



A Brief Introduction to
"The New Science of Cities"

新城市科学

概论

龙瀛

清华大学建筑学院

2018年9月20日

Dr Ying Long 龙瀛

Profile



Ying Long, Ph.D. is now an associate professor in the School of Architecture, Tsinghua University, China. His research focuses on urban planning, quantitative urban studies and applied urban modeling. He has an education background in both environmental engineering and city planning. Before joining Tsinghua University, he has worked for Beijing Institute of City Planning as a senior planner for eleven years. Familiar with planning practices in China and versed in international literature, Dr. Long's academic studies creatively integrate international methods and experiences with local planning

practices. He has published over one hundred journal papers and led over twenty research/planning projects. Dr. Long is also the founder of Beijing City Lab (BCL www.beijingscitylab.com), an open research network for quantitative urban studies. More information is available at <http://www.beijingscitylab.com/longy>.

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龙瀛，清华大学建筑学院特别研究员，博士生导师，研究方向是城乡规划与设计，研究兴趣是城市空间量化研究及其规划设计响应。他是北京城市实验室（Beijing City Lab）创建人与执行主任，中国城市科学研究会城市大数据专业委员会副主任委员兼秘书长，SCOPUS收录eSCI国际期刊IRSPSD执行主编，Environment and Planning B (SSCI)、《国际城市规划》和《上海城市规划》期刊编委，中国收缩城市研究网络与数据增强设计研究网络的共同发起人，剑桥大学国家公派访问学者，多个大学和科研机构的客座教授/研究员。出版Springer英文专著《Geospatial Analysis to Support Urban Planning in Beijing》，累计发表近两百篇学术论文，37篇学术论文被SCI/SSCI收录，受邀在多个国际国内刊物上作为客座

主编组织专刊（如Landscape and Urban Planning和Journal of Urban Management）。获得并主持国家自然科学基金、世界银行、阿里公益基金会、惠康基金会、世界资源研究所、自然资源保护协会、国家发改委、住建部、滴滴出行、摩拜以及多家规划设计机构的研究项目资助，获全国优秀工程勘察设计金奖、华夏建设科学技术奖（两次）、北京市科学技术奖（两次）、全国优秀城乡规划设计奖（五次）、金经昌中国城市规划优秀论文奖（三次）和首届最具影响力中国地理期刊优秀论文等。他分别于2002年、2004年和2011年在清华大学获得学士（环境系）、硕士（环境系）和博士学位（建筑学院）。更多详见<http://www.beijingscitylab.com/longy>

(2017年11月26日更新)

Full CV



Dr Ying Long's full CV

Updated in February 2018

CV_Ying_Long.pdf

Adobe Acrobat Document [433.8 KB]

Download

Publications

All my publications are available here [万方](#)、[中国知网](#)、[百度云](#)、[Google Scholar](#)、[ResearchGate](#)

My monograph in Springer: [Geospatial Analysis to Support Urban Planning in Beijing](#)

To sum up, I like to understand the whole China city system (rather one single city) at a fine scale (human-scale) through emerging new data, quantitative methodology, applied urban modeling as well as cutting edge techniques like deep learning and wearable sensors. In addition to understand, we also like to do spatial intervention like urban planning and design based on these quantitative urban studies. Our projects range from multi-level models for urban spatial development of Beijing, urban expansion model for the whole China at the block level, bus landscapes using public transportation smartcard records, quality and its variation identification using large-scale street view pictures as well as a cluster of shrinking city related works.

Visit me

How to visit me:

My office is at Room 501, New Architecture Building, School of Architecture, Tsinghua University, Beijing.

北京市海淀区清华园1号清华大学新建筑馆（紧邻老建筑馆东侧）501房间，邮编100084

Online map: <http://j.map.baidu.com/qlq88>

Please kindly note that an accepted face-to-face meet is generally for half an hour only, which is my longtime tradition and I think is enough for an effective discussion for a topic. 任何预约的面谈根据传统都是半小时以内的时间。

Contacts

Email: ylong@tsinghua.edu.cn

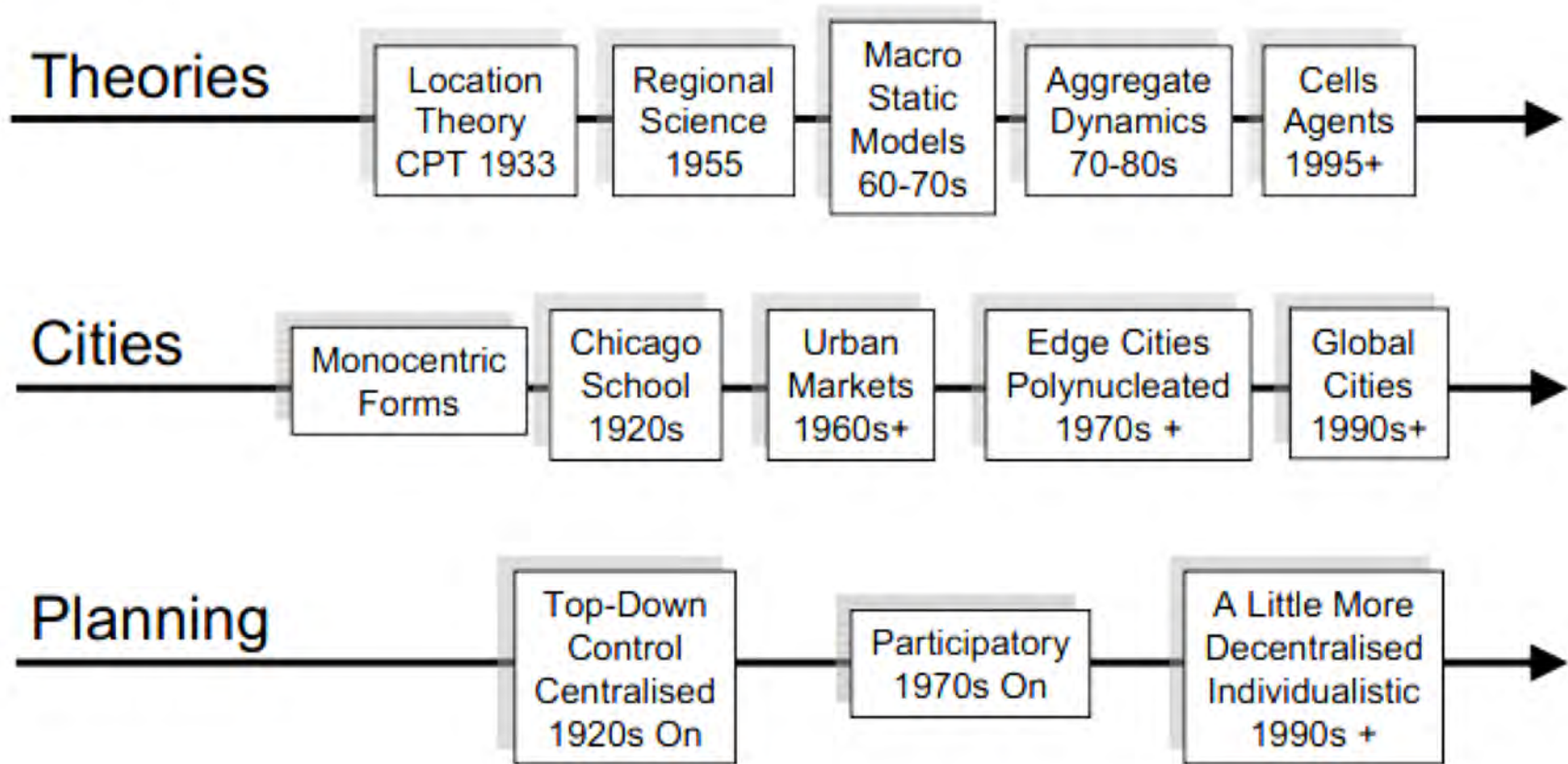
Mobile: +86 1366 1386 623

一、新城市科学

The New Science of Cities

新城市科学

1. 城市及城市科学的发展演变



19th century industrial city 21st century global city

来源: Michael Batty 《A Science of Cities》 P19

新城市科学

2. 复杂学派

- 复杂运动泛指20世纪80年代以来在自然科学以及社会科学对复杂、非线性及非均衡系统相对于简单、线性及均衡系统所做的观念革新
- 代表学派
 - 以美国圣塔菲研究所(**Santa Fe Institute**)为首的复杂科学(Complexity Science)
 - 规划学中以 **Lew Hopkins** 为首的伊利诺规划学派(Illinois Scholl of Planning)
 - 城市学中以 **Michael Batty**为首的城市科学(The Science of Cities)
 - 中国哲学中以易经为首的中国传统科学
- 以**Michael Batty**为首的城市科学(The Science of Cities)将过去区域科学及城市经济学以有系统的方式整理并建立在复杂科学上，称之为新城市科学。

新城市科学

3. 新城市科学的提出

- 英国皇家科学院院士Michael Batty

- 城市是个以自下而上发展为主的复杂系统，其规模和形态遵循因空间争夺而导致的扩展规律。
- 提出认识城市不仅仅是理解城市空间，还需要理解网络和流动如何塑造城市，他强调新城市科学在促进人们更好地理解城市系统和结构方面的作用。
- 新城市科学提供关于城市面临的限制和挑战的新见解，丰富当前的城市规划方法，并用有利于所有城市居民的现实城市规划取代传统的自上而下规划。

□ 新城市科学

3. 新城市科学的提出

- 英国皇家科学院院士Michael Batty

- 在《新城市科学》（The new science of cities）一书中提到“新”城市科学是利用过去20至25年内发展出来的新技术和新方法，基于复杂性理论的城市科学，体现离散性、“自下而上”的思想及演进的视角。
 - “老”城市科学则更多体现为“区域科学”，是基于静态的、截面的、系统论的视角。

3. 新城市科学的提出

- 城市科学是一门交叉学科，基于多学科的研究成果，研究不同的城市问题。随着以计算机技术和多源城市数据为代表的新技术和新数据的迅猛发展，**新城市科学（new urban science）**，即依托深入量化分析与数据计算途径来研究城市的学科模式，在过去的十数年中正在逐渐兴起。
 - “新”城市科学与“老”城市科学体现的“区域科学”不同，其使用更新的技术和工具，是演进的、复杂科学的，更体现离散性、自下而上的思想

3. 新城市科学的提出

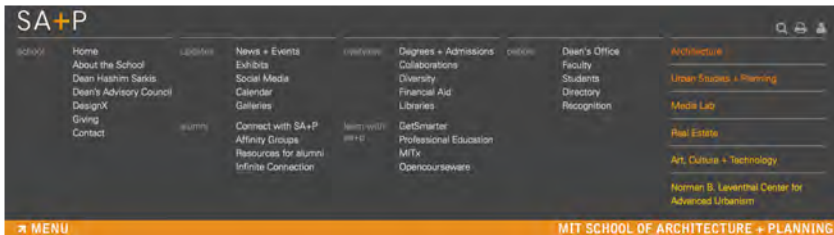
- 目前全球范围内已涌现了多家以此为核心关注点的研究机构。
- 不同于之前 1960 年代的庞大而复杂的城市模型研究，当前的这一波新城市科学不仅具有远胜于当时的计算能力和海量数据，还更关注技术与数据支持下的人本感受。
- 在多种新技术和新数据的支持下，以城市计算（urban computing）、虚拟现实（virtual reality）、人机交互（human-computer interaction）等方向为代表的多学科交叉的城市科学正在为城市设计带来革新的可能性。

新城市科学

4. 相关研究机构

● 麻省理工媒体实验室 (MIT Media Lab)

- 成立于1980年，是一个致力于科技，媒体，科学，艺术和设计融合的跨学科研究室
- 研究范围为传媒技术、计算机，生物工程，纳米和人文科学。
- 从机器人到生物工程，从电子产品到音乐娱乐，涉及范围极其广
- <https://www.media.mit.edu/>



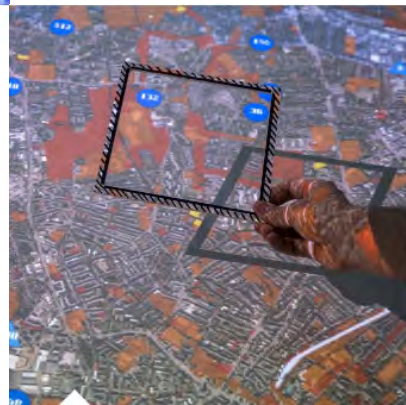
Publish or perish Deploy or Die



AR is transforming tech. What can it do for cities?

Cities need to work to ensure that AR makes the leap from "cool experience," to a technology that improves residents' lives.

via CityLab · Aug. 3, 2018
in City Science
#augmented reality #civic technology
#urban planning



Finding places: Facilitating public participation in the allocation of housing for refugees

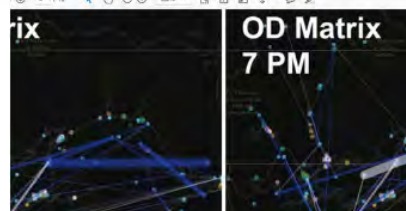
In reaction to the sudden arrival of tens of thousands of refugees in...

via UrbAct · Oct. 10, 2017
in City Science
#urban planning



Small European nation becomes a "living lab" for urban innovation researchers

When you think of innovation hubs around the world, Andorra, a tiny country tucked between...



新城市科学

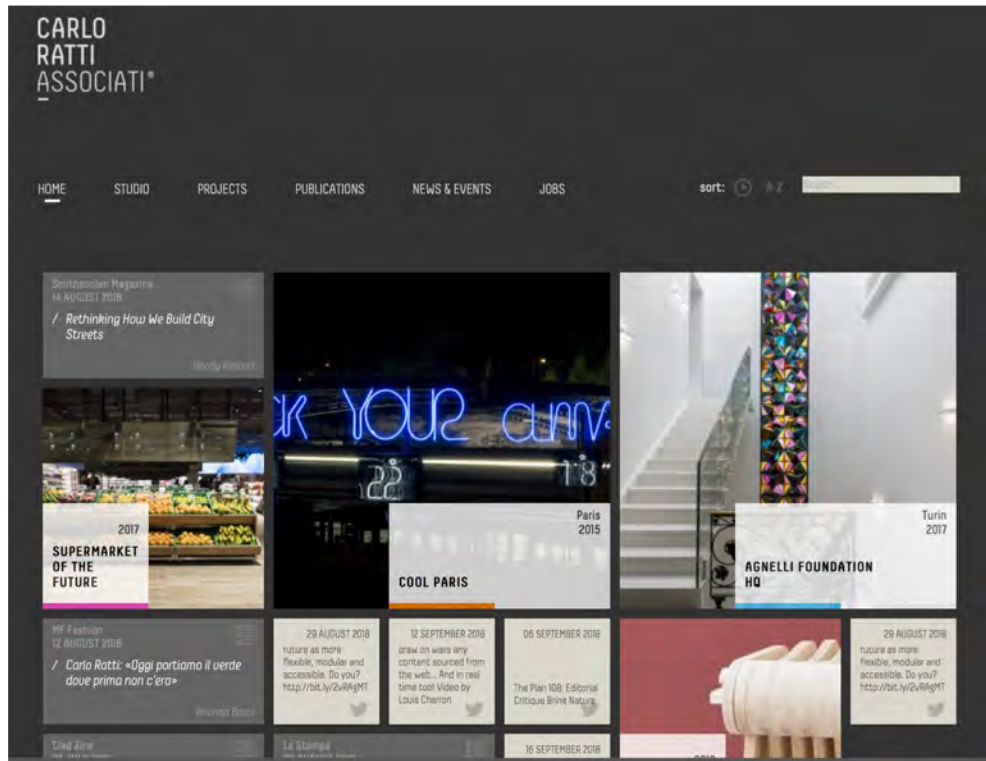
4. 相关研究机构

- 麻省理工感知城市实验室 (MIT Senseable City Lab)

- 实时城市是切实的！随着网络和数字信息层覆盖城市空间，新的建成环境研究方法正在涌现。我们描述、理解和设计城市的方式正在彻底改变。MIT感知城市实验室旨在预测并批判性地研究这些变化。

- <http://senseable.mit.edu/>





卡尔洛·拉蒂

建筑师

卡尔洛·拉蒂是意大利建筑师、工程师、发明家、教育家和活动家。他出生于意大利都灵，是麻省理工学院的教授、Senseable City Lab的负责人。此外，他还是国际设计和创新工作室CRA-Carlo Ratti Associati的创始合伙人。CRA于2004年在意大利都灵成立，目前在美国纽约市设有分公司。
[维基百科](#)

生于：1971年1月7日 (47岁)，意大利都灵

图书：[SENSEable CITY GUIDE to PUNE, WOOD BUFFALO and DALLAS](#)

教育背景：[剑桥大学](#)，[都灵理工大学](#)

<https://www.carloratti.com>

4. 相关研究机构

- 新加坡ETH 未来城市实验室 (Future Cities Lab)
- <http://www.fcl.ethz.ch/>

ETH zürich

Student portal Login Contact en

Alumni association

Keyword or person 🔍

Departments ▼

Future Cities Laboratory

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(FCL) FUTURE CITIES LABORATORY 未来城市实验室

Future Cities Laboratory (FCL) is the first programme of the Singapore-ETH Centre, established by ETH Zurich and Singapore's National Research Foundation. FCL seeks to shape sustainable future cities through science, by design, and in place, with an Asian perspective.

Read more →

Transformative research for future cities underway

At the FCL Symposium, the team presented research models based on current work at FCL and jointly explored what it takes for research to be "transformative".

新城市科学

4. 相关研究机构

- **新南威尔士大学城市未来研究中心 (UNSW City Futures Research Centre)**
 - **Research: City Analytics, City Housing, City Shaping, City Wellbeing**
 - **Themes: Equity, Governance, Productivity, Renewal**
 - <https://cityfutures.hse.unsw.edu.au/>



City Futures Research Centre
UNSW BUILT ENVIRONMENT



Home Research City Housing

City Analytics
City Housing
City Shaping
City Wellbeing
Themes
Projects
Postgraduate Opportunities

Equity
Governance
Productivity
Renewal

Led by Professor Hal Pawson, the City Housing Program focuses on the financing and development of social and affordable housing as well as the analysis of housing affordability and the operation of private housing markets.

This program has developed in large part through its success within the Australian Housing and Urban Research Institute (AHURI) network. AHURI is a national research commissioning body funded by the Commonwealth and State Governments. It comprises a central management office (AHURI Ltd) and a network of nine participating universities or Research Centres who undertake AHURI-supported projects on a competitive funding basis. While City Futures leads the UNSW AHURI Research Centre, colleagues from other faculties within the university also contribute to certain projects.

issues related to the governance,

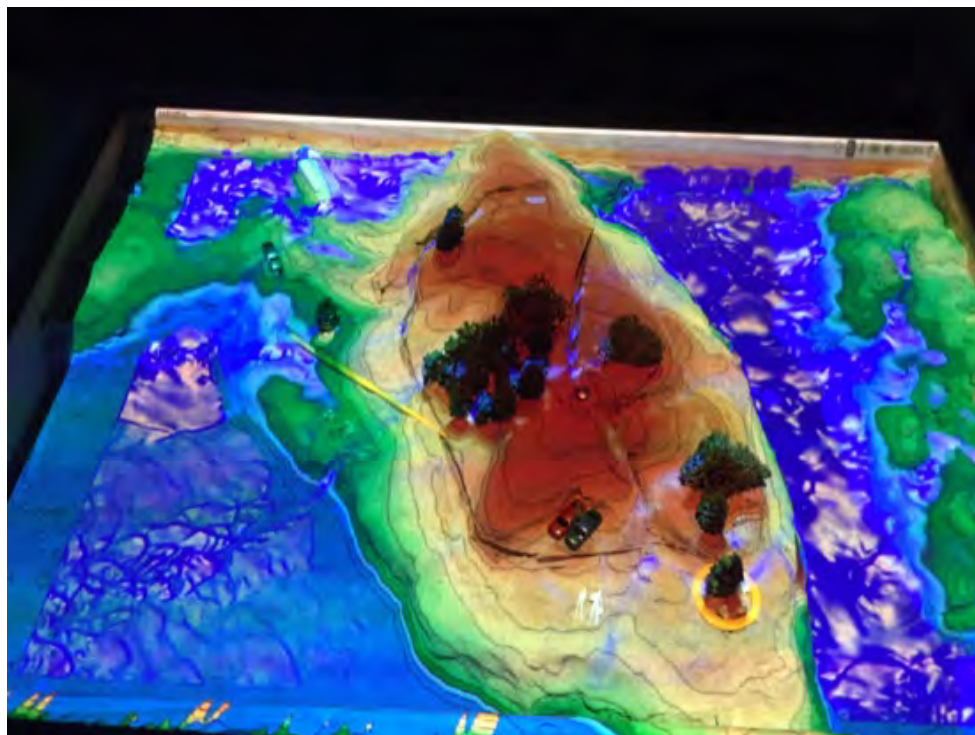
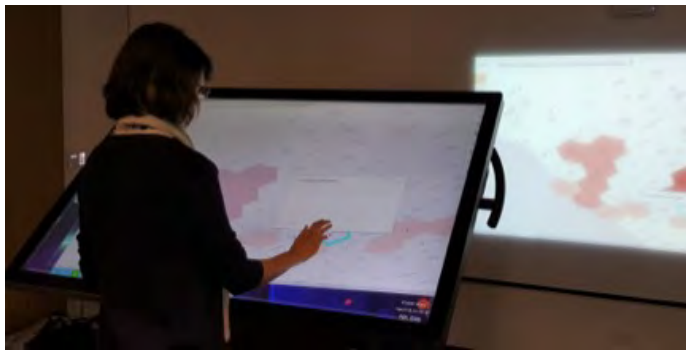
People

Professor Hal Pawson
Program Head, Associate Director, City Futures Research Centre

4. 相关研究机构

- **新南威尔士大学城市分析实验室 (UNSW City Analytics Lab)**
 - 旨在支持协作城市规划和以用户为中心的设计。配备有大型决策支持剧院、3个的VR/AR室、有形桌沙箱和用于实验的观察室。CAL旨在支持设想可持续、高效、宜居和适应力强的城市，并为研究与城市规划和设计相关的决策过程提供了机会。

<https://www.be.unsw.edu.au/content/city-analytics-lab>



新城市科学

4. 相关研究机构

● 新南威尔士大学智慧城市研究组 (UNSW Smart Cities Research Cluster)

- 旨在通过使用空间集成的信息和通信技术，促进城市环境和服务的有效设计、规划和传递。研究组以问题为导向，通过三种方式促进城市公共利益：(1) 发展公众参与式城市化；(2) 可持续和灵活的高科技基础设施和服务的智能设计；(3) 智能科技和基于实证的设计。

<https://www.be.unsw.edu.au/research/research-clusters/smart-cities>



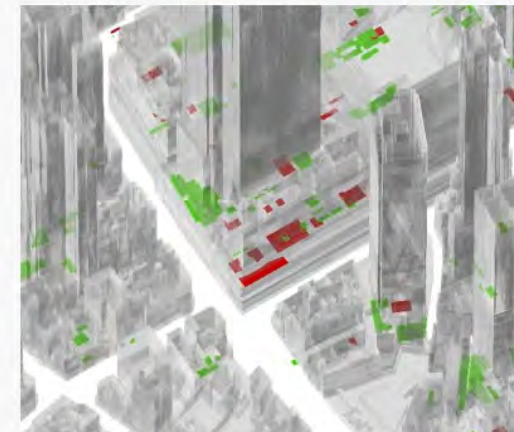
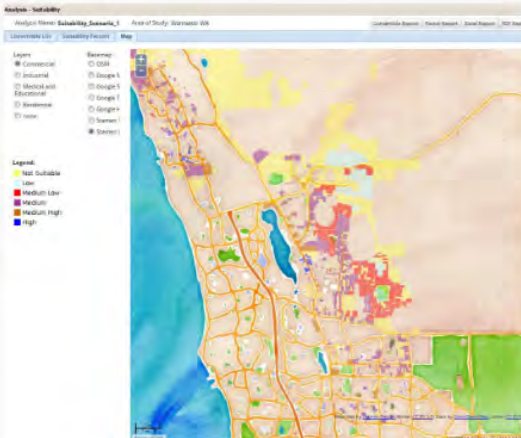
Modelling City Futures – A Scenario Planning Responsive Transport Environments

Sydney's 3D Economy

Christopher James Pettit

Matthias Hank Haeusler

Scott Hawken and Hoon Han



新城市科学

4. 相关研究机构

● 哈佛大学数据智能城市对策 (Data-Smart City Solutions)

- 位于哈佛肯尼迪学院的民主治理与创新中心，旨在促进涉及新兴数据的地方政府项目，为涉及这一新兴领域的城市提供资源平台。重点介绍前沿的实践、创新者和案例研究，并联系前沿的行业、学术和政府官员。研究重点是政府与数据的交叉，包括开放数据、预测性分析和公众参与技术等。力求促进跨机构数据与社区数据的结合，更好地发现和解决公众问题。
- 分析和可视化有关健康和人类服务、基础设施、公共安全和法规的不同数据，提供各种城市规划优化措施。 <https://datasmart.ash.harvard.edu/>

Data-Smart City Solutions

An initiative by the Ash Center at Harvard Kennedy School
and powered by Bloomberg Philanthropies



CIVIC DATA CIVIC ENGAGEMENT HEALTH & HUMAN SERVICES INFRASTRUCTURE PUBLIC SAFETY USE CASES CIVIC ANALYTICS NETWORK



新城市科学

4. 相关研究机构

- **芝加哥大学城市计算与数据中心 (Urban Center for Computation and Data)**
 - 将阿贡国家实验室在物理科学和工程方面的优势与芝加哥大学在社会科学、经济学和政策方面的专业知识相结合，创建计算研究工具并让研究者、政府机构、建筑公司、私营企业和公民志愿者联合起来，共同致力于理解和改善我们的城市。 <https://www.urbanccd.org/>

URBAN CENTER FOR COMPUTATION AND
DATA

*A research initiative at the University of Chicago
and Argonne National Laboratory*

COMPUTATION AND DATA SCIENCE TO ADDRESS RAPID URBAN GROWTH AND CHANGE

URBANCCD PROVIDES RESOURCES, TOOLS, AND COLLABORATIVE OPPORTUNITIES IN URBAN SCIENCE TO ADDRESS THE GLOBAL CHALLENGES CREATED BY RAPID URBANIZATION AND AGING CITIES.



4. 相关研究机构

- **纽约大学城市科学与发展中心 (NYU Center for Urban Science + Progress)**
 - **Urban informatics: collect, store, and process data to better understand and improve urban systems and quality of life**
 - <http://cusp.nyu.edu/>

NYU Center for Urban Science + Progress

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A UNIQUE RESEARCH CENTER THAT USES NEW YORK CITY AS ITS LABORATORY TO HELP CITIES.

The Center for Urban Science And Progress (NYU CUSP) is a unique public-private research center that uses New York City as its laboratory and classroom to help cities around the world become more productive and livable.

LEARN MORE ABOUT CUSP

MISSION

New York University's Center for Urban Science & Progress (CUSP) is a university-wide center whose research and education programs are

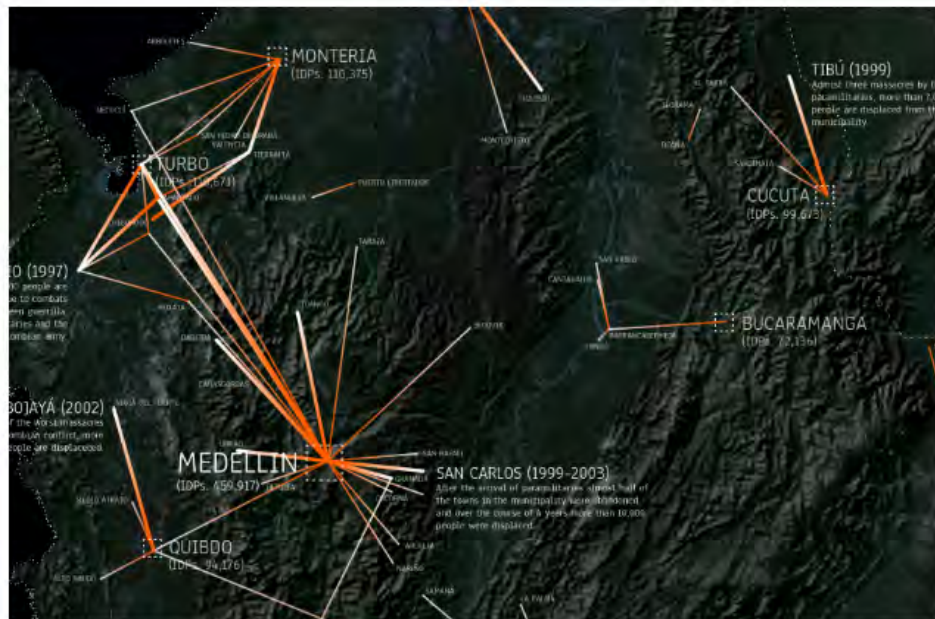
4. 相关研究机构

● 哥伦比亚大学空间研究中心 (Center for Spatial Research)

- 成立于2015年，是一个基于设计、建筑、城市规划学科，与人文科学和数据科学建立联系并为其提供空间专业知识的城市研究中心。支持围绕绘图、数据可视化、数据收集和数据分析等关于新技术的研究和教学活动。关注数据认知和“大数据”世界，致力于用先进的设计工具开拓新的研究领域，帮助学者、学生、合作者和受众了解全球城市的过去、现在和将来。

Featured Project

Conflict Urbanism: Colombia



About

The Center for Spatial Research was established in 2015 as a hub for urban research that links design, architecture, urbanism, the humanities and data science. It sponsors research and curricular activities built around new technologies of mapping, data visualization, data collection, and data analysis. [More](#)

People

Laura Kurgan
Dare Brawley
Grga Basic
Jia Zhang
Brian House
Wright Kennedy

Browse by Initiative

- Conflict Urbanism
- Architecture, Urbanism, and the Humanities
- Million Dollar Blocks
- Advanced Data Visualization
- Mapping Neuroscience

Browse by Theme

- Criminal Justice
- Conflict
- Open Data
- Mapping
- New York

Browse by Method


- GIS
- Mapping
- Data Visualization
- Data Science
- Web Mapping

4. 相关研究机构

- 伦敦大学学院 Centre for Advanced Spatial Analyses (UCL CASA)
- <https://www.ucl.ac.uk/bartlett/casa/>

退出全屏模式 (F11)

The Bartlett Centre for Advanced Spatial Analysis



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Research

CASA's research is focused on the application of computer models, data visualisation techniques, innovative sensing technologies, mobile applications and urban theory linked to city systems.

Watch

Catch up with the latest CASA video on our YouTube channel



新城市科学

4. 相关研究机构

● 昆士兰科技大学 QUT Urban Informatics Centre

- 在实时、遍在的科技对人类网络和城市基础设施的虚实环境带来的影响下，关注不同城市环境下的城市体验的研究、设计和实践。涉及不同的学科背景：人文科学和社会科学；设计，规划和建筑；人机交互，信息技术和计算机科学。
- <https://research.qut.edu.au/designlab/groups/urban-informatics/>

QUT QUT Design Lab

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Urban Informatics

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▸ Design Education

▸ Design Robotics

▸ Diseño@QUT

▸ HUB Studio

▸ People & Systems

▸ Stitchery Collective

▸ Urban Informatics

QUT Urban Informatics

The Urban Informatics group in the QUT Design Lab examines, communicates, and designs responses to how people, place, and technology come together to create urban experiences.

We apply diverse established and novel methods of enquiry to identify challenges and opportunities in urban environments, across socio-cultural, economic, ecological, and technological spheres. We design innovative technologies, interventions, and services to respond to such challenges and opportunities through meaningful engagement with individuals, communities, and organisations across the public, private, not-for-profit, and education sectors. Our aim is to research and co-create urban futures that are more liveable and equitable. Thus we dare to ask difficult questions and go an extra mile to ensure the most insightful, impactful outcomes.

Urban informatics is the study, design, and practice of urban experiences across different urban contexts that are created by new opportunities of real-time, ubiquitous

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RT @SyncCityIoT: Are you a #city or a #SME writing a proposal for our #opencall, but you are still looking for partners to complement your...
3 days ago

RT @SpringerCompSci: Robotic Building - Just published! First book in the new Springer Series in Adaptive Environments, treating both theor...
4 days ago

新城市科学

4. 相关研究机构

● 爱尔兰梅努斯国立大学 Programmable City Project

- 研究网络化数字技术与基础设施、城市治理与城市生活之间的关系。尤其关注如何将城市越来越多地转化为代码和数据，进而转换为我们在城市中理解、管理、工作和生活以及生产“智慧城市”的方式。

<http://progcity.maynoothuniversity.ie/about/>



BLOG

THE PROJECT

PEOPLE

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CONTACT

Introducing the ERC-funded Programmable City Project

FRAMEWORK

The Programmable City project is investigating the relationship between networked digital technologies and infrastructures and urban management and governance and city life. In

PLATFORMS

4. 相关研究机构

- **亚洲计算机辅助建筑设计研究协会 (CAADRIA)**

- The Association for Computer-Aided Architectural Design Research in Asia (CAADRIA) 旨在促进亚洲计算机辅助建筑设计的教学和研究。其年度会议先后于香港、澳大利亚、中国、印度、日本、韩国、马来西亚、新加坡、台湾和泰国等地举办了20次会议，为教师、学生、研究人员和从业者提供了相互交流的机会，并了解该领域的最新研究成果。会议记录可在世界各地的在线和研究图书馆中获得。
- <http://www.caadria.org/>



4. 相关研究机构

● 其他国外研究机构

- **Carnegie Mellon University: Metro21: Smart Cities Initiative:**
<https://www.cmu.edu/metro21/>
- **UC Berkeley : Urban Sim**
<https://www.ucl.ac.uk/bartlett/casa/>
- **Universidad Politécnica de Madrid: Master in City Sciences**
<http://www.citysciences.com/>
- **Amsterdam Institute: Amsterdam Institute for Advanced Metropolitan Solutions**
<http://www.ams-institute.org/>
- **Santa Fe Institute: Santa Fe Institute Cities**
<http://www.santafe.edu/news-center/>
- **Northeastern University: Urban Informatics Program**
<http://www.northeastern.edu/cssh/policyschool/urban-informatics/>
- **Universidad Politécnica de Madrid: Master in City Sciences**
<http://www.citysciences.com/>
- **University of Glasgow: Urban Big Data Centre**
<http://ubdc.ac.uk/>
- **University of Tokyo: Center for Spatial Information Science**
<http://www.csis.u-tokyo.ac.jp/english/index.html>

4. 相关研究机构

● 国内研究机构

- 北京城市实验室
- <https://www.beijingcitylab.com/>
- 北京市城市规划设计研究院
- <http://www.bjghy.com.cn/>
- 中国城市规划设计研究院
- <http://www.caupd.com/>
- 江苏省城市规划设计研究院
- <http://www.jupchina.com/webpage/index.jsp>
- 中国科学院深圳先进技术研究院
- <http://www.siat.ac.cn/>
- 清华同衡数字城市研究所
- <http://dcrc.thupdi.com/>
- 城市象限
- <http://www.urbanxyz.com/>
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5. 相关期刊

● International Journal of Urban Sciences



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Urban Science — Open Access Journal

Urban Science (ISSN 2413-8851) is an international, scientific, peer-reviewed, open access journal of urban and regional studies published quarterly online by MDPI. The first issue has been released in March 2017. The European Cool Roofs Council (ECRC) and Society for Urban Ecology (SURE) are affiliated with Urban Science.

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Latest Articles

Reuse Choice, Flood Risk and Resilience, and Characteristics of Counties with Brownfield Cleanups

by Ann M. M. Carroll and Norma F. Kanarek
Urban Sci. **2018**, *2*(3), 85; <https://doi.org/10.3390/urbansci2030085> - 4 September 2018

Abstract Limited research has examined brownfields clean-up, reuse choice and associations with flood risk or resilience. This cross-sectional analysis examines counties with U.S. Environmental Protection Agency (EPA) funded brownfield cleanups initiated from 2005 through 2009 and assesses the county-level relationship of green reuse with



6. 相关课程

● 新南威尔士大学的短期课程 Digital Cities

- 通过City Futures Research Centre and Built Environment的实地项目，提供深入地利用政策制定者可获得的数据和信息进行实践的机会。学生可以访问创新的全国空间数据集，澳大利亚城市尤其是悉尼将成为我们的实验室，同时结合国际视角。学员将学习如何使用新的数据和技术平台并应用于设计、规划和管理当代城市。<https://www.be.unsw.edu.au/digital-cities>

Digital Cities

Digital Cities

Course Code:
BENV7504

Units of credit:
6

Duration:
Term 1, 2019

Course Timetable:
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The Digital Cities UNSW Built Environment short course provides an in-depth practical experience of the data and information available to urban policymakers through investigation of live projects in the [City Futures Research Centre](#) and Built Environment. You will learn how to identify new data and technologies platforms and apply to design, plan and manage a contemporary city.

This course explores the breadth of data available to urban policymakers, using recently completed and indeed 'live' projects being undertaken within City Futures Research Centre and Built Environment more widely. With the Faculty providing a principal hub in the Australian Urban Research Infrastructure Network (AURIN), students will have access to innovative, nationwide spatial datasets: Australian cities



6. 相关课程

● 伦敦大学学院的硕士课程 MSc Smart Cities and Urban Analytics

- 希望利用数据和技术创新来解决城市化世界面临的一些基本问题。重点是与智能城市基础设施相关的核心研究挑战。从其运营职能和规划，到管理和控制以及优化，探索城市作为创新实验室的概念，反映创新技术是如何改变我们对城市的运营方式和理解方式的。
- 旨在：探索面向未来的设计；探索和开发传感和信息流等技术；理解智能系统理论；培养定量方法，GIS和编程技能
- <https://www.ucl.ac.uk/bartlett/casa/programmes/msc-smart-cities-and-urban-analytics>



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MSc Spatial Data Science and Visualisation

MRes Spatial Data Science

MSc Smart Cities and Urban Analytics

The MSc in Smart Cities and Urban Analytics looks to take advantage of data and technological innovations to tackle some of the fundamental problems facing the urbanised world.

Watch

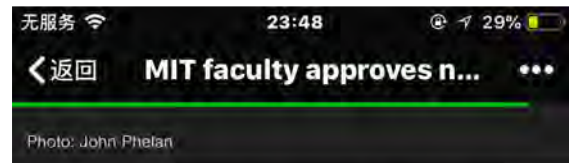
Catch up with the latest videos on CASA's YouTube channel



6. 相关课程

● MIT开设新城市科学专业

- 2018年5月16日，麻省理工学院批准设立一个新的本科学位：城市科学与规划 & 计算机科学联合学士学位——“Bachelor of Science in urban science and planning with computer science”
- **背景：**传感网、大数据、量化分析、交互式通信和社交网络、分布式智能给城市带来的深刻变化；无人驾驶、资源自管理传感网、重点基础设施物联网、生物识别、共享经济、新数据环境下的公众参与...
- **简介：**结合城市规划和公共政策、设计和可视化、数据分析、机器学习和人工智能、传感网技术、机器人技术、新材料以及其他计算机科学和城市规划领域的相关内容。该项目将反映城市科学家如何以一种前所未有的方式理解城市和城市数据，并重塑现实世界
- **院系：**同属两院——城市研究与规划系（DUSP）和电气工程与计算机科学系（EECS）



MIT faculty approves new urban science major

Interdisciplinary undergraduate program combines urban planning and computer science.

School of Architecture and Planning | School of Engineering
June 5, 2018



Urban settlements and technology around the world are co-evolving as flows of population, finance, and politics are reshaping the very identity of cities and nations. Rapid and profound changes are driven by pervasive sensing, the growth and availability of continuous data streams, advanced analytics, interactive communications and social networks, and distributed intelligence. At MIT, urban planners and computer scientists are embracing these exciting new developments.

The rise of autonomous vehicles, sensor-enabled

6. 相关课程

● MIT开设新城市科学专业

• 专业侧重:

- (1) 城市规划和公共政策的基本技能, 包括公正与伦理学;
- (2) 统计学、数据科学、地理空间分析和可视化;
- (3) 计算机科学、机器人学和机器学习

- **专业教学:** 通过labs, UROP assignments, client-based courses等形式提供大量解决场地问题的实践机会, 让学生在计算机和城市科学的交叉点上, 综合应用其所学理论于实践中。学生还有机会根据个人需求选修数据可视化、应用空间分析、设计、公共政策等高级专业选修课。

6. 相关课程

● MIT开设新城市科学专业

▼ 教学计划

Computer Science Requirements		Units
6.00	Introduction to Computer Science and Programming	12
6.042[J]	Mathematics for Computer Science	12
6.006	Introduction to Algorithms	12
6.009	Fundamentals of Programming	12
6.031	Elements of Software Construction	15
<i>Select one of the following options:</i>		12-24
Option 1 (12 units)		
6.008	Introduction to Inference	
Option 2 (24 units)		
6.034 or 6.036	Artificial Intelligence Introduction to Machine Learning	
6.041A & 6.041B	Introduction to Probability I and Introduction to Probability II	

AI、机器学习、概率论 作为选修



6. 相关课程

● MIT开设新城市科学专业

▼ 教学计划

Urban Planning Requirements

11.001[J]	Introduction to Urban Design and Development	12
11.007	Urban and Environmental Technology Implementation Lab	12
11.188	Urban Planning and Social Science Laboratory (CI-M)	12
<i>Select one of the following:</i>		12
6.805[J]	Foundations of Information Policy ¹	
11.002[J]	Making Public Policy	
11.011	The Art and Science of Negotiation	
11.165	Urban Energy Systems and Policy	

▼ 教学计划：
高级选修课

Advanced Computer Science Electives

6.803	The Human Intelligence Enterprise	12
6.811[J]	Principles and Practice of Assistive Technology	12
6.813	User Interface Design and Implementation	12
6.815	Digital and Computational Photography	12
6.837	Computer Graphics	12
6.170	Software Studio	12

Urban Science Electives

2.00A	Fundamentals of Engineering Design: Explore Space, Sea and Earth	9
4.032	Design Studio: Information and Visualization	12
4.432	Modeling Urban Energy Flows for Sustainable Cities and Neighborhoods	12
6.805[J]	Foundations of Information Policy ¹	12
11.123	Big Plans and Mega-Urban Landscapes	9
11.137	Financing Economic Development	12
11.148	Environmental Justice: Law and Policy	12
11.156	Healthy Cities: Assessing Health Impacts of Policies and Plans	12
11.158	Behavior and Policy: Connections in Transportation	12
12.010	Computational Methods of Scientific Programming	12
15.276	Communicating with Data	12
IDS.012[J]	Statistics, Computation and Applications	12
IDS.060[J]	Environmental Law, Policy, and Economics: Pollution Prevention and Control	12

新城市科学

6. 相关课程

● MIT新开设城市科学专业



The screenshot shows a Zhihu question page. At the top, there are navigation links for '知乎', '首页', '发现', '话题', and a search bar. The question title is '如何看待麻省理工学院 (MIT) 开设城市规划与计算机结合的本科学位？是不是反映了行业的未来趋势？'. Below the title, there are tags for '城市规划', '计算机科学', '麻省理工学院 (MIT)', '城乡规划学', and '城乡规划软件'. The question has 905 followers and 136,299 views. The answer section shows 44 answers, with the top one by user 'wepon' (高级城市规划师, 智慧城市与城市大数据研究) stating '这是一个伟大的转折点。' and providing a detailed analysis of the impact of ICT technology on urban planning.

来源: <https://www.zhihu.com/question/280236630>

6. 相关课程

● MIT新开设城市科学专业

- MIT规划系去年就城市科学这一专题的辩论会中，针对“**城市规划+计算机科学**”出现的两派观点：
 - **反对派**：认为技术问题交由计算机专业的技术人员解决即可，规划师有其他工作需要，如社区调研及不同群体之间的利益协调
 - **支持派**：认为规划师若不掌握这些技术，就相当于在规划问题的讨论中让出立场。计算机科学家可以把规划问题单纯当成一个理论应用场景。在此过程中如果规划师连基本概念术语或算法原理都不清楚的话，沟通就无从谈起。培养两个领域都有足够知识的人才至少是规划师能向计算机科学从业者用它们能听懂的语言讲述规划逻辑的一个有效办法

可以说，城市规划+AI+大数据早就已经是行业的一大趋势了，但是MIT这次把AI纳入本科学位，则代表了机器学习、大数据处理这些技能很可能在将来也将成为城市规划师的标配。

来源：<https://www.zhihu.com/question/280236630>

新城市科学

6. 相关课程

- 同济大学 “数字设计与建造方向”
- 同济大学建筑与城市规划学院建筑学国际博士生课程项目——数字设计与建造方向
- **简介：**聚焦建筑学在数字化变革中的诸多发展，涵盖从数字化建筑设计与建造到空间性能化模拟与可视化研究的各个层面



来源：<http://news-caup.tongji.edu.cn/news.php?id=6081>

新城市科学

6. 相关课程

● 老八校本科开课调研：量化研究方法类课程

- **同济大学**：《城市分析方法》(王德) 必修；《城市模拟》(朱玮、潘海啸) 选修
- **东南大学**：《规划数据分析》必修；《城市建模初步》必修；《城市政策分析》必修
- **天津大学**：暂无
- **华南理工大学**：暂无；本科高年级时老师单独指导；体现在《城乡社会综合调研》(赵渺希)、《地理信息系统》(王成芳) 等课中；学生数学基础薄弱，想开课但无适合师资
- **哈尔滨工业大学**：暂无；有《统计学》；体现在《城市系统工程学》、《城乡社会综合调研》和《开放型研究性设计》等课中
- **重庆大学**：暂无；体现在《城乡社会综合调研》、《地理信息系统分析》等课中
- **西安建筑科技大学**：暂无；本科生基本不具备这方面的知识；研究生阶段各老师如在研究方面有需求会专门辅导，但无针对全部学生的课程，无相关背景的老师

主讲教师：龙瀛（清华大学建筑学院城市规划系）

上课时间：每周四第6大节（19:20-20:55）

上课地点：清华大学六教6B109

考核方式：考查

课程学分：2学分（32学时）

课程助教：陈婧佳

chen-jj18@mails.tsinghua.edu.cn

教学形式：课堂讲授、外部专家、课堂研讨、现场教学、企业参观等

课程简介：

致力于介绍近十年涌现出的认识城市和改变城市的新技术、新数据和新领域等，达到了解城市，扩展专业视野的目的。

考核方式：

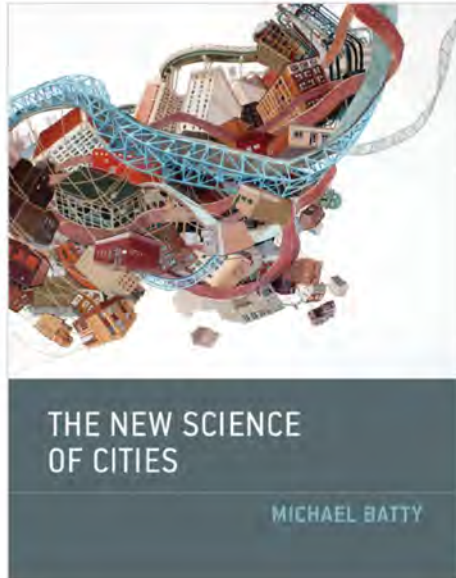
课堂讨论30分，考勤20分，期末论文50分（针对某个新技术新数据新领域的思考、批判或展望，4000-6000字）。

新城市科学

The New Science of Cities

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（课号00000042）

- W1, 9月20日, 龙瀛, **新城市科学概论（上）**
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- W4, 10月11日, 新技术：陈箴, 同济大学景观系副教授, **环境感受测度和可穿戴生物传感器**
- W5, 10月18日, 新技术：王静远, 北航大学计算机学院副教授, **机器学习、人工智能与深度学习**
- W6, 10月25日, 新技术：崔福东, 极海科技平台总监, **地理数据分析、可视化与商业智能**
- W7, 11月1日, 新技术：朱宁, 清华大学建筑系助理教授, **装配式建筑产品在老旧小区改造中的应用**（拟周四下午西王庄小区现场教学）
- W8, 11月8日, 新技术：黄蔚欣, 清华大学建筑系副教授, **基于Wi-Fi定位技术的人群时空行为研究**
- W9, 11月15日, 新数据：**百度大数据部**（拟周四下午现场教学与参观）
- W10, 11月22日, 新数据：龙瀛, **基于图片数据的城市空间分析与可视化**
- W11, 11月29日, 新数据：**腾讯研究院**（拟周四下午现场教学与参观）
- W12, 12月6日, 新数据：田超, 摩拜大数据部负责人, **摩拜大数据及其应用**
- W13, 12月13日, 新领域：詹仙园/郑宇, 京东智能城市研究院主任研究员, **数据驱动方法在城市中的应用：新问题、新思路与新方法**
- W14, 12月20日, 新领域：沈振江, 日本金泽大学环境设计学院教授, **智慧城市与智慧住区：日本经验**（拟）
- W15, 12月27日, 新领域：孟天广, 清华大学政治学系副教授, **计算社会科学新进展**
- W16, 1月3日, 新领域：王鹏, 华夏幸福基业股份有限公司城市规划研究院首席智慧城市专家/云数据实验室主任, **城市全生命周期数字改造升级**（拟）



The New Science of Cities

By [Michael Batty](#)

A proposal for a new way to understand cities and their design not as artifacts but as systems composed of flows and networks.

A proposal for a new way to understand cities and their design not as artifacts but as systems composed of flows and networks.

In *The New Science of Cities*, Michael Batty suggests that to understand cities we must view them not simply as places in space but as systems of networks and flows. To understand space, he argues, we must understand flows, and to understand flows, we must understand networks—the relations between objects that comprise the system of the city. Drawing on the complexity sciences, social physics, urban economics, transportation theory, regional science, and urban geography, and building on his own previous work, Batty introduces theories and methods that reveal the deep structure of how cities function.

Batty presents the foundations of a new science of cities, defining flows and their networks and introducing tools that can be applied to understanding different aspects of city structure. He examines the size of cities, their internal order, the transport routes that define them, and the locations that fix these networks. He introduces methods of simulation that range from simple stochastic models to bottom-up evolutionary models to aggregate land-use transportation models. Then, using largely the same tools, he presents design and decision-making models that predict interactions and flows in future cities. These networks emphasize a notion with relevance for future research and planning: that design of cities is collective action.



python

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优惠券 满105减6 满200减16

促销信息 满减 每满100元，可减50元现金 详情 >>

共3项促销

加价购 满19元另加19.90元，或满29元另加15.90元，或满39元另加9.90元。

- 博远慧达图书专营店 ¥33.64
- 慧思文创图书旗舰店 ¥34.50
- 世纪慧泉旗舰店 ¥34.50

40个卖家在售

增值业务 礼品包装

排名 自营 计算机与互联网销量榜 第240位

配送至 北京朝阳区三环以内 有货

支持 49元免基础运费(50kg内) | 京准达 | 自提 | 闪电退款 |

由 京东 发货，并提供售后服务。11:10前下单，预计今天(09月20日)送达

重量 0.58kg



关注 分享

举报

企业批量购书

选择系列

- KK套装
- 必然
- 科技想要什么
- 银带
- 新未来简史：区块链、人工智能
- 未来地图：技术、商业
- 未来互联网 人工智能
- 时空简史

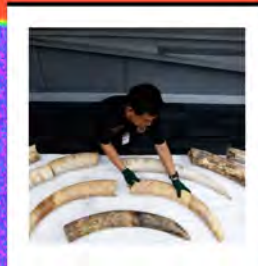
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本期驻场大神周榕，清华大学副教授。清华博士、哈佛硕士，对互联网时代下的城市演变有深入研究。

21127

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11

课时

课程内容

【试听】为什么你需要关注城市的命运

试听 已完成 00:04:15 / 80032次学习

1. 城市是最早期的互联网

已完成 00:07:38 / 49957次学习

2. 买房就是买城市的股票

入学 我的学习进度：100% 毕业

《周榕·互联网文明怎样改变城市》课程表	
城市是最早期的互联网	网络社会下的“鬼城”
	城市的信息互联机制
买房就是买城市的股票	城市的两大价值
	互联网剥夺城市的信息价值
	房价和城市价值的背离
城市与互联网的进化之争	永恒罗马和剧变纽约
	移动互联网的超速迭代
	互联网与城市的物种战争
城市多巴胺大贬值	奇怪建筑的“多巴胺奖赏”
	互联网比城市让你更兴奋
失效的《雅典宪章》	现代城市规划的宪法
	《雅典宪章》的局限
碎片化：城市夹缝的魅力	北京的碎片化城市结构
	移动互联下夹缝的新价值
	宜家式空间逻辑的终结
分布化：快递、外卖和便利店	便利店分布逻辑的的复兴
	旧式城市规划的三大杀手
	自上而下的城市规划
自发化：人和城市的双赢	Airbnb对城市规划的改变
	被“嫌弃”的城市广场
微型化：电影院的兴起	微型公共空间的崛起
	物联网带来“随身城市”
未来城市，文明新物种	城市的未来：硅碳复合





HOME

PROJECTS

MEMBERS

WORKING PAPERS

SLIDES

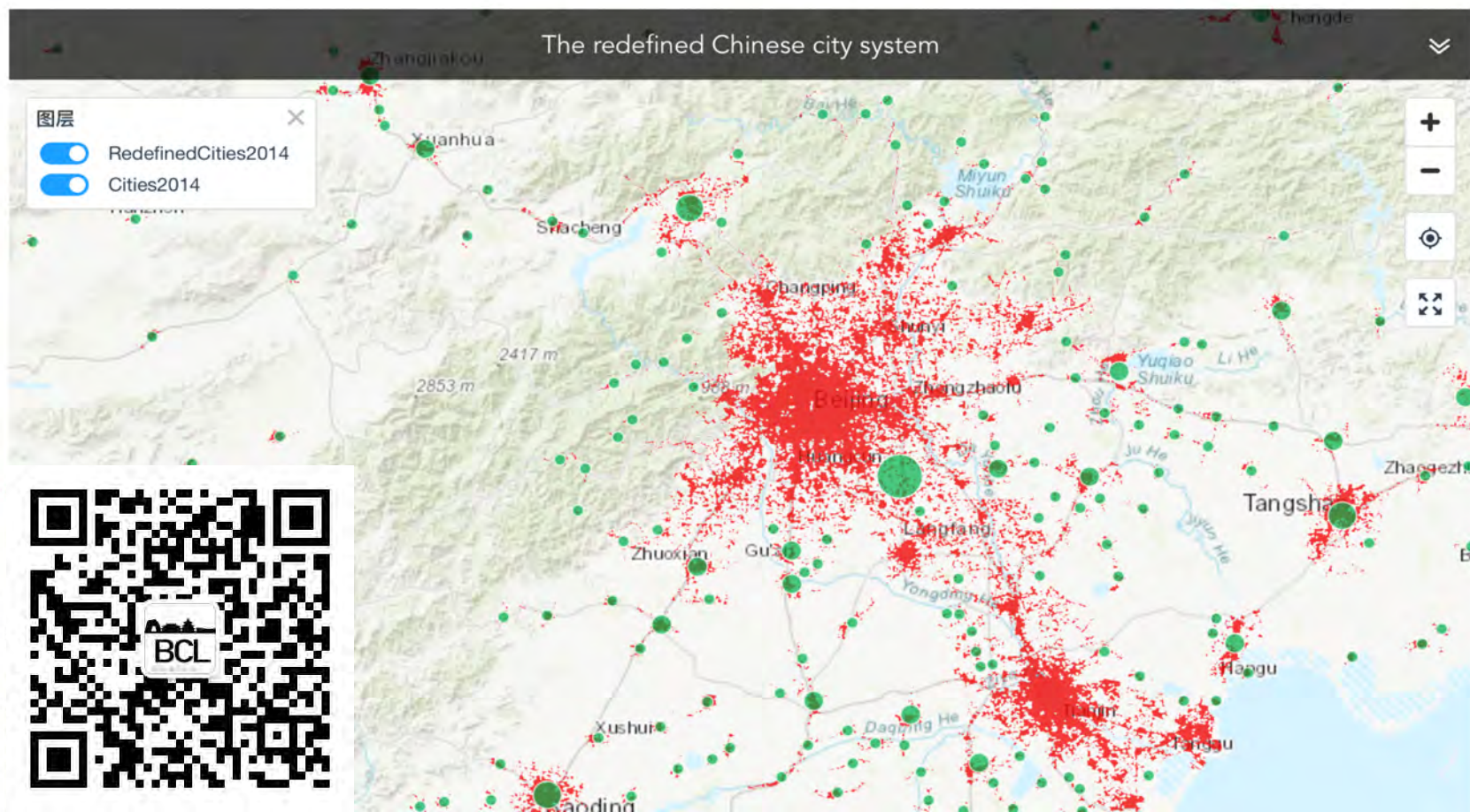
COURSES

DATA RELEASED

RANKING

LINKS&PARTNERS

ABOUT



□ 课后安排

- 阅读材料和课件将更新到网络学堂
- **OPEN OFFICE HOUR**
 - 每周五上午08:00-09:15
 - 需要提前通过info预约
 - ylong@tsinghua.edu.cn, 新建筑馆501, 13661386623
- 答疑邮箱
 - ylong@tsinghua.edu.cn



北京城市实验室
Beijing City Lab

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