0.1 / About the Workshop
0.2 / Workshop Calendar
0.3 / Symposium/Lecture
0.4 / Venues/Transportation
0.5 / Around the Campus
0.1 ABOUT THE WORKSHOP

Over the course of three weeks, participants from both Massachusetts Institute of Technology (MIT) and Tongji University will work together to design, develop and build a full-scale robotically manufactured shell structure in Shanghai, where they will be developing hands-on skills to integrate programming, structural design exploration, digital fabrication, and robotic assembly. The workshop explores novel shell structures leveraging advances in additive manufacturing and robotic fabrication, equilibrium-based methods of structural design and assembly, and the design opportunities enabled by their integration.

Participants are expected to possess a good handle on 3D modeling and computational design, preferably with working knowledge of Python, and experiences in digital fabrication and prototyping. Participants of all levels of expertise in structural design and analysis and robotics are welcomed. Students will be exposed to computational tools, techniques and workflows to engage with the robotics-enabled design exploration using the open-source COMPAS framework, an open-source, Python-based computational framework for collaboration and research in architecture, engineering and digital fabrication.
INSTRUCTORS

Prof. Philippe BLOCK
Professor, ETH Zurich

Dr. Philippe Block, Professor at the Institute of Technology in Architecture at ETH Zurich, studied architecture and structural engineering at the VUB in Belgium and at MIT in USA. The Block Research Group focuses on equilibrium design methods and computational form finding and fabrication of curved surface structures. Prof. Block is also the director of the Swiss National Centre of Competence in Research (NCCR) Digital Fabrication and partner of Ochsendorf DeJong & Block (ODB Engineering).

Prof. Philip F. YUAN
Professor, CAUP Tongji University

Dr. Philip F. Yuan, Professor of CAUP at Tongji University, Council Member of Architects Sector and Digital Fabrication Sector, Architectural Society of China; Director of Academic Committee of Shanghai Digital Fabrication Engineering Technology Center, Founder of Archi-Union Architects. Prof. Yuan mainly focuses on performance-based architectural tectonics, intelligent construction and is able to realize many of his research theories in architectural practices.

TEACHING ASSISTANTS

ETH Zurich
Kam-Ming Mark TAM
Gene Ting-Chun KAO
Dr. Matthias Rippmann

MIT
Zain Karsan

Tongji University
Dr. Xiang Wang
Liming Zhang
Hua Chai

PARTICIPANTS

Alexandre Beauquain-Mackay
Dalma Földesi
Benjamin Carlton Hoyle
Hyerin Lee
Molly Rita Mason
Jung In Seo
Anna Vasilieiou

Weizhe Gao
Zhe Guo
Ce Li
Youyuan Luo
Chunpong So
Xiao Zhang
Weiran Zhu
D0 TUE JAN 08
Arrival

D1 WED JAN 09
9:00am - 12:00pm Lecture / Workshop Introduction by Prof. Philip F. YUAN Building B B411
1:30pm - 5:00pm Tutorial / Installation and Setup Trouble-shooting Module 1 / Python and Programming Foundation B411
6:30pm - 8:00pm Public Lecture by Prof. Mike XIE Building D D2

D2 THU JAN 10
9:00am - 12:00pm Module 2 / Fundamental Computational Structural Design Concepts B411
1:30pm - 5:00pm Module 3 / Geometry & Topology I Module 4 / Panelization & Tessellation B411
6:30pm - 8:00pm Public lecture by Prof. Philippe Block D2

D3 FRI JAN 11 - D5 SUN JAN 13
Field Trip / Sichuan Sichuan

D6 MON JAN 14
9:00am - 12:00pm Module 5 / Geometry & Topology II B411
1:30pm - 5:30pm Module 6 / Equilibrium-Informed Assembly Module 7 / Design Space Exploration and Optimization B411
7:00pm - 9:00pm Studio / Individual Design Project Kick-off B411

D7 TUE JAN 15
9:00am - 12:00pm Studio / Individual Design Project B411
1:30pm - 6:00pm Studio / Individual Design Project B411

D8 WED JAN 16
9:00am - 12:00pm Studio / Individual Design Project B411
1:30pm - 6:00pm Studio / Individual Design Project B411

D9 THU JAN 17
9:00am - 12:30pm Review / Review of the Individual Design Project AU Studio
1:30pm - 6:00pm Module 8 / Robotic Programming and Operation Studio / Group Design Project kick-off AU Studio

D10 FRI JAN 18
9:00am - 12:00pm Module 9 / Robotic 3D Printing Studio / Group Design Project AU Studio
1:30pm - 6:00pm Studio / Group Design Project AU Studio

D11 SAT JAN 19
Field Trip / Suzhou Suzhou

D12 SUN JAN 20
9:00am - 5:00pm Studio / Group Design Project AU Studio
6:00pm - 9:00pm Review / Interim Review of the Group Design Project AU Studio

D13 MON JAN 21
9:00am - 6:00pm Studio / Group Design Project + Prototyping AU Studio

D14 TUE JAN 22
9:00am - 6:00pm Studio / Group Design Project + Prototyping AU Studio

D15 WED JAN 23
9:00am - 6:00pm Studio / 3D Printing and Robotic Fabrication AU Studio

D16 THU JAN 24 - D20 MON JAN 28
9:00am - 6:00pm Studio / 3D Printing and Robotic Fabrication+Installation AU Studio

D21 TUE JAN 29 - D22 WED JAN 30
9:00am - 6:00pm Studio / Installation and Preparation for the Final Review AU Studio

D23 THU JAN 31
3:00pm - 6:00pm Review / Final Review AU Studio
7:00pm - 9:00pm Farewell Party
LECTURE: STRUCTURAL PERFORMANCE BASED ARCHITECTURAL DESIGN AND REALIZATION

Time: JAN 09 2019, 6:30pm - 8:00 pm
Location: Building D, D2
Lecturer: Prof. Yi-Min (Mike) XIE

Professor Yi-Min (Mike) Xie is a Fellow of the Australian Academy of Technology and Engineering. Currently he is a Distinguished Professor of RMIT University, Adjunct Professor of Nanjing Tech University, and Guest Professor of the School of Architecture and Urban Planning of Tongji University. After graduating from the Department of Engineering Mechanics of Shanghai Jiaotong University in 1984, he studied for masters degree with Professor Zhong Wanxie, an academician of the Chinese Academy of Sciences. In 1987 he commenced his PhD research with Professor O.C. Zienkiewicz, a Fellow of the Royal Society of England. In 1992, he played a leading role in pioneering the Evolutionary Structural Optimization (ESO) method, which has had a far-reaching international impact on the structural optimization field.
SICHUAN FIELD TRIP

JAN 11
Morning // Depart from Shanghai
Afternoon // Luyeyuan Stone Sculpture Art Museum
In-Bamboo

JAN 12
Morning // Jianchuan Museum Cluster
Liu’s Manor Museum
Afternoon // Forum - "Soul of the Place"

JAN 13
Morning // Mount Qingcheng
Afternoon // Chengdu City Tour
Depart from Chengdu

"SOUL OF THE PLACE" FORUM

Time: JAN 12 2019, 2:00pm - 6:00pm
Location: Inkstone House, Linpan Cultural Exchange Centre
Moderator: Prof. Xiangning LI
Guest Speaker: Jiakun LIU
with Prof. Philippe BLOCK
Prof. Philip F. YUAN

Dr. Xiangning Li is deputy dean and full professor in history, theory and criticism at Tongji University College of Architecture and Urban Planning. He is a member of CICA and Secretary General of China Architectural Society Architectural Criticism Committee. He serves as advisory board member of Confluence Institute for Innovation and Creative Strategies in Architecture, and editorial board member of magazines including Plan and Le Visiteur (Journal of Société Francaise des Architectes).

He has been a jury member to many international awards and lectured in universities and institutes. He was a Visiting Professor in Architecture at Harvard GSD in 2016. He is the curator of 2013 Shenzhen/Hong Kong Bi-city Biennale, 2015 and 2017 Shanghai Urban Space Art Season. He serves as director for 2017 Busan Architectural Culture Festival Korea and recently curated the Chinese Pavilion at 2018 Venice Biennale.

With a focus on social reality and a respect for local context and vernacular craftsmanship, Liu Jiakun aims to solve contemporary architectural issues with a sense of realism - an approach inspired by folk wisdom - for each project. His vision remains open to China’s multi-traditions. Having the faith in the compatibility of tradition and modernity, Liu Jiakun devotes himself to translating traditional Chinese cultural ethos into contemporary architectural language, which represents a fine quality of intertexture between individual and collective memories. His exploration of a suitable technical approach in architecture is purely a logical continuation of his professional work on how to serve the people in need. Many of these projects throw light on the reciprocal relation between Chinese people’s public life and urban cultural space.
Inkstone House, Linpan Cultural Exchange Centre

Archi-Union Architects
The scheme of this project demands that the surrounding commercial streets shall make a concession to allow the museum to occupy the central area of the site. The museum will attract the flow of crowds towards the center while the shops around it can promote the commercial gains of the museum in return. It is a chance for cultural and commercial organizations to develop a pattern of mutually beneficial and win-win cooperation. The museum is consisted of three parts connected by an arcade, adopting classical two-dimensional planes such as circles, squares and crosses to create a "holy space", of which the tranquility and sacredness form a stark contrast with the worldliness of the surrounding business district. Such a contrast intensifies the atmospheric tension between commercial reality and historical remains, resembling a traditional Temple-Street relationship that flourished in the old days.

Luyeyuan Stone Sculpture Art Museum / Jiakun Architects

The Museum preserves a collection of Buddhism stone sculptures, and takes the strategy of classical Chinese gardening layout, making the audiences pass through different natural and artificial spaces. The wall is built with local construction labor and techniques, organizing the light, exhibited items and scenarios by gaps between building blocks. The building is integrated into the environment and creates a specific sense of site.

Liu’s Manor Museum / Archi-Union Architects

Liu’s Manor Museum, contains former residence of the big landlord Liu Wencai in south area, is mainly made up of Xu Hall, Employers’ Hall, Living Scenes of Liu Wencai, Clay Sculptures of asking rents, and Cultural Treasure Hall where 20 thousand cultural relics and large amounts of literature information are kept. These collections combined with distinctive manor make a great contribution to learning and researching on the economy, culture, Sichuan warlord history and folklore in semi-colonial and semi-feudal China. In other words, Liu’s Manor Museum shows an epitome of old china or a section of the history of China social development.

In-Bamboo Village / Archi-Union Architects

The village consisted of 86 families and known for its bamboo weaving traditions, has inherited this vernacular intangible cultural heritage for over 500 years. The design brought an approach of digital architecture design and corresponding construction paradigm to this village, experimenting with multiple possibilities of the industrialization and prefabrication of rural architecture. The entire renewal project was completed in two phases. Phase I of the project “In-Bamboo” is the main local activity center with a diverse range of functions such as display, conferences, forum, dinning, entertainment and spaces for tea ceremonies. Eight individual B&B guesthouses of the second phase are located halfway up the mountain, each including a central courtyard to accommodate the existing trees, respecting the original appearance of the base and preserving the rustic charm of the village.
West Village is a maxi-courtyard that adopts an atypical design when compared to other commercial complexes in that its centrifugal layout encircles the entire block to maximize the inner area of sports and green like a park, echoing the form of a basin and encompassing a diverse public life.

The spatial design carries on the ever-popular traditional leisure lifestyle under the shade of bamboo among locals in order to refresh their former collective memories. Its functional structure allows a miscellaneous forms of expression to utilize the customizable spaces at will, while the large scale of the courtyard harbors and displays a vernacular façade that encourages creativity of the vast public. An elevated runway tails along the silhouette of the courtyard all the way up to the rooftop and then back to the ground. This constant change of altitude activates a dynamic flow of energy within this architectural project and brings joggers and cyclists an unusual experience.

Mount Qingcheng

Located at the southwest of Dujiangyan City, Mount Qingcheng is one of the four famous Taoist mountains in China. Together with Dujiangyan Irrigation System, it’s listed as World Heritage Site in 2000. Mount Qingcheng has enjoyed a reputation of Serenest Mountain under Heave since ancient time. The whole mountain is covered with evergreen forest all year round, and thus it gets this name “Qingcheng” mountain, which literally translated as “mountain of green”. The whole scenic spot can be divided into two parts, and the anterior part is the Front Mountain, while the posterior part is the Rear Mountain. Most historical and cultural relics are located in Front Mountain, including Jianfu Palace, Tianshi Celestial Cave, Shangqing Palace, etc. Rear Mountain is featured in beautiful and tranquil natural scenery, with an area about 100 square kilometers.

Next to the Chengdu’s busiest commercial street, Chunxi Road, Daci Monastery is a tranquil place in the city’s bustling downtown areas. Just a few steps away from the Chunxi Road and adjacent to the Sino-Ocean Taikoo Li Chengdu, Daci Temple is a tranquil place in Chengdu’s bustling downtown areas. Once the largest Buddhist monastery in Sichuan, the temple was first built in the Sui Dynasty (581-618) but it has been rebuilt many times. The current buildings were mainly constructed in the Qing Dynasty (1644-1911). The monastery was the site where Xuan Zang, an eminent monk in the Tang Dynasty (618—907), was ordained into monkhood and expounded Buddhism sutras for several years.

Daci Monastery

Sino-Ocean Taikoo Li

Sino-Ocean Taikoo Li is the living urban heart of future Chengdu. Set in the context of the Buddhist Daci Temple, the low-rise, project provides a unique mix of shopping, dining, drinking, entertainment, live performance, workplace, and hotel accommodation in an exciting and enjoyable setting of lanes, squares, streets, alleys and courtyards. Interwoven into this master plan for urban regeneration is the strategic conservation and adaptive reuse of six preserved buildings and ancient lanes associated with ancient Daci Temple at the heart of the development.
In the center of Chengdu, China, the Sliced Porosity Block forms large public plazas with a hybrid of different functions. Creating a metropolitan public space instead of object-icon skyscrapers, this three million square foot project takes its shape from its distribution of natural light. The required minimum sunlight exposures to the surrounding urban fabric prescribe precise geometric angles that slice the exoskeletal concrete frame of the structure. The large public space framed in the center of the block is formed into three valleys inspired by a poem of the city’s greatest poet, Du Fu, who wrote, ‘From the northeast storm-tossed to the southwest, time has left stranded in Three Valleys.’ The three plaza levels feature water gardens based on concepts of time—the Fountain of the Chinese Calendar Year, Fountain of Twelve Months, and Fountain of Thirty Days. These three ponds function as skylights to the six-story shopping precinct below.

Raffles City Chengdu
/ Steven Holl Architects

Kuanzhai Alley - Wide and Narrow Alley

Consisting of Wide Alley, Narrow Alley, Well Alley, as well as 45 courtyards along them, Wide and Narrow Alley is one of Chengdu’s historical and cultural reserves. It is a microcosm of the city’s history as well as a deep mark in local people’s memory. The history of Wide and Narrow Alley can be dated back to the Qing Dynasty (1644 - 1911 AD) where the court quartered troops. As time passed by, the city decayed and only the Wide Alley and Narrow Alley were left. In 2003, renovation work of the two alleys began, aiming to build a complex cultural and business street with the functions of tourism and recreation. Nowadays, Wide and Narrow Alley is a popular entertainment and nightlife block as well as a famous tourism site, with lots of restaurants, pubs, teahouses, and stores selling featured souvenir.

SUZhou FIELD TRIP

HUMBLE ADMINISTRATOR’S GARDEN FORUM

Time: JAN 19 2019, 10:30am - 12:30pm
Location: Humble Administrator’s Garden (Zhuo Zheng Yuan), Suzhou
Moderator: Prof. Philip F. YUAN
Guest Speaker: Prof. Ming TONG

Prof. Ming TONG
Tongji University
TM Studio

Tong Ming is an urban design professor in the College of Architecture and Urban Planning of Tongji University, Shanghai, responsible for teaching and research in urban design, urban regeneration, and urban policy analysis. Tong Ming focuses on both theoretical research and practical work in architecture and urban planning, participates actively in various communication programs of international teaching and research work. Tong Ming is also an expert for Shanghai urban planning committee, a member of Academic Committee of Urban Design in the Urban Planning Society of China, General Planner of Shanghai Tongji Urban Planning & Design institute. Tong Ming is also the principle architect of a Shanghai based architectural office, TM Studio, projects of which include museums, residences, institutional
Humble Administrator’s Garden
拙政园 (Zhuo Zheng Yuan)
Eulogized as one of the Four Most Famous Gardens of China, the Humble Administrator’s Garden is the largest as well as the most famed in Suzhou and contains almost all the features of classical Suzhou gardens. Having been inscribed as a UNESCO World Heritage Site by UNESCO in 1997, Humble Administrator’s Garden is celebrated by its exquisite layout of pools, rockeries, islets, bamboo grove, pines, pavilions and corridors. It is the representative and exemplar of classical gardens in the south regions of the Yangtze River, and hailed as the “mother of Chinese gardens.”

Pingjiang Road
Pingjiang Road is a historical street that is located in the northeastern Suzhou ancient city. The length of this road is 1,606 meters which has been recorded since the Song Dynasty. On the map of Suzhou ancient city in Song Dynasty, the Pingjiang Road was regarded as the main route. After 800 years, Pingjiang Road is still well-preserved.

Pingjiang Road is a stone route with a river flowing along it. Bridges across the river, houses with white walls and black roofs built along the stone road, locals especially the old walking leisurely, the scene here shows a traditional Suzhou local life. As well, it is a traditional Chinese painting scene for tourists to appreciate. Because of its ancient style, Pingjiang Road becomes the symbol of Suzhou ancient city. Only a street distance away to the Guanqian Pedestrian Street, Pingjiang Road is a quite place for people to get rid of the noisy city.

Suzhou Museum
/I.M. Pei + Pei Partnership Architects
As one of the latest built works of acclaimed Pritzker architect I.M. Pei, Suzhou Museum was built in the heart of his hometown, Suzhou, China. As one of the last surviving modernists, the architect strove to bring together both his modernist sensibilities as well as the Suzhou vernacular. Sited on the northeast section of the historic quarter of Suzhou, the museum is adjacent to the landmarked Zhong Wang Fu, a complex of 19th-century historical residences, and the Garden of the Humble Administrator, a 16th-century garden listed as a UNESCO World Heritage site.
0.4 VENUES/TRANSPORT

Accommodation
Shanghai Metropolo JinJiang Hotels
(Former Name: Shanghai Jinjiang Magnolia Hotel)

Workshop Studios
B411, Building B, CAUP

Workshop Lectures
D2, Building D.

For specific venue arrangement, please refer to the workshop calendar.
From Tongji to AU Studio

1. Take Bus 147 at Stop Tongji University
   (同济大学站)

Get off at Stop Jungong Road and Minxing Road
   (军工路民星路站)

2. Walk 670 meters along Jungong Road to Creative Park
   (Convenient store at the entrance)
   (五维创意园)

Alternatively, you could take a taxi (about 20 mins) to Creative Industry Park, 1436 Jungong Road
   五维创意园 军工路 1436 号
A prepaid card for public transportations in Shanghai including metro, bus, ferry and taxi.
0.5 AROUND THE CAMPUS

ATMs around the campus

Bus Stops around the campus

Convenience Store around the campus