FROM ROOTS TO ROUTES
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ABSTRACT

FROM ROOTS TO ROUTES

by

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In the past two decades, more than 200 million people in China moved from rural to urban areas. These rural-to-urban migrants have formed the largest peace-time inland migration in history. Mobility is a socially produced motion that often bears ideologies. It is associated with a desire for progress, freedom, and opportunity. The massive inland migration in China demonstrates the tremendous social force that aims to overcome the outdated social strata. However, as migrants move, limitations on mobility emerge. The Hukou, the household registration system in China, is an institutional framework that has entrenched the social strata for ages. Records of births, marriages, and moves identify each person with a place. As soon as migrants move from their designated origins, immobility appears. Welfare exclusion, job inequity, urban transit inaccessibility, etc. are the consequences of these immobility. Mobility is needed to move beyond their territory, while the unique scale and flexibility of scooters align with their needs. Scooters are not only their primary means of transportation but also personal vehicles that empower them to move beyond their territory. The thesis proposes to study this condition of mobility, immobility, and estrangement in the district of Minhang, Shanghai, where 1.5 million migrants currently live and work. Scooter, an emerging fast and cheap personal vehicle, is the protagonist in this story of mobility and estrangement in the district of Minhang. This thesis explores the relationship between mobility and estrangement in a modern China, one that is marked by a daunting economy and pronounced popular culture. The thesis proposes to relocate social stratification and spatial values, and shows how the immobility of these migrants is the consequence of economic and political policies. The thesis also explores the transformation of the social strata in the district of Minhang, which is marked by the immobility of these migrants. The thesis concludes that the Hukou system is a major barrier to mobility, and suggests that policies should be implemented to reduce the immobility of these migrants.
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- The Biggest Peace Time Inland Migration in China
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Movement as an act of displacement is devoid of meaning, history and ideology. However, mobility as socially produced motion is charged with meanings. In his book *On the Move*, Tim Cresswell described mobility as the dynamic equivalent of place whereas movement as the dynamic equivalent of location. Mobility is an act of displacement, whereas movement is movement. To move beyond their territory, migrants need products and producers of power to empower them. They need to engage in ideological transformation and urban reterritorialization.

Cross section of which expresses the immobility of migrants currently experienced, and calls for architectural research into a mass phenomenon. Where distribution of migrants follows specific social and spatial patterns, the massive movement of millions of migrants crossing the surface of China. This thesis explores the issue of migrant mobility at different scales, from the country map, to the city of Shanghai, to the migrant populated district of Minhang, to the street level.

As products and producers of power, mobility of migrant workers at all these scales could empower them to move beyond their territory. People and things are moving all over the world at all scales: moving hands, running away, commuting to work, immigration, etc. In the story of Chinese migrant workers, forms of mobility also appear at different scales. Lyons of mobility also appear at different scales. This thesis explores the meaning behind these connected and allows mobility to jump scales. They may seem to be unrelated at first glance, but if digging deeper, the meaning behind these connected and allows mobility to jump scales.

Mobility and Ideology & Scale

These questions in the context of mass rural-to-urban migration in China, are connected to the themes of the thesis. How are rural-to-urban migrants and producers of power engaged in the dynamic equivalent of place, and the dynamic equivalent of location? How do they produce motion is charged with meanings. In his book *On the Move*, Tim Cresswell describes mobility as the dynamic equivalent of place whereas movement is movement. Movement as an act of displacement is devoid of meaning, history and ideology. How do they produce motion is charged with meanings. In his book *On the Move*, Tim Cresswell describes mobility as the dynamic equivalent of place whereas movement is movement. Movement as an act of displacement is devoid of meaning, history and ideology. However, mobility as socially produced motion is charged with meanings. In his book *On the Move*, Tim Cresswell describes mobility as the dynamic equivalent of place whereas movement is movement. Movement as an act of displacement is devoid of meaning, history and ideology. How do they produce motion is charged with meanings. In his book *On the Move*, Tim Cresswell describes mobility as the dynamic equivalent of place whereas movement is movement. Movement as an act of displacement is devoid of meaning, history and ideology. However, mobility as socially produced motion is charged with meanings.
1994, the Ministry of Labor set strict limits for urban employers to hire workers from outside their own provinces. An outside worker can only be recruited when no local people are qualified and the employer has to obtain approval from the local labor and employment agency.

1997, State Council approved the Experimental Plans on Reforming the Hukou System in Small Cities and Towns. They allowed rural migrants living in small cities or towns for more than 2 years, marking the beginning for the reform of the Hukou system.

2003, directive Measures on Helping and Administration of Poor Urban Vagrants and Beggars affirming migrants' rights to work.

2005, Wang Longde, Vice Minister of Health, criticized local governments for limiting HIV/AIDS services to residents with local Hukou registration, a policy which excludes many migrant workers from treatment.

2010, Foshan, Taiyuan, Shenzhen, Jiangxi, Changchun, Dalian, and more large cities in China began to grant migrants residence permits, which, apart from medical care, education, employment and social security, grant migrant workers more welfare such as career and financial advice, free vaccination for children. Permanent residence can be filed 7 years later.

ON THE MOVE

245 MILLION MIGRANTS

RURAL TO URBAN

EDUCATION LEVEL

HOME VISIT FREQUENCY

DURATION OF STAY IN MIGRATION CITY

DURATION OF STAY IN CURRENT DWELLING

MIGRANT WORKER AGE DISTRIBUTION

SOCIAL BOUNDING PREFERENCE

FRIENDS

RELATIVE
MOBILITY VS IMMOBILITY

Mobility correlates to immobility. While the mobility of massive rural-to-urban migrants are restructuring social partition as migration policy opens up in the past two decades, it triggers a series of immobility that organizes and partitions their destination cities.

Institutional Barrier

Initially set up in 1951, Household Registration (Hukou) was largely adopted as a monitoring mechanism of population movement and provided welfare to urban residents in priority-industrial sectors. However, as influxes of peasants escalated in the 80s, Hukou, through a system of migration permits and recruitment certificates, became a control mechanism that has since then perpetuated population inequality and mobility barriers.

Two primary types of Household Registration: peasant and non-peasant. This distinction arose from a period in history when industry development was viewed as the priority so the state provided welfare to urban residents in priority-industrial sectors, while leaving the rest large rural population outside state-provided benefits and outside state support. Policies has changed over the years but this close link to state-provided benefits and institutional barrier still persists (Murphy, 2009). In recent years, continuous efforts have been made by government to adjust Hukou to fit the changing policy.

In recent years, continuous efforts have been made by government to adjust Hukou to fit the changing political-economic system. There is a trend of loosening this strata-entrenching institutional system, yet more need to be overcome.
Social Barriers

Many social factors exclude migrants from becoming members of urban society. The term 'nongmingong', or 'peasant workers', is a term commonly called by urban residents. It associates migrants with two identities: peasants from the rural land and laboring workers in the urban setting. It reinforces their place of origin and their purpose in the city as hard laborers required for the operation of giant urban machine. Another term, diszhou or inferior quality, frequently appears in descriptions of migrants. It is an urban critique of migrants' lack of education and their supposed poor upbringing due to their poverty and substandard school facilities (Wallace, 2013). These urban prejudices lead to further immobility in migrants' social life. Lack of social bonding between migrant workers is another social barrier within themselves. Due to their long working hours and rootless living and working style, migrants often found friendship hard to develop and maintain in their migrating cities as revealed in migrant surveys conducted in Shanghai (2012).
Located on the mouth of Yangtze River Delta, Shanghai is a global financial center and also the world's busiest container port. Out of its total 20.6 million population, 5.4 million are migrants (Shanghai Yearbook, 2015).

**SPATIAL PARTITION - Center vs Periphery**

Geographically, Shanghai is divided into three rings: central city, inner suburbs, and outer suburbs. Despite government's continuous efforts in socioeconomic development, disparities between the city core and urban fringe are still prominent. While inner-city slums used to host large number of migrants to settle needs, large industrial plants as well as small-to-medium manufacturing companies also gathered a huge migrant population there. Recently, demand of large-scale migration labor forces have attracted large number of migrants to settle nearby. Large industrial plants as well as infrastructure and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs. Large industrial plants as well as infrastructure and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs. Large industrial plants as well as infrastructure and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs.

**EMPLOYMENT PARTITION - Informal jobs in labor-intensive sectors**

Migrant settlements are formed based on various reasons. Proximity to potential employment in major determinant in their locational choices. The large number of infrastructural and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs. Large industrial plants as well as infrastructure and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs. Large industrial plants as well as infrastructure and real-estate construction work in inner suburbs that require massive labor forces have attracted large number of migrants to settle needs.

Number of employment opportunities rose up and down dramatically overtime, and informality characterizes most of these jobs.
As the earliest migrant aggregated district, Minhang has accumulated a large number of migrants since the early 2000s. Initially addressed by numerous housing development plans, the district has been developed in a demand for better commuting service industry. Out of its total 2.5 million population, 1.5 million people in Minhang district are migrants.

However, migrants are rather far from high-rail line as rapid public transit is not accessible to them on foot. Furthermore, rapid real estate development along the high-rail line also brings a large number of migrants to the area. As a result, those migrants who live far away from high-rail lines often live in an unsettled manner—staying in rental home and annually moving from one to another to avoid rising rents is a common practice.

The insanely high housing price in Shanghai drives migrants to live far away from light-rail lines. Often, they live in an unsettled manner—staying in rental home and annually moving from one to another to avoid rising rents is a common practice. Data collected from housing rental websites (Fang.com, 2016) also show that majority of rental home are clustered further away from high-rail lines. Moreover, rapid public transit is not accessible to them on foot. However, scooters are a personal vehicle very popular among migrants.

While density of metro stations in central city is based on walking distance, as metro goes to suburbs, its density drops sharply as one would frequently spot high rise residential neighborhood and commercial spots. Among the metro lines, the density of metro stations in central city is based on walking distance, as metro goes to suburbs, its density drops sharply since it is no longer an overlapping network system but a spine running across vast land. Land use re-arranges accordingly.

Mapping of average suburban housing price in Minhang reveals similar trend (Lianjia.com, 2016). They are all in the reach of scooter, a personal vehicle very popular among migrants.
SCOOTER IS RISING UP!

Electric-powered scooter is a special phenomenon in contemporary China. Thanks to technology breakthroughs in the early 90s, scooter emerged as an affordable personal vehicle and gained unmatched popularity in the past 20 years. Its sales went from 150,000 in 1999 to 21 million in 2007, and recently reached 2 billion (APE, 2014).

FAST, CHEAP & FLEXIBLE

Such popularity is not coming from nowhere. While under state regulation, scooters couldn’t exceed 20km/h speed limit, many users ride it at 30-40km/h, which is more than twice as fast as biking. On one charge, scooter can easily ride 20-25km (Ma, 2006). Moreover, its small size and flexible parts allow experienced riders to quickly maneuver through heavy traffic. Migrants have been particularly popular among migrants in urban periphery: living on a vast land without sufficient rapid transit coverage and having informal jobs that may require constant trips across the area. Migrants’ life in urban periphery depends a lot on this fast and flexible personal vehicle. Many migrants use scooters not only as a means of transportation but also as a means of production, as jobs like food delivery, housing agents has rising employment number.

TRANSPORTATION + PRODUCTION

In major cities like Beijing and Shenzhen, scooter is banned in certain central region. Despite these suppression, scooter continued to flourish in urban periphery, rushing through red lights, riding in opposite directions, etc. Major city like Beijing and Shanghai banned electric-powered scooters because of their illegal riding moves and opportunistic characters.

OPPORTUNISTIC IDENTITY

Many relate migrants to scooters because of their illegal riding moves and opportunistic characters. Migrant workers are known for their illegal riding practices, like rushing through red lights, riding in opposite directions, etc. Despite these suppression, scooter continued to flourish in urban periphery and became an identifier of migrant workers.
Shanghai vehicle statistics

First electric bike using in-wheel motor born in the lab in Tsinghua University

Breakthrough in electric bike research and development for mass production
Electric Bike General Technical Condition Report came out as the national standards for electric bike

Beijing banned electric bike on several streets in city center
Electric bike annual production exceeds 10 million
Speed limit of 20km/hr set as standard for electric bike manufacturer
Shenzhen banned electric bike in city center

Electric bike annual production exceeds 20 million

Estimated possession electric bike in China exceeds 2 billion
Shanghai Non-Motor Vehicle Regulations came out, requiring registration of electric bike
SCOOTER METRICS - RIDING

Turning radius = 4 m
(at 15 degree leaning angle)

Scooter height rider eye level = 1.4 m

Lane width 3.5 m - 5 m

Riding clearance = 2.2 m
battery lasts for about 1.5 hours or 30km.
Full battery recharge needs about 8 hrs.
Battery lasts for about 1.5 hrs or 30km.

SCOOTER METRICS - TRAVELING

Multiple stops
Round trip
One way
Based on 1.5 million migrants and 20 light rail stations in Minhang.

For 5% of local migrants to take light rail to city center, each station should have 4000 scooter parking.

Night school & computer cluster

Job exchange & printing station

Scooter parking & charging

Each station should have 4000+ scooter parking.
To empower migrants with greater mobility and access to the city, this design proposes scooter parking garage at each subway station in Minhang District. In addition to scooter parking, education and job/info exchange program are included in the design. It aims to create migrant hotspots along the light-rail line-a high land value area where migrants don't normally belong-to reterritorialize existing social and spatial partitions.
In addition to parking garages at each light-rail station, this design also proposes a riverside promenade next to water. Scooter paths branch off to two sides, connecting to activity space underneath train track and traffic intersections were studied as formal precedents for riverside promenade. It allows traffic to branch off to two sides, connecting to activity space underneath train track and traffic intersections were studied as formal precedents for riverside promenade. It allows

and be transformed into pop-up places for various migrant activities. Etc., and be transformed into pop-up places for various migrant activities. They can be activated by scooter carry-ons, such as shading umbrellas, food delivery boxes, etc. They can be activated by scooter carry-ons, such as shading umbrellas, food delivery boxes, etc. They can be activated by scooter carry-ons, such as shading umbrellas, food delivery boxes, etc. They can be activated by scooter carry-ons, such as shading umbrellas, food delivery boxes, etc.

Norms of streetscape in Minhang, such as streetlights, fences, and shipping containers, are rede- Norms of streetscape in Minhang, such as streetlights, fences, and shipping containers, are rede-

In addition to parking garages at each light-rail station, this design also proposes a riverside promenade next to water.
POP-UPS: CHAIN-LINK MAT
TRAFFIC INTERSECTION TYPOLOGY STUDY

roundabout T

T-bone
cloverleaf

trumpet
stack

turbine-stack hybrid

semi-directional T

turbine

U-turn

roundabout
Trumpet is chosen as the intersection type for scooter riverside promenade.

Living rooms

Water edge public

The Water

Scenery path overlooking

Pop-up market
PARKING GARAGE TYPOLOGY STUDY
Split-level, conjunct is chosen as the garage type for parking design. It's stretched so the middle ramping part is being placed above a six-lane primary street, allowing scooters to cross the street as flying above flows of traffic.
loop

rise up

terrace

stack

notch and connect
STRUCTURE SYSTEM

EXPLODED AXON STRUCTURE SYSTEM

concrete-filled steel column
vierendeel trusses
circulation core
precast concrete slab
roof ramp
glass enclosure
chain-link mesh facade

moments
Column and truss system
Vierendeel truss bolt-connected to welded con-
necting-plates on steel column.

Structure Details
Steel angles connected to Vierendeel truss precast concrete hollow core planks (w/ re-bar) placed on top of

Floor System
Liping and her scooter; and selfie time :) scooter everywhere!!
MAPPING OF AN URBAN SECTION FROM LIGHT-RAIL LINE TO INDUSTRIAL WATERFRONT
Program Brainstorming

Stop-and-Stay Living Room
Spiral Ramp Job Exchange
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