBUH + Bouygues Construction + International Steering Panel



## The Sustainability Implications of Differing Urban + Suburban Locations in Chicago

This project compares dense high-rise vs dispersed low-rise living across several key sustainability metrics: household energy consumption, transportation options, material embodied energy, etc.

**Project Duration:** 2 years

**Dates of Research:** February 2014 – February 2016

**Funding Sponsor:** CTBUH

**Research Team:** CTBUH + Illinois Institute of Technology



## Study on the Properties of Composite Megacolumns

This study focuses on the architectural and engineering properties of composite megacolumns, which are being increasingly implemented in tall buildings around the world.

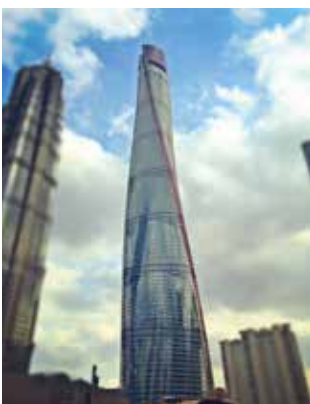
**Project Duration:** 2 years

**Dates of Research:** April 2014 – April 2016

**External Funding Amount:** \$150,000

**Funding Sponsor:** ArcelorMittal (Luxembourg)

**Research Team:** CTBUH + Magnusson Klemencic Associates + ArcelorMittal + China Academy of Building Research (CABR) + International Steering Panel



## Skyscrapers and Skylines: The Case of China

This study investigates the determinants of skyscraper heights and completion rates across 62 Chinese cities from 1978 to 2014 using sophisticated statistical analyses.

**Project Duration:** 5 months

**Dates of Research:** October 2015 – March 2016

**External Funding Amount:** \$20,000

**Funding Sponsor:** Sun Hung Kai Properties (China), via the CTBUH 2015 Research Seed Funding Program

**Research Team:** Rutgers University + CTBUH

# CTBUH Principal Investigators



## Dr. Antony Wood

Dr. Wood has been Executive Director of the Council on Tall Buildings and Urban Habitat since 2006, responsible for the day-to-day running of the Council and steering in conjunction with the Board of Trustees, of which he is an ex-officio member. Prior to this, he was CTBUH Vice-Chairman for Europe and Head of Research. His time at the Council has seen a revitalization of the CTBUH and an increase in output and initiatives across all areas.

Based at the Illinois Institute of Technology, Chicago, Antony is also a Research Professor in the College of Architecture at IIT, and a visiting Professor of tall buildings at Tongji University Shanghai. A UK architect by training, his field of specialty is the design, and in particular the sustainable design, of tall buildings. Antony has served as a principal investigator for numerous funded research projects. His PhD explored the multi-disciplinary aspects of skybridge connections between tall buildings.

### Selected Recent Publications:

- Wood, A. & Malott, D. (eds.) (2015) *Global Interchanges: Resurgence of the Skyscraper City: A collection of state-of-the-art, multi-disciplinary papers on tall buildings and sustainable cities*. Proceedings of the CTBUH 2015 International Conference, New York, USA, 26–30 October 2015. Council on Tall Buildings and Urban Habitat: Chicago.
- Wood, A. (2015) "Rethinking the Skyscraper in the Ecological Age: Design Principles for a New High-Rise Vernacular," *International Journal of High-Rise Buildings*, vol. 4, no. 2, pp. 91–101. June 2015.
- Wood, A., Bahrami, P. & Safarik, D. (2014) *Green Walls in High-Rise Buildings*. Council on Tall Buildings and Urban Habitat: Chicago.
- Wood, A, Parker, D. (eds.) (2013) *The Tall Buildings Reference Book*. Council on Tall Buildings and Urban Habitat: Chicago.
- Wood, A., Ruba S. (2013) *Natural Ventilation in High-Rise Office Buildings*. Council on Tall Buildings and Urban Habitat: Chicago.



## Dr. Dario Trabucco

Dr. Trabucco is the Research Manager for the CTBUH, and oversees operations at the CTBUH Research Office in Venice, Italy at the IUAV University of Venice. He has been the principal investigator for numerous sponsor-funded research projects and is responsible for initiating many of the research activities performed by the Council.

Dario is also a tenured researcher in Building Technology at IUAV. There he is involved in teaching and research activities related to tall buildings, including the life cycle assessment of tall buildings, service core design, and issues pertaining to the renovation/refurbishment of tall buildings. In 2009 he obtained a PhD in building technology with a thesis entitled *The Strategic Role of the Service Core in the Energy Balance of a Tall Building*. This research examines the implications of alternative service core placement in relation to the embodied energy and the energy consumption of a tall building.

### Selected Recent Publications:

- Trabucco, D., Wood, A., Popa, N., Vassart, O. & Davies, D. (2015) *Life Cycle Assessment of Tall Building Structural Systems*. Council on Tall Buildings and Urban Habitat: Chicago.
- Oldfield, P., Trabucco, D. & Wood, A. (eds.) (January 2014) *Roadmap on the Future Research Needs of Tall buildings*. Council on Tall Buildings and Urban Habitat: Chicago.
- Trabucco, D., Paolo, F. (2013) "Confronting the Question of Demolition or Renovation," *CTBUH Journal*, 2013 Issue IV, pp. 38–43.
- Trabucco, D. (2012) "Life Cycle Energy Analysis of Tall Buildings: Design Principles," *CTBUH 2012 9th World Congress, Shanghai*, pp. 447–453.



## Dr. Peng Du

Dr. Du joined the CTBUH in February of 2012 as a Research Assistant and has since received his PhD at the Illinois Institute of Technology, where he investigated many aspects of sustainable vertical urbanism. He received his Master of Architecture degree from Tongji University in 2011.

Peng has been the Principal Investigator for the research project *The Sustainability Implications of Downtown High-rise vs. Suburban Low-rise Living*, which compares the sustainability of vertical and horizontal cities in terms of energy efficiency and quality of life. In addition to research work, he has also been responsible for coordinating CTBUH China operations including the 2012 CTBUH Shanghai Congress, CTBUH Asia Headquarters, media cooperation, and data collection for The Skyscraper Center.

### Selected Recent Publications:

- Du, P., Wang, Z., Gamburg, E. (2015) "Tall Buildings as Extensions of Urban Infrastructure and Vitality," *CTBUH Journal*, 2015 Issue IV, pp. 46–51.
- Du, Peng & Wood, A. (September 2014) "The Sustainability Implications of Urban & Suburban Locations – Initial Report," in Wood, A., Zheng, S. & Johnson, T. (eds.) (2014) *Future Cities: Towards Sustainable Vertical Urbanism*. Proceedings of the CTBUH 2014 Shanghai Conference. Council on Tall Buildings and Urban Habitat: Chicago.