

# **General Report**

**On**

## **2014 Beijing Low Carbon Urban Design Joint Studio**

**Taiyuan: Promoting the High Efficiency, Energy Saving and Low Carbon  
Planning for Residential Areas**

Tsinghua University  
Massachusetts Institute of Technology  
University of Cambridge  
Technical University Munich  
Chongqing University

September 2014

## 2014 Beijing Low Carbon Urban Design Joint Studio

### Name List of All Participants

#### I. Faculty

1. Professor Dennis Frenchman, MIT
2. Professor Jan Wampler, MIT
3. Professor Christopher Zengras, MIT
4. Professor Thomas Georg Auer, TUM
5. Dr. Vicky Cheng, TUM
6. Mr. Daniele Santucci, TUM
7. Professor Koen Steemers, UCAM
8. Dr. Ying Jin ( 金鹰 ), UCAM
9. Dr. Anthony James Hargreaves, UCAM
10. Professor Mao Qizhi ( 毛其智 ), THU
11. Professor Zhang Jie ( 张杰 ), THU
12. Professor Shao Lei ( 邵磊 ), THU
13. Professor Zhao Wanmin ( 赵万民 ), CQU
14. Professor Li Heping ( 李和平 ), CQU

#### II. Students

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4. Alice Davis, MIT
5. Anson Stewart, MIT
6. Agustina Gonzalez Cid, MIT
7. Elizabeth Galvez, MIT
8. Allegra Fonda-Bonardi, MIT
9. Ethan Lay-Sleeper, MIT
10. Kuan Butts, MIT
11. Paloma Gonzalez Rojas, MIT
12. Patrick Evan Little, MIT
13. Rena YANG, MIT
14. Kara Elliott-Ortega, MIT
15. Kun QIAN ( 钱坤 ), MIT
16. Xu ZHANG ( 张旭 ), MIT
17. Zhao MA ( 马昭 ), MIT
18. Longrui PENG ( 彭珑瑞 ), MIT

19. Meng REN ( 任萌 ), MIT
20. Akhila Jambagi, TUM
21. Michael Alexander Kramer, TUM
22. Anna Valeria Marchetti, TUM
23. Boris Berndtson, TUM
24. Rüdiger Schätzler, TUM
25. Sofia Sfakianaki, UCAM
26. Steffi Kuhn Ellen Kuhn, UCAM
27. Thi Tram, UCAM
28. David Stephen Jones, UCAM
29. Wang Jixiao ( 王霁霄 ), THU
30. Zhang Bo ( 张波 ), THU
31. Li Chenxing ( 李晨星 ), THU
32. Wu Junda ( 吴俊妲 ), THU
33. Ge-Pei Meizi ( 葛裴美子 ), THU
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#### Note:

MIT - Massachusetts Institute of Technology (US)  
麻省理工学院  
TUM - Technische Universität München (Germany)  
慕尼黑工业大学  
UCAM - University of Cambridge (UK) 剑桥大学  
THU - Tsinghua University (China) 清华大学  
CQU - Chongqing University (China) 重庆大学

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# Design and Teaching

## I. Curriculum Plan

Tsinghua-MIT Joint Urban Design Studio is a biennial regular teaching program jointly held by Tsinghua University of China and Massachusetts Institute of Technology (MIT) of the United States. Choosing the hot and frontier issues to meet the challenge of the fast urbanization in China, faculty and students of the two universities conducted this program including field survey, site investigation and urban design schemes. This teaching activity has been carried out for consecutively 30 years since 1985, and arousing the active and extensive impacts in the field of international architecture and urban planning education.

In June 2014, Tsinghua University invited total 52 faculty and students from four famous universities including MIT, University of Cambridge, Technische Universität München and Chongqing University, to participate in the four-week “2014 Beijing Low Carbon Urban Design Joint Studio”. This program was also a part of the project named “Low Carbon Urban Design: From Options Assessment to Policy Implementation” sponsored by

the Tsinghua-Cambridge-MIT Low Carbon Energy University Alliance, and also granted by The China Sustainable Energy Program of the Energy Foundation. The studio reviewed the scientific research projects mentioned above, and chose Wucheng Community, an urban village at Xiaodian District, Taiyuan city of Shanxi Province, to study and investigate residential area redevelopment models and approach of low carbon urban design.



Figure 1 Studio opening at Tsinghua University

## Studio Objective

The objective of the studio was expected that students could master the spatial techniques to create the low carbon communities by the urban design with the guidance of related research, planning and

design methods through the four-week studio study of field survey, initial draft design, energy consumption calculation and feedback adjustment.

Specifically, there were three requirements: firstly, students were required to focus on the expansion of the whole city, deeply think of the interrelation between urban development and economy, society and culture, hunt for sustainability of the city-region and urban construction relationship, and cultivate their overall cognition ability to the sustainable city; secondly, the students were required to look for appropriate solution based on comprehensive analysis and finally cultivate their ability of spatial design in aspect of low carbon urban design; thirdly, students were required to have extremely sensitivity to energy conservation, understanding the functional approaches of spatial forms on residential energy saving, the basic techniques of building energy and method of green building design, and to develop their design capacity for urban residential area.

**Curriculum Requirements**

According to teaching objectives, the selected project site was located at Wucheng Community, Xiaodian District of Taiyuan, where had diversified building types and complicated social relations. Covering a land area of 35 hectares, and it lived about ten thousand permanent residents. The site is a typical urban village which land use was highly-blended. It is the result of rapid urbanization process with land property confliction.

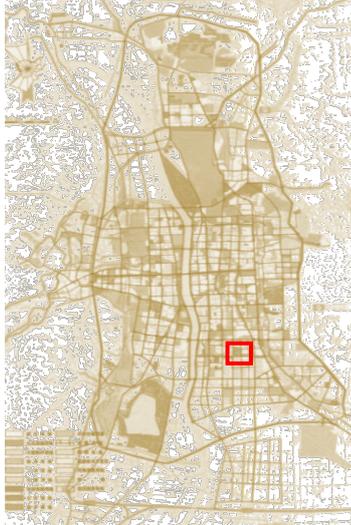


Figure 2 Location of design site at Taiyuan city

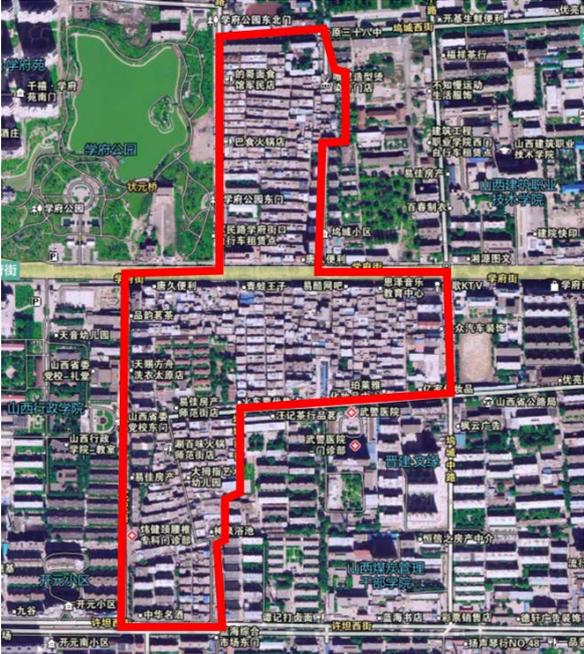


Figure 3 Satellite image of the site

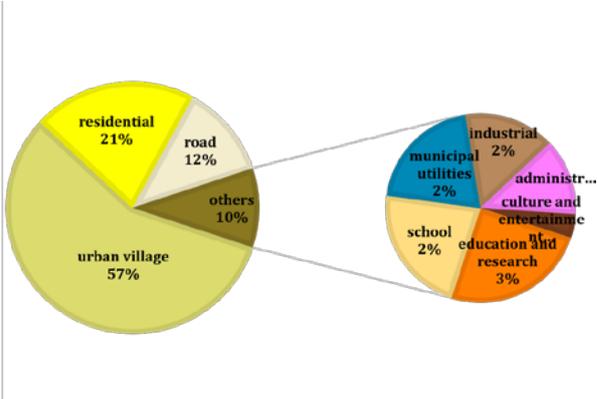


Figure 4 The existing land-use of the site

In the curriculum, students were required to investigate, discover and sum up the issues in the project site, propose their design ideas of the whole city, and conduct the in-depth design based on this important urban area correspondingly. The curriculum specified the following requirements:

Firstly, students were required to investigate this area under the sustainability background of Taiyuan, with a focus on the relation between Wucheng Community and surrounding public spaces, to analyze the influences of transportation improvement such as a planned subway station will be built on the nearby; secondly, students were required to comprehensively understand the actuality of this area, discover the existing problems and shape the relatively integrative cognition to the place's historic background, present situation and possibility of future development; thirdly, students were required to conduct the overall low carbon urban design in the whole range of the project site, and form the ideas, approaches and plans for solving problems via the spatial redevelopment; fourthly, all groups were asked to select the target places to deepen their respective design schemes according to their own achievements in the whole urban planning and design; fifthly, students were required to adjust the urban design plan and finally achieve the purpose of making energy-efficient cities and communities based on the energy consumption calculation by the software of Energy Proforma.

## II. Teaching Implication and Enlightenment

The urban design curriculum of Taiyuan boasted the smooth teaching process, in-depth curriculum assignments and rich harvest for students. Its teaching process and enlightenment could be summarized in aspect of site selection, international platform and whole-process participation.

### Site Selection Stimulated the Interaction between Teachers and Students

Taiyuan is the capital city of China's most important coal-producing province. The curriculum encouraged students to put forward the solution against relevant development issues after they had a full recognition to major conflicts between morphology and society during the process of fast urbanization in China. Thus, the interaction between teaching and learning was inspired.

First of all, metropolis in the North China faced severe situation of energy conservation due to multiple reasons like economy, weather, topography and history. In the investigation, both faculty and students felt it necessary to launch energy saving design in this area. Secondly, Taiyuan had the diversified complexity even though it is smaller population size than the mega-city like Beijing and Tianjin. So, it was appropriate to be grasped. Through the teaching arrangement, faculty and students were divided into groups to jointly make investigation, analysis and research on the city, so that students could acquire a more clearer and comprehensive cognition to Taiyuan in a short period. In

doing so, the curriculum requirements for overall cognition was demonstrated fully; secondly, considering that the place to be designed, as an urban village to be transformed, had the multiple possibilities, the teaching curriculum encouraged students to apply the comparison method of multiple proposals to sort out problems and seek for answers. Viewed from the homework of students, their personality was developed in a diversified manner.

### **International Platform Promoted the Communication of Multi-cultures**

This curriculum developed an international exchange platform. Along with the combination of faculty and students with different cultural background as well as the participation of scholars of local institutions and come from different professional fields, the curriculum design was given the diversified thinking. For instance, foreign students were very interested in the unique spatial form and urban texture of urban villages in China. In their designs, they generally preserved and continued the original form and texture as far as possible. Chinese students, however, were mostly very familiar with the domestic urbanization process, so they tended to conduct the large-scaled urban renewal in their designs. Perspectives of both sides got collision continuously to inspire more inspiration, forming more comprehensive thinking concerning these issues. By taking another example, German students could more initiatively integrate various technologies of building energy saving

earlier in their design, due to their engineering professional knowledge. Additionally, people come from local institutions (planning bureau) and of different professions are arranged to participate in the discussion of curriculum, through which students can better understand the complexity and diversification of China's urban reality and energy saving community in aspect of transcultural exchange and coordination.

### **Whole-process Participation for Exploring the Situational Teaching Mode**

Most of students are relatively unfamiliar with the designed place and even Chinese cultures, so the studio attaches great significance to the links of investigation, visit and practice beyond the classroom teaching. The aim is to make foreign students to familiar with China's national conditions and get adaptative to the learning and life in all aspects. At the early stage of the field investigation, the curriculum not only arranged local people to introduce the urban development of Taiyuan but also led students extensively visit the building types of different historical period. When back to Tsinghua, the studio continually organizing students to investigate and visit the new and old buildings and areas of typical styles in Beijing, so as to make students familiar with local conditions and customs in the shortest time. In doing so, students could really get accessible to the local actualities in the design link, instead of "student's utopian homework" merely bearing no fruits. In aspect of effects, Shanxi and

Taiyuan planning departments' people thought highly of operability and practical meaning of each group of proposal when listening to the final reports.

### III. Epilogue

This program is the extension of the traditional biennial Tsinghua-MIT Joint Urban Design Studio that has witnessed the cooperation for about three decades. During this period, the studio has experienced great changes in every aspect. From Beijing inner city at its beginning stage, the designed places have expanded to Jinan, Taiyuan and other Chinese cities. From initial schools of Tsinghua and MIT, the participators are increased up to five universities of domestic and overseas. From the first concept was set up in 1985 to deal with old settlement transformation and historic city preservation, the focus of curriculum is also gradually evolved to urban energy conservation and eco-city's design.

Perspective looking for the joint urban design studio curriculum from the faculty and students, the university international cooperation and communication can be conducted successfully by relying on long-term plan, exquisite topic selection and elaborate arrangement.



Figure 5 Faculty and students conducted field survey at Wucheng Community, Taiyuan City

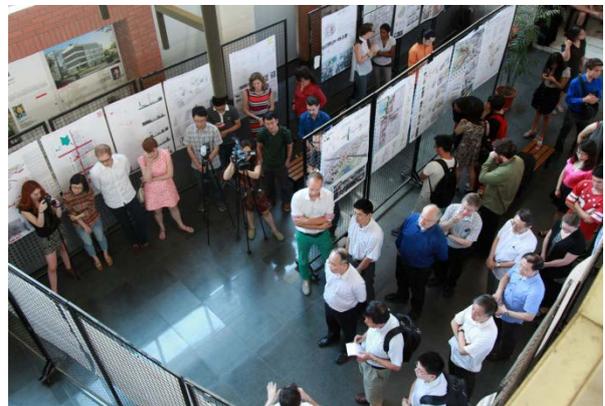


Figure 6 Studio final presentation and public exhibition at Tsinghua School of Architecture

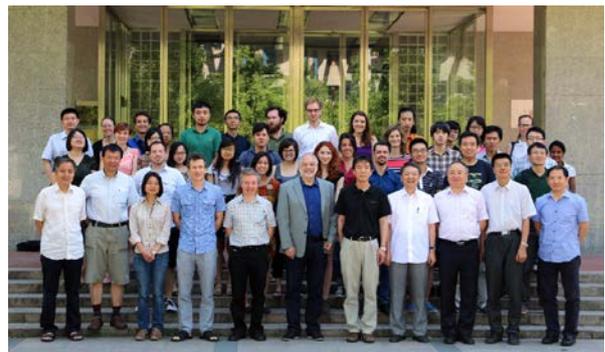


Figure 7 Group photo of the International Symposium on Low Carbon Urban Design, at Tsinghua University dated on June 28, 2014

## IV. Studio Achievements

### Group One: Five Seeds

Design team:

Kara Elliott-Ortega

Ethan Lay-Sleeper

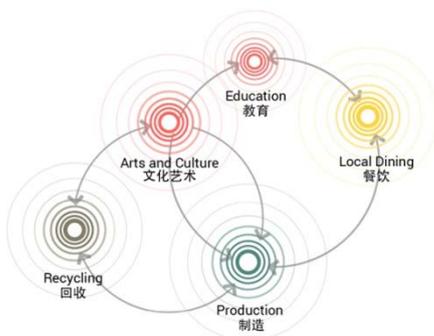
Kun Qian (钱坤)

Jixiao Wang (王霁霄)

Boris Berndtson

Sustainable urban design not only depends on energy conservation, but also concerns the continuous social and economic momentum for development. For the urban villages with serious issues and coexistence of the pros and cons, it is expected that natural ecology and social ecology can maintain a sound and orderly sustained development while the high top-down vitality and diversification can be continued.

Clusters



“Five Seeds” with five clusters of urban functions were expected to promote the industrial development of urban villages and stimulate the process of self-renewal of communities. On the one hand, it could avoid excessive energy consumption and context breakage caused by overall re-construction of communities; on the other hand, it could preserve as far as possible the vitality and diversification of

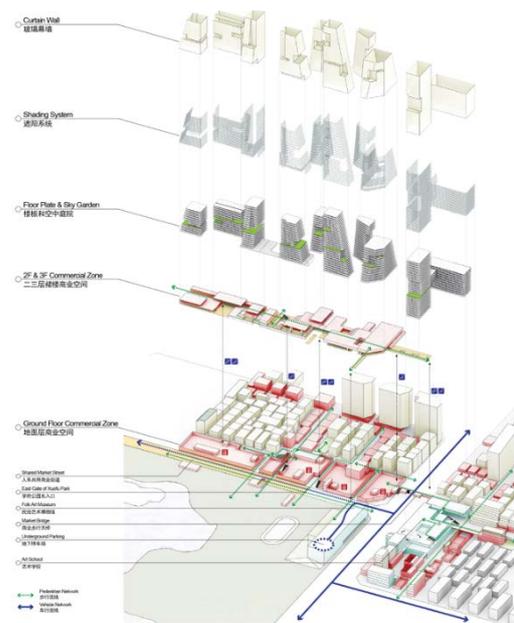
original communities, so as to exert the bottom-up inherent vitality and avoid the excessive intervention.



The clusters took into full account the history, current fundamentals and development potential of the base, and formed the functional interrelation, from agricultural production and marketplace sale to consumption of local dining industry, and from waste recycling, artwork manufacturing to creativity marketplace. Meanwhile, the clusters integrated and developed the industry of arts and culture, forming the circulating system of urban ecological entity in aspect of functions, materials and energy. The clusters not only promoted the economic development by the rise of employment but also decreased the population mobility and enhanced the formation of human network of communities by relying on the decrease of local employment, so as to help build the sound community featured with safety, stability, self-management and

sense of belonging. Materially, more infrastructures were introduced by the clusters, such as underground parking, water circulation and energy station, etc. Additionally, partial increase of construction intensity could promote the FAR and spatial utilization efficiency. In addition to those five clusters under major construction, the design guidance and technique application of sectional base could reduce the urban energy consumption and improve the environmental quality. The urban updates would enhance the FAR and functional mixed-use; small-sized and roof greening were increased; the buildings were conceded to favor for the in-depth illumination; the high-rise and with three-dimensional courtyard was increased for the sake of ventilation; public activities and street life were launched in the air, namely, to form the urban activity

ground with abundant sunlight and wide vision. Technologically, the application was focused on solar PV modules and heaters, low-temperature radiant floor heating technique, and establishment of recycling and utilization system for water, wastes and used heat.



## Group Two: Social Proforma

Design team:

Paloma Gonzalez Rojas

Agustina Gonzalez Cid

Longrui PENG (彭泷瑞)

Sofia Sfakianaki

Zhang Bo (张博)

The design proposal was dedicated to improving the current living environment of urban villages, designing the settlement form with overall low energy conservation, increasing the employment opportunities and household incomes of villagers in the urban village - Wucheng Community, so as to create the diving board for rural population migrating the cities.

Originally, the land parcels in urban villages were arable land and villagers lived on planting vegetables. Now, immigrating population is ten times than the original villagers. In the urban village, low living costs and cohabited living mode have provided a diving board for immigrating population who want to convert their registered permanent residence from rural to urban.

Hence, the partial modification and new construction under the overall protection serve as two important steps to improve the living conditions of villagers in the urban village of Wucheng. Based on the energy consumption calculation results of different clusters in Energy Proforma, the total energy consumption of living under the clustering of urban village is low. Therefore, the proposal wholly preserved the clustering of urban village, partially modified the existing buildings and newly

built the architectural complex in the regions with unsound development.

Partial modification made for improving the quality of living environment: By reasonable transformation of locality of original buildings, the negative space inappropriate for living was converted into the positive space. The original purposes of underground rooms and semi-basements were converted and built into the infrastructures of urban village.

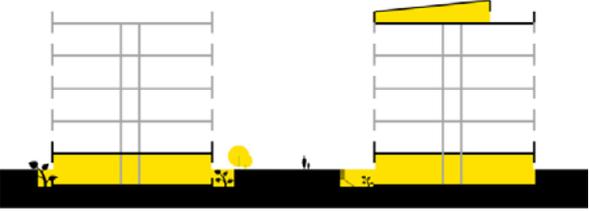
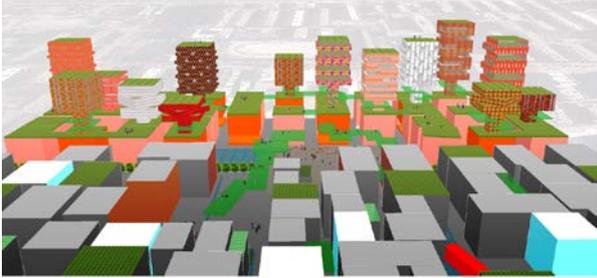
Full utilization of roofs could strengthen the productivity of urban village: In view of marginality and complexity of collective land of urban village as well inexpensive land use right compared with that of state-owned land, it had the market of strong demand and the differentiate right of land use promised the objective reality of urban village.



Through special planning and examination of construction authorities, lessee or lesser may conduct the appropriate roof re-building. The contents of construction included the roof garden for beautifying community, plantation cultivating vegetables and flowers, breeding garden for raising poultry and light steel structure for temporary dwelling.

In the design proposal, the newly-established architectural complex was planned to locate at the core position of

clusters of urban village, so as to stimulate the vitality of nearby urban villages in the entire area. The newly-established clusters located at the north of the base served as major functions, and dining services were centralized in the middle of the base, serving the villages in the south and north. Office building areas and recycling center in the south are dedicated to reducing the environmental pollution and energy consumption, and creating more jobs for residents in Wucheng Community. Through the new establishment of architectural complex under the overall clustering of urban village, the proposal expected to preserve the advantages of low energy conservation of urban villages, fully exert the particularity of urban village in the city, reduce living costs, improve living conditions, promote the development of urban villages, increase the jobs and create the diving board for rural population immigrating to cities.



### Group Three: Distributed Millennium

Design team:

Chenxing Li (李晨星)

Meng Ren (任萌)

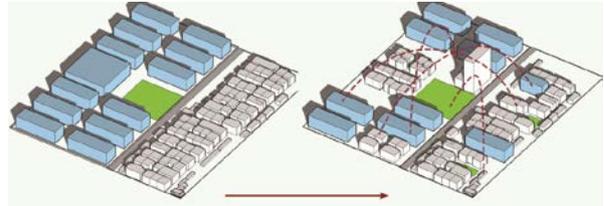
Anson Stewart

Linda Wu (吴俊姐)

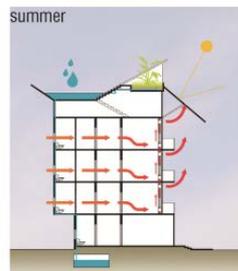
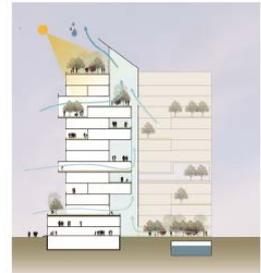
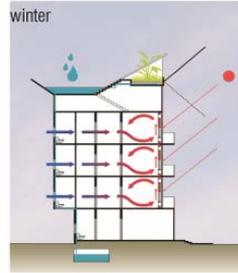
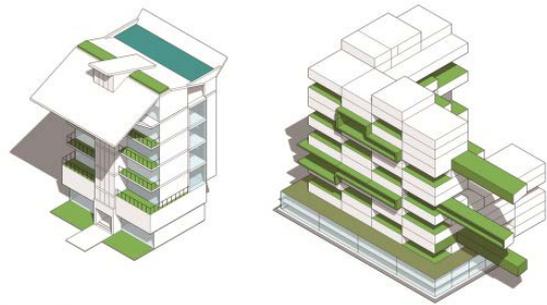
Xu Zhang (张旭)

The features of the site should be developed. The existing neighborhoods and institutions are discretely integrated into the networked space of learning and health organizations. To create the sharing spatial system of high quality, the historical water system and green space system are recovered and rebuilt; meanwhile, the schools, educational and medical utilities are integrated into the dwellings, in a bid to closely communicate with the masses, provide the medical security and encourage residents to insist on learning throughout their lifetime. Generally, from the north to south, the base is successively surrounded by primary schools, research institute and universities. Its advantages in geographic location and traffic system make it a foothold of cooperation between the high-tech development zone in the south and the university town. Hence, we divide it into three districts, which respectively provide the space for service institutions of students and their parents, educational institutions of college entrance examination and high-tech enterprise incubators. Meanwhile, we tease out the historical water system and determine the community center and sub-center in combination of schools, medical

institutions and the current points of vitality. Then we reasonably strengthen the development around the community center and major roads, and implement the corresponding function and mixed functions for different districts.



In the further design of a 200x200 meters residential block, the thoughts of general planning was deepened. In view of the overall community system, we take the educational or medical utilities as the core to provide the public services and activity space. Nearby the core, we deploy the aged residence and other dwelling clusters which need the support of public services. At the surrounding of the core, we preserve the building texture and FAR of urban villages, and launch a planning for a series of common living clusters. Along the major roads and parks, we make the best of their advantages over landscape and geographic location to plan high-rise residences with commercial outlets. Meanwhile, we design the air duct system in the community units and organize to adjust the wind environment of the residences. Additionally, we also take over the water system of the overall planning and introduce it into the residential buildings, forming the good ecological circulation. Moreover, we capitalize the solar, plants and other ecological-friendly measures to build the human-oriented ecological community.



Rain water harvesting and gray water reuse reduce water and energy consumption and are connected with hydroponic food production. Roof top gardens, green houses and living walls provide food, shade and evapotranspirative cooling. The movable solar panels and trombe wall provide climate-appropriate insulation and reduce heating and cooling cost.

In addition to these features, towers provide stack-effect cooling for each block.



## Group Four: Original Line

Design team:

Allegra Fonda-Bonardi

Xu Zheyuan (许哲源)

Kuan Butts

Rena YANG

Thi Tram

The design concept originates from a fable – Gem Seamed in the Limer. Through investigation and analysis on a couple of urban villages like Wucheng Village and Beizhang Village, the existing courtyard space of urban villages were considered as undiscovered treasures, which, on the contrary, needed more possibility and vitality.



In the design of land parcel, a few of north-south streets undertook the major business service functions of existing community, and connect the important public utilities surrounding the land parcel, like marketplace, garden, hospital and school. However, the existing courtyard space mostly fails to form series connection with these “lines”.

Hence, “Original Line” is expected to conduct deduction of different dimension against the existing Chinese traditional courtyard space, through knitting the “lines” crossing through those courtyards. Namely, important public facilities are integrated with existing texture of land parcel; meanwhile, community better integrates with the surrounding public resources. This “line” full of vitality includes various forms, such as footpaths, roads, greenbelts, water systems and business streets.

Considering that existing buildings of

urban villages are mostly of better quality, rebuilding not only means expensive compensation for relocation, but also stands for huge waste of resources. Hence, in aspect of general planning, the existing building texture shall be preserved as far as possible, and then transformed or additionally built through various models according to the actuality of different buildings. Meanwhile, the plan proposed to sort out the traffic lines based on preservation of several main streets, and appropriately introduced the high-rise tower building to enhance the FAR.

On the basis of preserving the existing private courtyards, the courtyard of different size and openness in the clusters were preserved, which not only sustained the traditional living mode and size of courtyard, but also made the best of the

roof space to form the air courtyard. Vertically, it achieved the mixed use of functions. The living function on the upper floors was complemented with the business space on the bottom, realizing the domestic wastes to be disposed underground separately. Meanwhile, collection and disposal place for wastes also functioned as the workshop for waste reutilization and value-added production.

The analysis of Energy Performance showed that, while promoting the living density and increasing the public open space, this design not only reduced the energy consumption effectively but also organically organized the spatial structure and complex form of urban villages to make it better integrated into the while city texture.



## Group Five: Flexible Future

Design team:

Alice Davis

Elizabeth Galvez

Steffi Kuhn

Chao Liu (刘超)

Zhao Ma (马昭)

Design concepts: Mixture density; community for multi-generation; lifetime residence; rhythm space; shuttling lines.



three-dimensional courtyards 三维院落

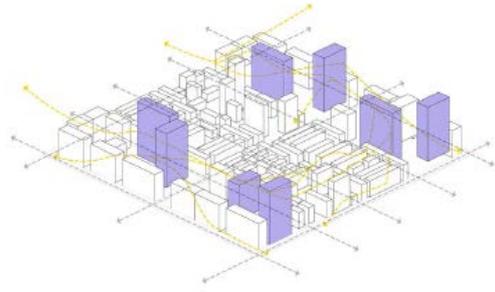
Mixture density: This proposal expands the traditional plane courtyards to three-dimension courtyards, which not only enriches the spatial pattern, promotes the communication among residents and improves the capacity of day-lighting and ventilation, but also makes the horizontal courtyard combined with vertical three-dimension courtyard. Meanwhile, high-density and vertical mixed functions were adopted to cater for the space of venue and social actuality.

Community for multi-generation and lifetime residence: With adequate consideration to the current social structure in the venue, this proposal provides multiple house types to flexibly meet the mixed habitation of different generation, so as to boost the

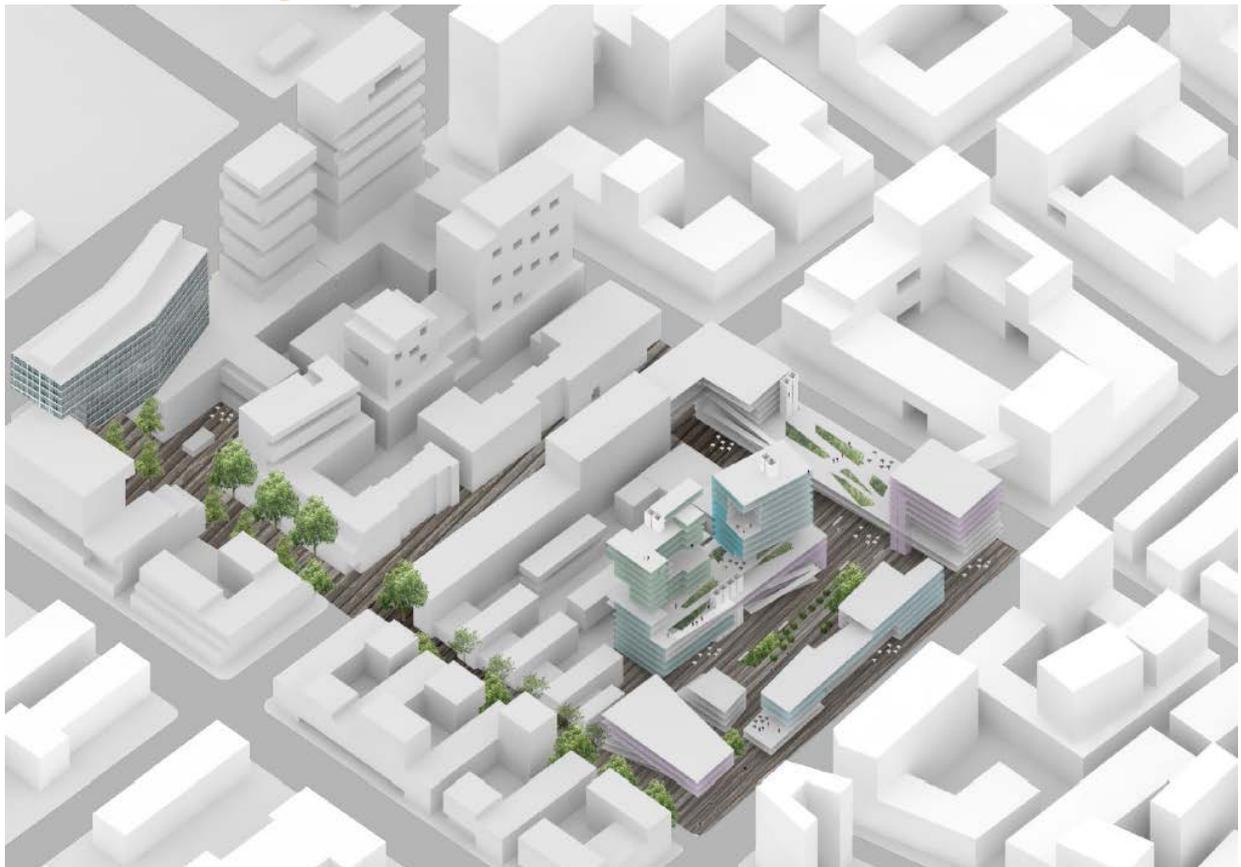
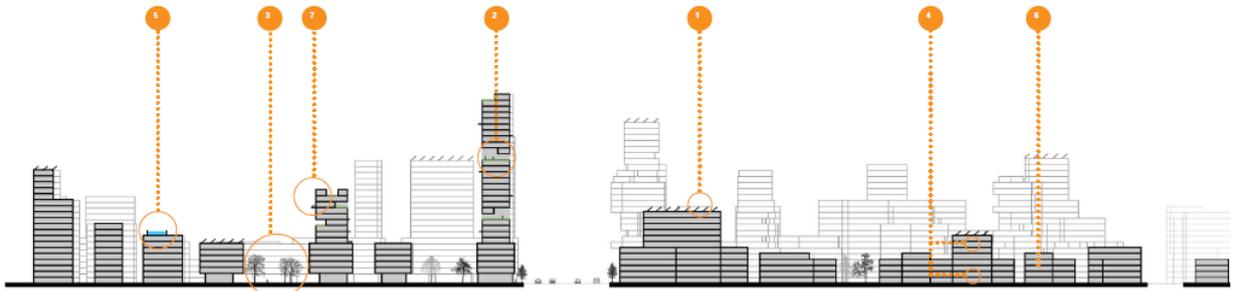
communication among households and shape the vigorous community. Meanwhile, the using mode of flexible house types may be changed according to the amount of family members and capital demands at different stage, so that the variable mode of use makes it possible that residents can always live in the community. The residences will provide the sense of belongings for residents, thus becoming their “lifetime residences”.

Rhythm space and shuttling lines: This proposal designs the diversified open space in all clusters in combination of the venue’s actuality, so as to provide the space for activities and communications of residents. The space can meet the demands of residents for different activities in different time of one day. Meanwhile, the pedestrian system with flexible lines and suitable dimension make it an open spatial system, enhancing the accessibility and sharing.





density 密度



## Group Six: Streetism

Design team:

Ma Yugang (马宇刚)

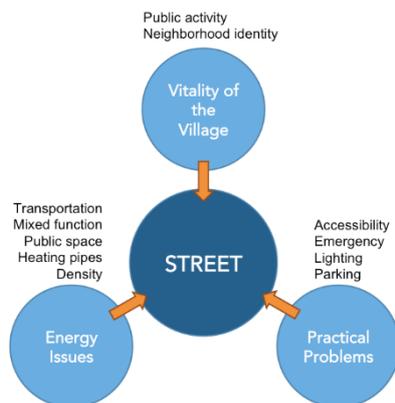
Ge-Pei Meizi (葛裴美子)

Akhila Jambagi

David Stephan Jones

Rüdiger Schätzler

Streetism serves as framework and support of urban form. The overall pattern of streets and lanes is mostly of tree branches, distributed in network. Streets serve as the trunk, while lanes serve as branches. As the important infrastructures of a city, streets and lanes are mainly used to communicate all elements in the city, effectively organize the communication lines and make the city as an organic whole; as the major external space of a city, streets and lanes function as the stage of social and economic activities and cultural life.



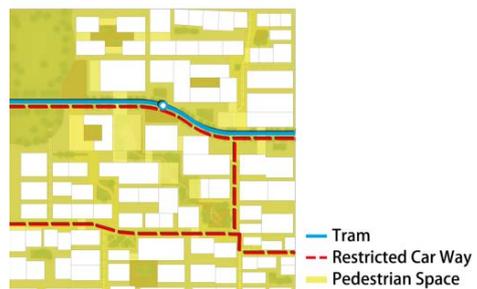
Starting from streets and lanes, the design expects to create an energy-conserving urban system by virtue of framework of streets and lanes.

In aspect of planning: Through macro-control of overall design, the proposal sustains the original network of streets and

lanes, so as to maximize the originally low-carbon life. Only in few of frontage areas, the proposal conducts the appropriate updates, which not only meets the requirements for low-carbon urban design but also maximizes the design drawing that many cities share the same appearance.

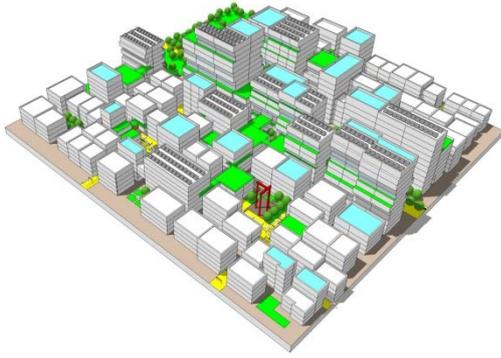
In aspect of clusters: By middle-level deepening of cluster design, the proposal expressly points out how streets and lanes connect each building and courtyard, so as to realize the low carbon life of ideal clusters. For instance, walking and public transportation, mixed function, outdoor public activity and renewable resource utilization among courtyards are all the low carbon strategies raised in this aspect.

TO promote walking and public transportation  
鼓励步行及公交出行



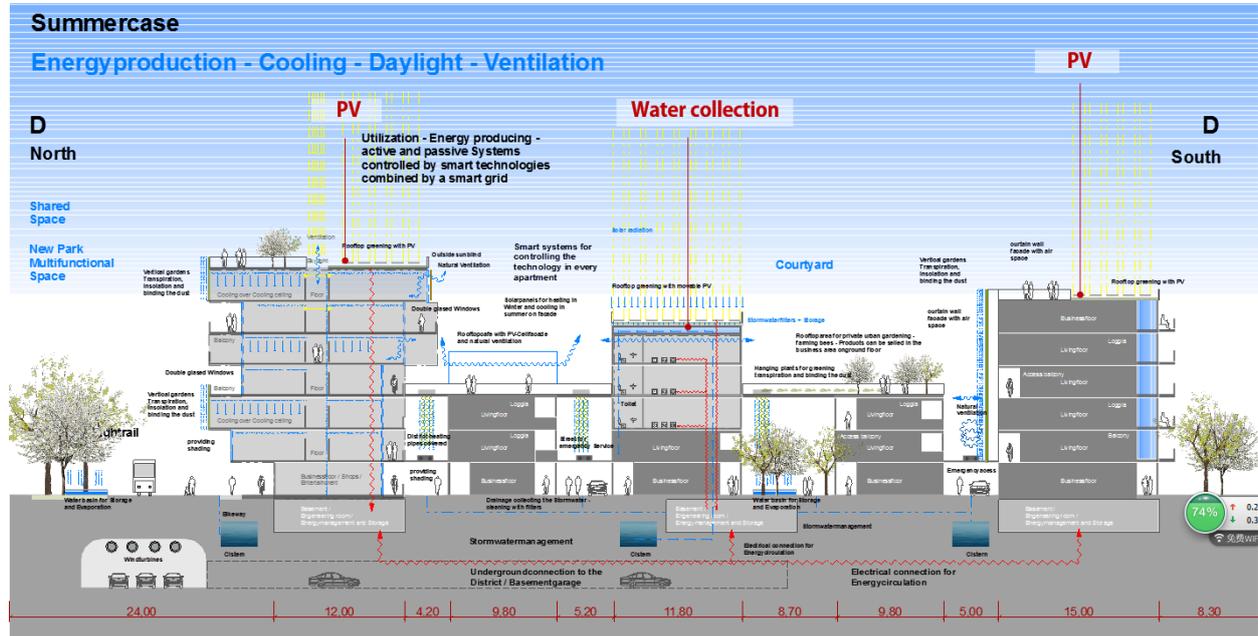
TO encourage outdoor public activity  
倡导公共活动





In aspect of energy: Through finally combing the concept of energy sciences, this proposal conducts the final conclusion and illustration on this design in the sectional manner, and achieves the trinity mastery of three sciences (building, planning and energy).

In aspect of building: Through the microscopic design of courtyards and buildings, this proposal completely illustrates the consistent ideas of our group on the top-down concept of streets and lanes. This proposal emphasizes the integrated concept of “Inner Space” of buildings (buildings with roof) and “Outer Space” of streets and lanes.



## Group Seven: Pleased Path

Design team:

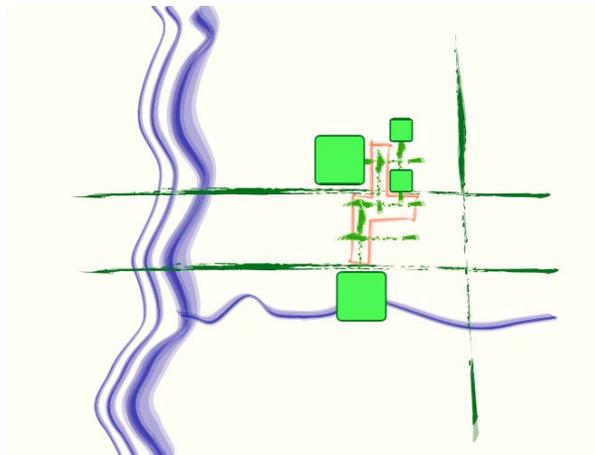
Fan Jinglin (樊滢琳)

Michael Alexander Kramer

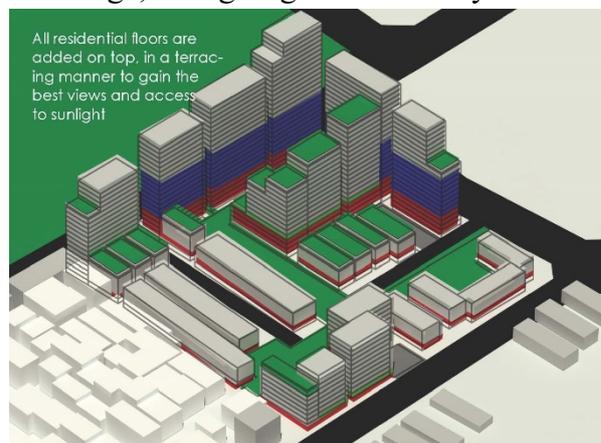
Patrick Evan Little

Anna Valeria Marchetti

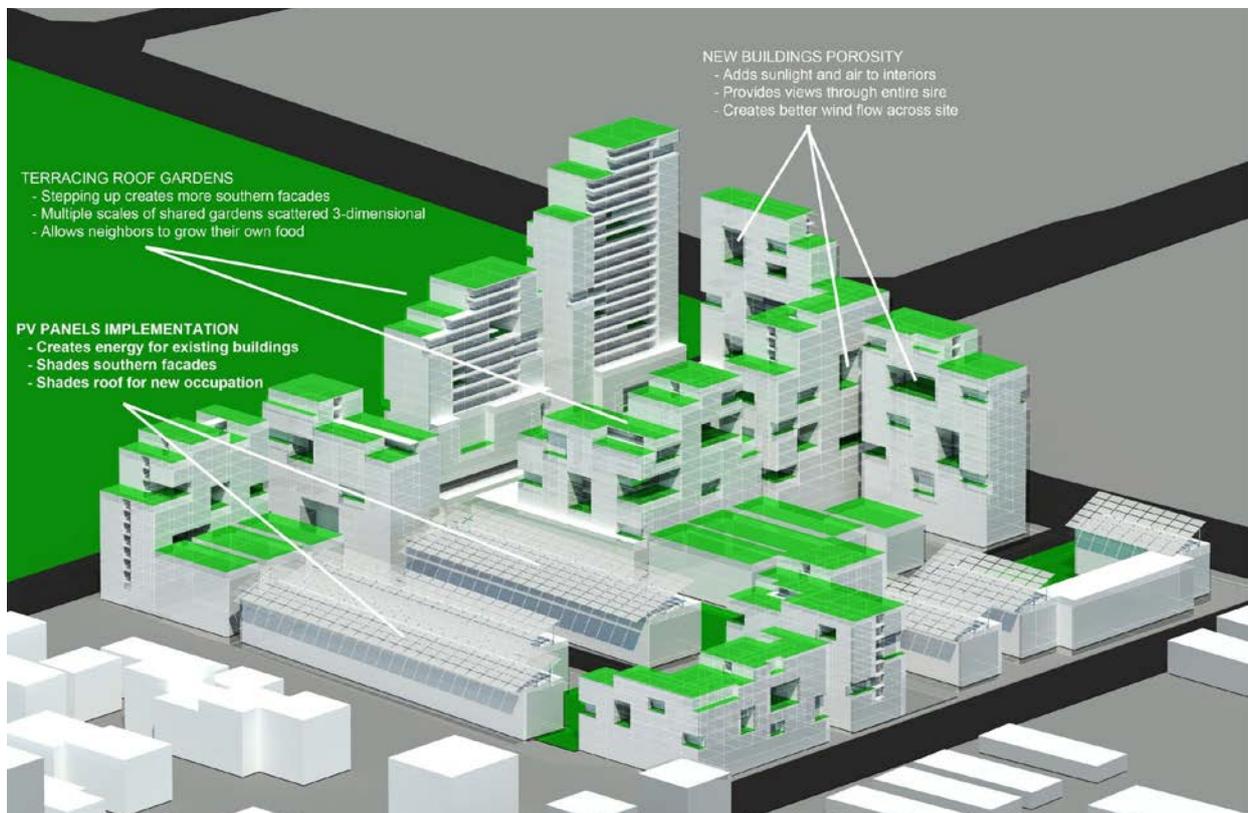
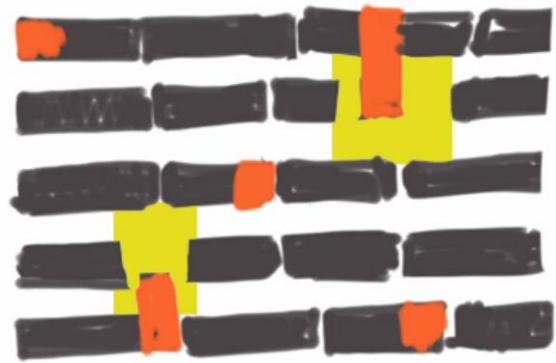
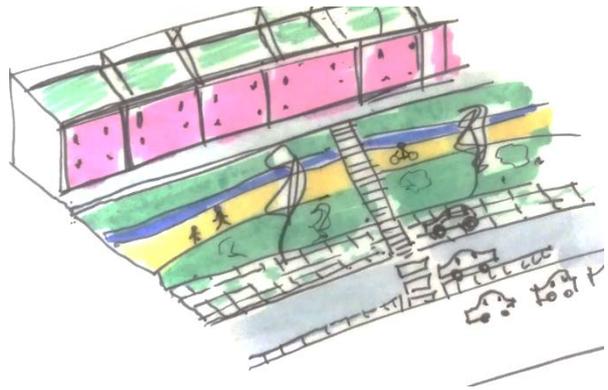
In this design, the site is adjacent to central areas of Taiyuan, with convenient traffic, abundant facilities and outstanding educational resources. The interior floating population of the base is complicated, most of whom are migrant lessees and even residents who rent a house only for solving the education of child. Thus, this proposal stepped into the whole base from the perspective of Kids and Families and hoped to achieve integration between the surroundings and inside of the place, between space and culture, between traditional elements and new ones, by the improvement of material environment and new increase of greenways and expanded node space. Meanwhile, moderate educational activities were introduced to enrich the economic type and groups of the place and provide the space for living, business and entertainment of the site.



In this design process, the proposal first made a general analysis on the green space, educational resources and business space of the surrounding areas as well as the relations between these three aspects with major roads, found out the major directions and entrances that children run through after school. Secondly, the proposal combined with current texture to find out the safe and convenient “path” as the major target of this design. Finally, this proposal expanded space in the appropriate nodes and formed the square corresponding to the surrounding activities. At the level of clusters, this proposal adhered to the principle of diversified integration and green convenience; to be specific, the proposal suggested demolishing some original buildings moderately and increasing new high-rise buildings; designing the one-way vehicle



roads to prevent vehicles from running through the clusters; focusing on the design of “path” and “square” for the clusters. High-rise buildings integrated the multiple purposes, namely, ground floor for business, middle floors for office working and high-rise floors for residence or hotel. They were located nearby the park, of which the square was to provide the place of leisure and rest for workers. The original functions of buildings were preserved, of which the square was used for leisure of residents and play of children. The “path” integrated the features that greening could serve as the flexible space to cater for the curiousness, playfulness and sharing of children.



## Visit & Survey

In order to promote foreign students to understand Chinese culture and urban architectural culture in particular, and deepen the trust and cooperation among students, the studio arranged a series of collective visits and survey activities. The schedule adopted the combined way of concentrated and scattered activities and places. Via our elaborate organization and enthusiastic participation, faculty and students from all corners of the world can have initial cognition to such aspects as the planning and development of China's historical cities, ancient public buildings and dwellings, religious building and etiquette system, traditional urban culture, folk life as well as the issue of modern urban construction and urban planning, so as to facilitate them to increase the localization elements in the design and then make their design to closely combine with the actual problems.

### I. Cities and Traditional Architecture of Shanxi

During June 3-7, the studio arranged the survey routine of Taiyuan – Pingyao World Heritage – Ancient Buildings of Mount Tai – Hanging Temple of Mount

Heng, after combining the survey of the designed section of Taiyuan. The whole trip was jointly organized by the studio, Beijing China Travel Service Co., Ltd. and Taiyuan Xingyun International Travel Agency.

### Taiyuan Urban Survey

Visiting Taiyuan Urban Planning Exhibition. On the afternoon of June 3 when studio members arrived at Taiyuan, the local support unit of the studio – Taiyuan Planning Bureau arranged the activity themed with experience Taiyuan's history, understand Taiyuan's development and know Taiyuan. Upon the completion of Taiyuan Urban Planning Exhibition, Ms. Gao Hui, Director of the City Planning Research Center, narrated the situation personally. Through the interpretation about a lot of historical data, drawings, models and multimedia, all visitors had comprehensive understanding to historical development, current urban construction and future planning of Taiyuan. After visiting, Ms. Gao put forward her expectation and suggestions on the designed section of the studio, and meanwhile expressed his subsequent supporting.



Visiting Taiyuan Changfeng Cultural Business District. On the afternoon of June 3, all members of the studio visited the newly built-up Taiyuan Changfeng Cultural Business District. As a new urban landmark of Taiyuan, Changfeng Cultural Business District represented the latest development of Taiyuan's public service facilities. The municipal government hoped it could be enriched the cultural life of residents, exhibit the urban image and stimulate the development of west bank of Fenhe River. The cultural center is a city sub-center which is nearest to the designed site of the studio, and also the core node of development axes of southern area of Taiyuan. Hence, the understanding and survey serves as one of basic conditions to understand the design of the selected place.



## Survey of Pingyao Ancient City

### Visiting Shuanglin Temple.

On the morning of June 4, the studio people took a coach to arrive at Pingyao Ancient City, 120km away from the southwest of Taiyuan. Firstly, members visited Shuanglin Temple, one of key cultural relic sites under the state protection, which is located at Qiaotou Village, 6km away from the southwest of Pingyao County, Shanxi Province. It is also one of national key Buddhist temple in the area of Han nationality. The temple faces south, covering a land area of about 15,000m<sup>2</sup>. It includes two parts, of which the western part is the courtyards of temple, including three courtyards with ten halls along with the central axis.

### Visiting Pingyao Ancient City.

On the afternoon of June 4, all teachers and students surveyed Pingyao Ancient City. Through survey, they not only had initial understanding to Chinese traditional urban pattern, public buildings and traditional dwellings, but also enhanced their cognition to folk cultures and living habits.



Pingyao Ancient City is a famous cultural city with a history of over 2,700 years and

named as the Four Ancient Cities best preserved in China together with Langzhong of Sichuan Province, Lijiang of Yunnan Province and Shexian County of Anhui Province reputed as the second batch of national historical and cultural city. Meanwhile, it is also one of two ancient cities which succeeded in applying for the world's cultural heritage by the name of the entire ancient city in China (the other city is Lijiang Ancient City). As one of the ancient counties best preserved in China mainland, Pingyao Ancient City is the outstanding example of Han nationality cities of China in Ming and Qing Dynasty. In the history of China's development, Pingyao Ancient City has displayed an extraordinary complete picture scroll of China's development in culture, society, economy and religion.

### Survey of Ancient Buildings of Mount Wutai and Mount Heng

#### Visiting Mount Wutai.

On the morning of June 6, all faculty and students visited the scenic spot of Mount Wutai, 180km from the northeastern Taiyuan. They firstly visited Foguang Temple – one of treasures of Chinese traditional architecture. Famous architect-professor Liang Ssu-ch'eng reputed Foguang Temple as China's First Treasure and one of rare wooden structures of Dang Dynasty in China.

As the head of China's four well-known Buddhism Mountains, Mount Wutai covers an area of over 600km<sup>2</sup>. Surrounded with burning incense, Mount Wutai currently has 95 temples which are

well preserved, including Tayuan Temple, Shuxiang Temple, Zhenhai Temple and Wuye Temple that were visited.

#### Visiting Hanging Temple.

On the morning of June 7, faculty and students visited Mount Heng, 280km from the northeastern Taiyuan. They mainly visited the Hanging Temple – one of miracles of China's ancient buildings.

Hanging Temple, also called Xuankong Temple, is the only unique temple integrating Buddhism, Taoism and Confucianism. Hanging among the half cliff of Cuiping Peak at the west of Jinlong Valley of Mount Heng, Hanging Temple is one of national key culture relic protection sites in China. Founded in the late period of the Northern Wei Dynasty over 1,400 years ago, Hanging Temple in Mount Heng was repaired in the past dynasties. The Northern Wei Dynasty moved Taoism Altar southward to arrive here from Pingcheng (Datong city at present). The ancient craftsman of Han nationality built the Hanging Temple according to the requirements of keeping far away from crowing and barking sound. It is a great building which integrates architectonics, mechanics, aesthetics and religious studies, standing for the infinite wisdom of the people of Han nationality. Hanging Temple consists of forty halls. Based on the self-inserted beams of mechanics principle, these halls are integrated as a whole by artfully cancelled supporting beam columns on the rocks. The right and left of columns are connected mutually, forming the zigzagging and extraordinary scenery.



## II. Capital Construction, Royal Architectural Complex and Great Wall of Beijing

### Beijing Planning Exhibition Hall

On the morning of June 15, members of the studio visited Beijing Urban Planning Exhibition Hall. Located at Qianmen East Street of Dongcheng District in Beijing (at the east of the old Beijing Railway Station), Beijing Planning Urban Exhibition Hall is built on the basis of its original building. After completion, the exhibition hall has four floors, which exhibit long history of Beijing city and its great achievements in capital urban planning construction respectively by means of display boards, light boxes, models, photos, sculptures and 3D films.

### Visiting Qianmen Street – Imperial Palace – Temple of Heaven

On June 15, all teachers and students visited Qianmen Street –Imperial Palace – Temple of Heaven, which is a route representing the top achievement of royal buildings in Ming and Qing Dynasty of China.



As one of quite famous business streets in Beijing, Qianmen Street is located at the

central axis of Beijing. It starts from Yue-liang-wan of Qianmen in the north and ends at the intersection of Tianqiao Street. Before the outer city was built on the year of 1550 at Ming Dynasty, it served as the royal road for the emperor to go to Temple of Heaven and Temple of Shanchuan.

The Imperial Palace, formerly called the Forbidden City, is one of the world's cultural heritages. Covering a land area of 720,000m<sup>2</sup> and a building area of about 150,000m<sup>2</sup>, the Imperial Palace has been the best preserved palace building with the largest size in the world.

Temple of Heaven, one of the world's cultural heritages, covers an area of about 2.73 million m<sup>2</sup>. Founded in 1420 by Emperor Yongle of Ming Dynasty, and was reconstructed by Emperor Qianlong and Emperor Guangxu of Qing Dynasty, serving as the venue for emperors of Ming Dynasty and Qing Dynasty to sacrifice and pray for a golden harvest. As the general name of Round Altar and Golden Harvest Altar, Temple of Heaven was built with two layers of walls, forming the interior and exterior altars. The walls of altars are square in the south and round in the north, symbolizing the round heaven and square earth.

## Visiting Mutianyu Great Wall

On June 22, the members of studio visited Mutianyu Great Wall, 70km at the northeast from Beijing downtown. In ancient China, the Great Wall is a general name of large-scale military engineering project which was used to defense the invasion of Saibe nomadic tribes at different periods. The well-known three enemy towers (Jiankou, Niujiabian and Yingfeidaoyang) are the essence of the Great Wall, located at west of Mutianyu Great Wall.

All these visits and filed surveys are very helpful for the participants of 2014 Beijing Low Carbon Urban Design Joint Studio.

**Appendix:**

**Schedule of 2014 Beijing Low Carbon Urban Design Joint Studio**

June 1-29, 2014

**June**

- 1 Sun. Arriving Beijing International Airport  
Transfer to THU guest house and student dormitory, settle in
- 2 Mon. Meet at School of Architecture  
Studio opening, form teams, introduce assignment 1: Site Clues  
Overview of Low Carbon Urban Design  
Introduce Taiyuan and field trip agenda  
Welcome buffet reception
- 3 Tue. Travel to Taiyuan by CHR Train G91  
Tour city and site; visit city planning exhibition and meet officials
- 4 Wed. One day trip to old city Pingyao, and back Taiyuan in the evening
- 5 Thur. Teams work on case study neighborhoods in Taiyuan
- 6 Fri. Morning: Travel to Wutai Mountain, visit Foguang Temple  
Afternoon: Visit Wutai temples, overnight on Wutai Mountain Hotel
- 7 Sat. Wutai visiting continue and visit Hanging Temple on the way  
Evening: Return to THU, Beijing
- 8 Sun. Work in teams for site analysis at School of Architecture
- 9 Mon. Morning: work in teams  
Afternoon: Present Site Clues,  
Introduce assignment 2: Preliminary Design of Area
- 10 Tue. Work in teams
- 11 Wed. Design directions pin-up
- 12-13 Work in teams
- 14 Sat. Present preliminary design  
Introduce assignment 3: Low Carbon Neighborhood Plan
- 15 Sun. Visit Beijing Planning Exhibition, Forbidden City, Temple of Heaven & Qianmen
- 16 Mon. Review of Energy Proforma tool and guidelines  
Begin energy work in earnest
- 17-20 Work in teams
- 20 Fri. Present Neighborhood Design Plan  
Introduce assignment 4: Neighborhood Design and Energy Performa
- 21 Sat. Work in teams
- 22 Sun. Visit Mutianyu Great Wall
- 23-27 Work in teams, finishing final presentation plans
- 27 Fri. Final presentation and farewell dinner
- 28 Sat. Low Carbon Urban Design International Symposium  
Energy Efficient Studio Exhibition and results presentation
- 29 Sun. Return home towns/countries

