

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

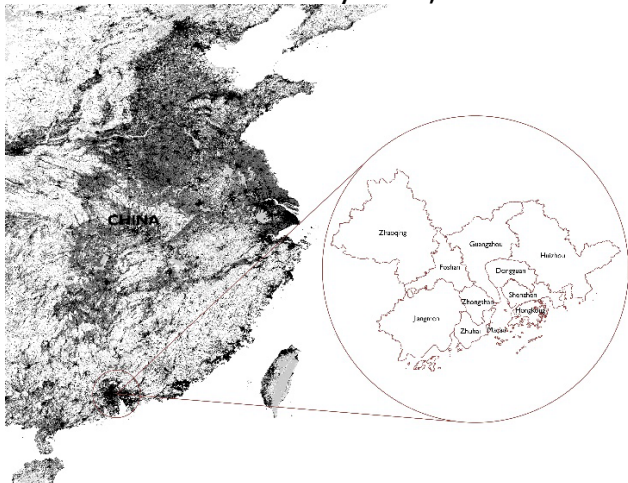


Graduation Plan: Urbanism

Personal information	
Name	Shiru Liu
Student number	5473306

Studio	
Name / Theme	Metropolitan Ecology of Places
Main mentor	Alexander Wandl Environmental Technology and Design
Second mentor	Cinco Yu Spatial Planning & Strategy
Argumentation of choice of the studio	<p>Being born in one of the peripheral cities in the Greater Bay Area (GBA), a mega-region in southern China, I have witnessed its transition from hinterland towards more urban and industrial functions, reflected not only in alternative economic structure but also in the associated change of landscape, reduction of nature, and water and soil pollution. Simultaneously, livelihood and daily life are under threat. These social and environmental challenges motivate me to look at the current trend and future of the Greater Bay Area from the spatial and social-technical perspective of the peri-urban territory and to combine the topic of circular territorial metabolism and sustainable development.</p> <p>The studio lies in the related idea of the territorial landscape transformation, understanding the base for design by questioning how ecological, artificial and morphological systems are interrelated (Furlan, 2022). It provides an interdisciplinary platform for me to integrate knowledge from the industrial landscape, metabolism and metamorphosis of the territory, etc., that are related to the reality of my location. Hence, I choose this studio to start my thesis.</p>

Graduation project	
Title of the graduation project	Towards a sustainable and liveable <i>Desakota</i>: designing for sustainable industry transition in the peri-urban territory of the Greater Bay Area
Goal	

<p>Location:</p>	<p style="text-align: center;">The Greater Bay Area, China</p> 
<p>The posed problem,</p>	<p>Since 1978, urbanisation has accelerated in the Greater Bay Area (GBA) due to China's reform and opening-up policies. Apart from the dramatic expansion of major metropolitan regions, a dispersed urbanised landscape lying beyond the city boundary can be recognised here. These dispersed areas, also called peri-urbanisation (Webster & Li, 2020), manifest in a patchwork landscape of urbanised and rural settlements and industrial and agricultural landscapes, which are most intensive along the transport infrastructure that connects the major cities. However, these areas have urgent problems: expanding in an unsustainably industrialised manner and lacking specific spatial planning. So this thesis looks at these dispersed urbanised areas in the GBA and explores the potential for sustainable urban development.</p> <p>As the works of literature introduce (Fan & Lei, 2009; Lin, 2018; Ye, 2013), the phenomenon of peri-urbanisation has been recognised in the GBA region due to the interplay of landscape conditions, export-processing industry development and regional networking of economic centres by transport infrastructure. The flow of people, goods, and information rapidly grows in these areas, generating a new and diffused arrangement of architecture.</p> <p>However, this new picture fails to ensure quality of life and sustainability, which leads to the decay of its social and ecological structure. First, many industrial activities rely on a scattering distribution of similar small-scale and labour-intensive export-processing firms; thus, the industry's material and energy flow linearly consumes large amounts of resources and generates pollution. The incompatible activities are mostly within the agricultural landscape, causing dramatic environmental pressure, including chemical, metal and water pollution and huge carbon dioxide emissions. Besides, the dynamics of human flows from industries generate a greater need for facilities and resources, which is not ensured with current morphological and functional elements.</p>

The spatial planning system in the GBA region is one of the factors causing the low-quality settlement and unsustainable industry chain. The dichotomy of urban and rural lands in the planning system intervenes only in urban or rural areas: it either focuses on economic centres' development and networking, simulating more infrastructure and factories into the hinterland for connections without considering local conditions, or it is only concerned with planning rural revitalisation for food security and village life. However, much of the dispersed territory of GBA cannot be described as either urban or rural typologies, so there is no understanding of these in-between areas.

In fact, special conditions of the mature industrial foundation of these dispersed areas in the GBA provide the potential capacity to transform. On the one hand, dispersed settlement patterns can be characterised by the diversity of culture and nature and have the potential for mutually complementary development on the basis of current communication networks (Sieverts, 2003). On the other hand, as this region becomes increasingly developed, fewer densities of processing industrial activities and the industry transition towards more circular and green can be achieved and contribute to the in-built redundancy of factories. This large amount of buildings means freedom of new functions; thus, territorial metabolism and spatial morphology have room to be designed. At the premise of sustainable industry transition, the structures of dispersed patterns can be adapted in response to the different natural and cultural features.

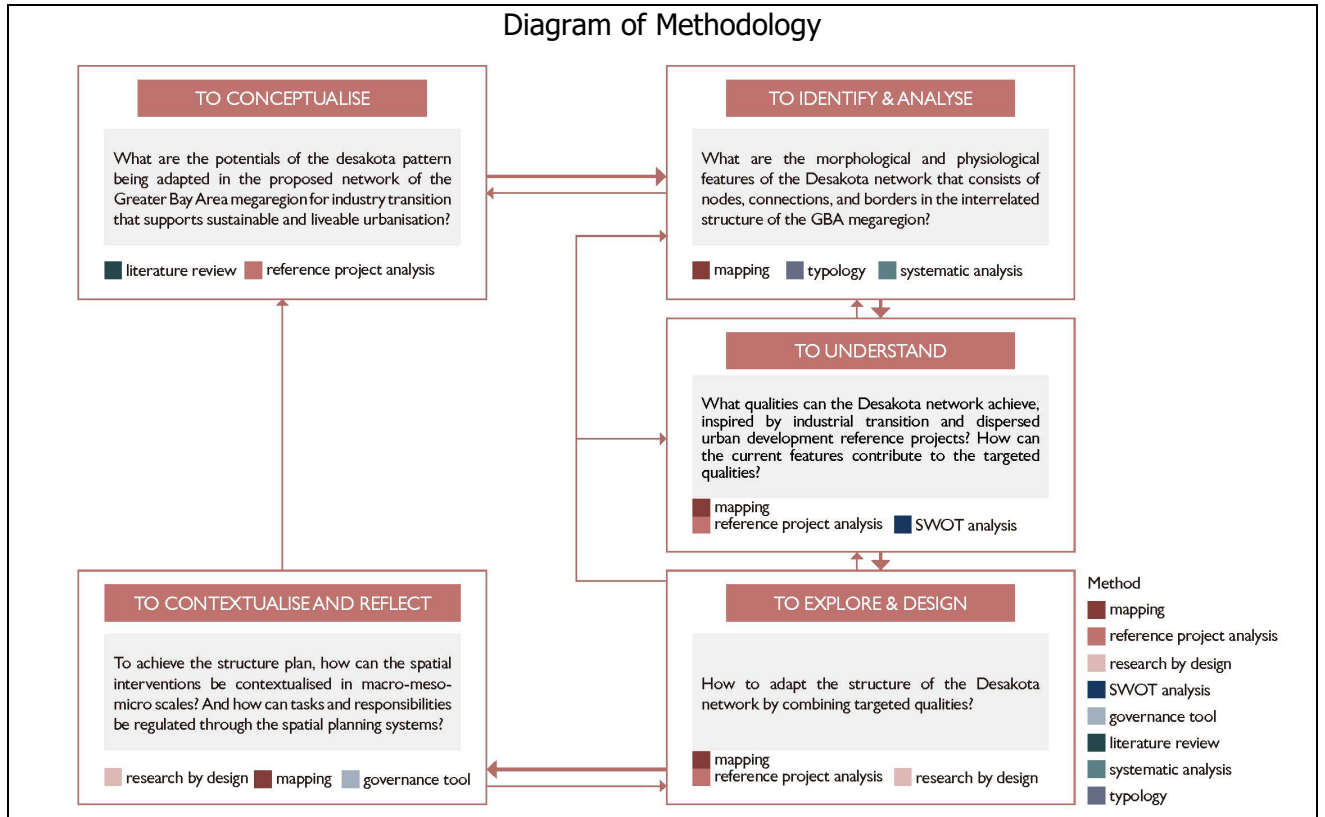
Some Chinese urbanists have acknowledged the condition and potential of peri-urbanisation in the GBA region (Kan & Chen, 2022; Lin, 2018; Zhou Y, 1991). However, these works are mostly symptomatic descriptions without methodological innovations, mainly in economic and political aspects without spatial or functional investigation. Thus, as Brenner and Schmid argued (Brenner & Schmid, 2013) in planetary urbanisation, new strategies of specific research and comparative analysis are required, which transcend the assumptions for the research of peri-urbanisation within mainstream planning.

To this end, a description embedded in the Asian context is proposed by the term "Desakota" (Mcgee, 1991). By that, it positions the dispersed urbanised areas in rapidly expanding and polynucleated metropolitan regions. So the thesis borrows from this concept to define design areas and guide spatial research for sustainable industry transition.

In short, the development of the Desakota region in the proposed network of the Greater Bay Area megaregion, with its current form, flows, and spatial planning system, cannot meet the condition of future sustainable and liveable urbanisation.

<p>research questions and</p>	<p>Main question: What are the potentials of the Desakota pattern to be adapted in the proposed network of the Greater Bay Area megaregion for industry transition that supports sustainable and liveable urbanisation?</p> <p>Sub-questions: 1. What are the morphological and physiological features of the Desakota network that consists of nodes, connections, and borders in the interrelated structure of the GBA megaregion? 2. What qualities can the Desakota network achieve, inspired by industrial transition and dispersed urban development reference projects? How can the current features contribute to the targeted qualities? 3. How to adapt the structure of the Desakota network by combining targeted qualities? 4. To achieve the structure plan, how can the spatial interventions be contextualised in macro-meso-micro scales? And how can tasks and responsibilities be regulated through the spatial planning systems?</p>
<p>design assignment in which these result.</p>	<p>To answer the main research question, the first assignment should clarify the theoretical framework, conceptual framework, and methodology, all based on the theoretical position of the Desakota model. However, the Desakota model has its limitation: it does not provide a specific methodology for the research. In this case, the Netzstadt method (Oswald et al., 2003) is also positioned as the theoretical foundation that provides a synthesis platform of morphological and physiological analysis. On these bases, the Desakota region is understood as an urban system and uses the network as a metaphor for analysis and planning.</p> <p>The outcome of the thesis will be an adapted structure plan of the Desakota network, its macro-meso-micro visions and the supportive spatial planning system.</p> <p>The sub-questions are built up towards this outcome. For sub-question 1, the assignment will be the identification and analysis of the Desakota network. The next step is to understand the presence of reference projects and learn their qualities. For sub-question 3, the task is to propose different urban projects according to the targeted qualities and the union of all these projects to envision the new structure plan of the Desakota region. The last step is to achieve the structure plan in macro-meso-micro scales with the representation of strategic projects. And reflection on the spatial planning system, including content, governance, and process that supports the visions. After design assignments, there will be a reflection on the theoretical realm to conclude the project.</p>

Diagram of Methodology



Process

Method description

As introduced above, the methodology includes five steps. In all these steps, the main methods used are described below.

Mapping: it is a method to extract the territorial types that form the regional structure and understand the diachronic change of Desakota; it helps visualise the Desakota network. Besides, it is used for explaining the relationship between design areas and the implications to the context.

Systematic analysis: it is used to understand the industry element in Desakota and how they form the industrial layer as part of the Desakota urban system; it includes systematic mapping, diagrams, and sections that help analyse the potential industry chain in Desakota and propose the potential industry transition in the future.

Reference project analysis: from the analysis to the design of the network, the reference projects, including the Zwischenstadt (Sieverts, 2003) in Germany and the patchwork metropolis (Pisano, 2016) in the Netherlands, provides an appropriate presence for the future of Desakota. It will be used by a literature review combined with field trips to provide the design reference to the thesis.

Urban projects: they provide a method by which the selected urban development strategies can be introduced, pursued and coordinated (Oswald et al., 2003). These strategies and related urban projects should test the combination and adjust. Additionally, each urban project is combined with the tools of research by design and reference projects analysis, such as the case of industrial symbiosis.

Research by design: when the desired outcome is proposed, this tool helps promote and visualise the ambition in the physical spaces. It is to find the possible spaces to contextualise the strategies and visions and examine how they interact with the local context.

Governance tools: these include SWOT analysis, policy analysis, stakeholder analysis, and stakeholder engagement strategies. They contribute to understanding the actions and actors towards the new vision based on the current strengths, weaknesses, opportunities, and threats.

Literature and general practical preference

Key literature:

1. Brenner, N., & Schmid, C. (2013). 11 Planetary Urbanization. In B. Neil (Ed.), *Implosions /Explosions* (pp. 160-163). JOVIS Verlag GmbH.
<https://doi.org/doi:10.1515/9783868598933-012>
2. Mcgee, T. (1991). The emergence of desakota regions in Asia: expanding a hypothesis.
3. Zhou Y, X. (1991). The Metropolitan Interlocking Region in China : A Preliminary Hypothesis. *The Extended Metropolis : Settlement Transition in Asia*
4. Oswald, F., Baccini, P., & Michaeli, M. (2003). *Netzstadt*. Springer Science & Business Media.
5. Zhang, Q. (2022). *The Elemental Metropolis: the past and future of the extended urbanity in the Yangtze River Delta, China* (Unpublished manuscript).

Practical preference:

1. the Emscher Park; 2. Cases of Industrial symbiosis

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

The topic of peri-urbanisation can be related to each studio of urbanism. Still, the choice of Metropolitan Ecology of Places studio manifests that my concern is not only about the physical space of urban fabric and open space but also the flows and dynamics shaping it and using it. Apart from my personal motivation, the basis of this concern is derived from what I have learned in my master programme in urbanism track, including the base of urbanism history and theory, the technical knowledge of QGIS, the method of analysing urban form and open space, the application of metabolism and systematic analysis, spatial planning tools, and the exploration of globalisation and mega-regions. On these bases, my thesis is built as a planning-based project that integrates the knowledge of regional planning, urban design and metabolism.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework?

The Desakota region is a complex urban system that relates peri-urban studies, social and ecological metabolism, planning theory, policy, sustainable development, circular transition, etc. Based on the foregoing overview of the proposed problem, many

urbanists have proposed peri-urban models, but most are European cases. Chinese scholars acknowledge the Desakota model as a concept applied in the Asian context, but spatial and functional innovations are still lacking. Hence, this thesis, through combing the Desakota model and the Netzstad method, is proposed to reflect on the theoretical realm of peri-urbanisation after design assignments. To contribute to the planning theory and policy, the project also discusses the potential of overcoming the urban-rural dichotomy of the spatial planning system that restricts sustainable and diverse urban development in China. Besides, it explores how the green and circular industry transition can be processed within a restricted country of less uncertainty. Overall, this thesis is a theory-and-reference-based project, both conceptually and methodologically grounded, so these larger scientific and professional will be reflected upon in conclusion.

Reference

- Brenner, N., & Schmid, C. (2013). 11 Planetary Urbanization. In B. Neil (Ed.), *Implosions /Explosions* (pp. 160-163). JOVIS Verlag GmbH.
<https://doi.org/doi:10.1515/9783868598933-012>
- Fan, L., & Lei, C. (2009). Contradictories and countermeasures of peri-urbanity in the metropolitan city: A case study in Guangzhou (大城市边缘区演化发展中的矛盾及对策——基于广州市案例的探讨). *Urban Development Studies*, 16(12), 22-28+55.
- Furlan, C. (2022). Introduction lecture of Metropolitan Ecology of Places Studio. In.
- Kan, K., & Chen, J. (2022). Rural Urbanization in China: Administrative Restructuring and the Livelihoods of Urbanized Rural Residents. *Journal of Contemporary China*, 31(136), 626-643. <https://doi.org/10.1080/10670564.2021.1985841>
- Lin, G. (2018). Towards a Desakota Extended Metropolis? Growth and Spatiality of New (Peri-)Urbanism in Chinese Metropolitan Regions. In P. Viganò, C. Cavalieri, & M. Barcelloni Corte (Eds.), *The Horizontal Metropolis Between Urbanism and Urbanization* (pp. 111-130). Springer International Publishing.
https://doi.org/10.1007/978-3-319-75975-3_12
- Mcgee, T. (1991). The emergence of desakota regions in Asia: expanding a hypothesis.
- Oswald, F., Baccini, P., & Michaeli, M. (2003). *Netzstadt*. Springer Science & Business Media.
- Pisano, C. (2016). Patchwork Metropolis. *Progetto di città contemporanea*.
- Sieverts, T. (2003). *Cities without cities: An interpretation of the Zwischenstadt*. Routledge.
- Webster, D., & Li, J. (2020). East Asian megacities: the view from the periphery. In *Handbook of Megacities and Megacity-Regions* (pp. 169-187). Edward Elgar Publishing.
- Ye, L. (2013). Urban transformation and institutional policies: Case study of mega-region development in China's Pearl River Delta. *Journal of Urban Planning and Development*, 139(4), 292-300.
- Zhou Y, X. (1991). The Metropolitan Interlocking Region in China : A Preliminary Hypothesis. *The Extended Metropolis : Settlement Transition in Asia*, 89-112.
<https://cir.nii.ac.jp/crid/1571698599295172992>