

INFORMATION ARCHITECTURE OF CITIES

Welcome to one of the world's most liveable cities: Zürich



Information Architecture
Prof. Dr. Gerhard Schmitt

ETH zürich

(FCL) FUTURE
CITIES
LABORATORY

未来
城市
实验室

Information Architecture of Cities - Motivation

- In the next 25 years, 2 billion more people need living and working spaces in existing and new cities
- In the next 75 years, 3-4 billion more people, mostly in Africa, need living and working spaces in urban systems
- The Future Cities Laboratory in Zürich and Singapore proposes processes and technologies for sustainable and resilient future cities

Urban Analysis: Stocks and Flows of Finance - Eva Friedrich



Information Architecture of Cities - Content

- Information Architecture
- Data – Big Data – Information – Knowledge - Architecture
- Scales – Systems – Simulation
- Stocks and Flows

Linked courses

- Programming
- Simulation

Understanding the Urban System

Improving the Urban System

Designing the Urban System

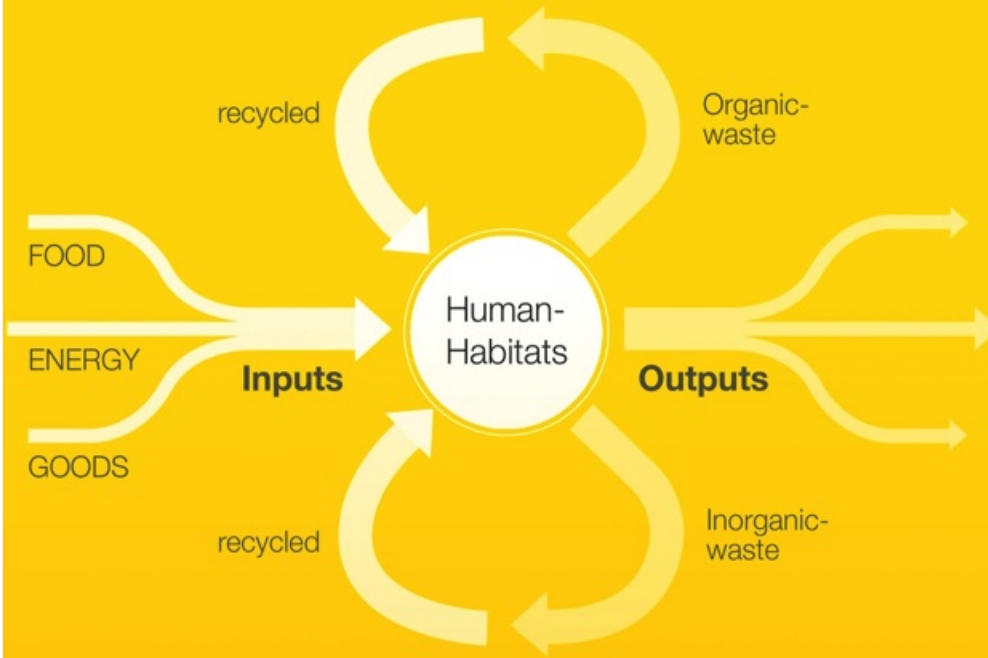
- Cultural Context
- Urban Metabolism
- Stocks and Flows

Urban Metabolism

Understand the city as a dynamic and complex system

Read and model this system in terms of Stocks and Flows

Recognise Urban Stocks as basic elements of the urban metabolism and as locally available resources



Welcome to one of the world's most liveable cities: Geneva



Welcome to one of the worlds most dynamic cities: Rio de Janeiro



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Welcome to an urban system we can learn from most: Lake Inle, Myanmar



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Welcome to one of the worlds most dynamic cities: Shenzhen



Hong Kong, South of Shenzhen

Shenzhen: In a garden south of the Pearl River Delta



Shenzhen: Stocks and flows of food for 18 million people



Shenzhen: Striving to become a Global Bay Area City



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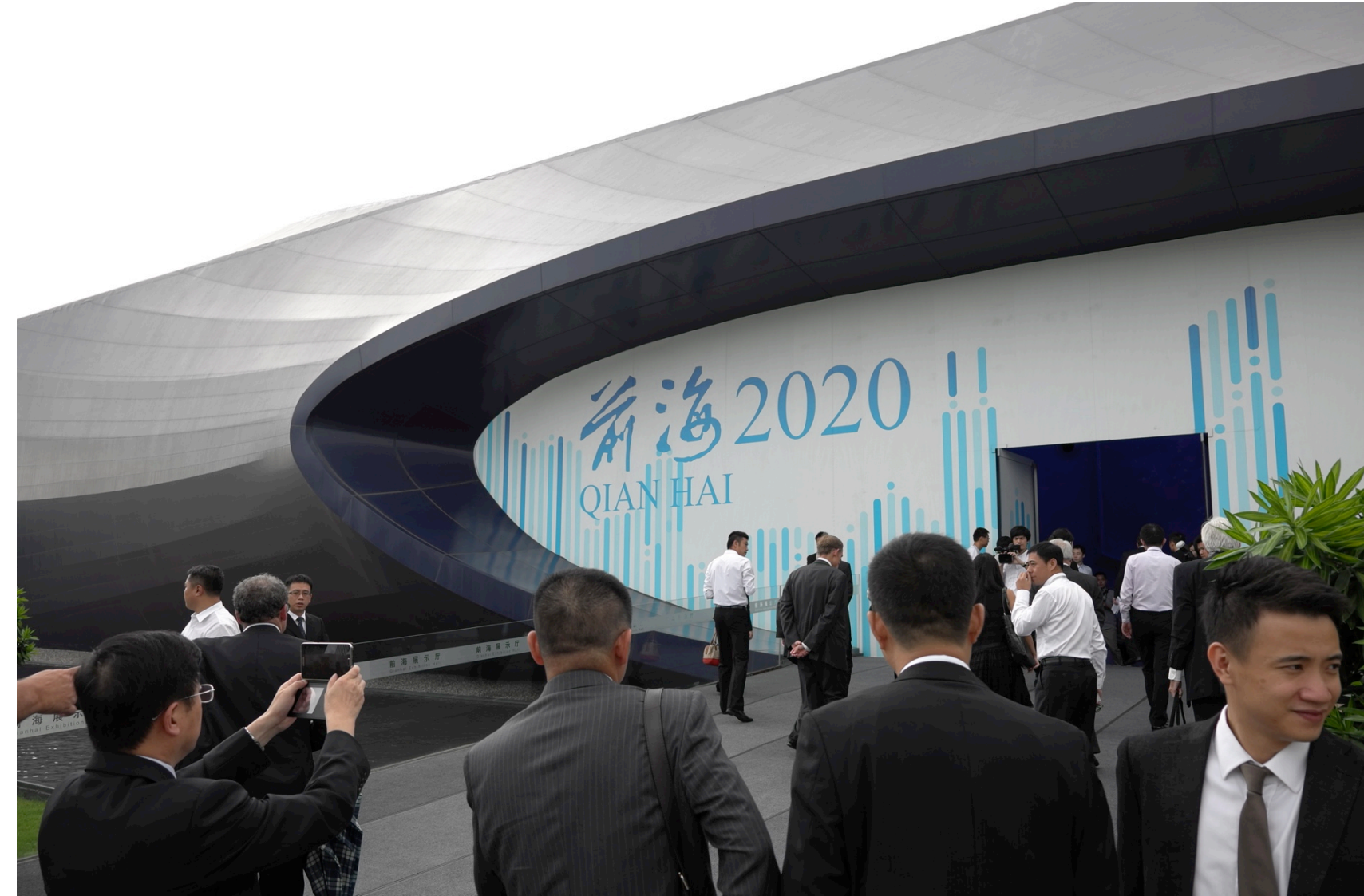


深圳市前海开发投资控股有限公司

发扬特区敢为天下先的精神，
先行先试政策。

中国 前海
CHINA QIANHAI





前言 FOREWORD

2010年8月26日，在深圳經濟特區成立三十周年的特殊歷史節點上，國務院批複《前海深港現代服務業合作區總體發展規劃》。2012年12月7日，習近平總書記在黨的十八大之後，將前海作為基層視察的第一站，強調前海開發開放是深圳經濟特區發展的新契機、轉型升級的新推力、改革開放的新起點、粵港深港合作的新平台，要求前海**準確把握中央賦予的戰略定位，依托香港、服務內地、面向世界，充分發揚特區敢為天下先的精神，落實比經濟特區還要特的先行先試政策，堅定不移，持之以恆，艱苦奮鬥，開拓創新，精雕細琢，精耕細作，畫出最美最好的圖畫，**前海，始終牢記肩負的歷史使命，致力於體制機制創新，為中國新一輪改革開放探索新路。

世界焦點

戰略使命 STRATEGIC MISSIONS

發揮經濟特區先行先試作用，利用粵港兩地比較優勢，為我國構建對外開放新格局、建立更加開放經濟體系做出有益的探索，為全國轉變發展方式、實現科學發展發揮示範帶動作用。

- 探索改革開放的新經驗
- 探索深港合作的新途徑
- 探索轉型升級的新路子

中國醫藥

戰略定位 STRATEGIC POSITIONING

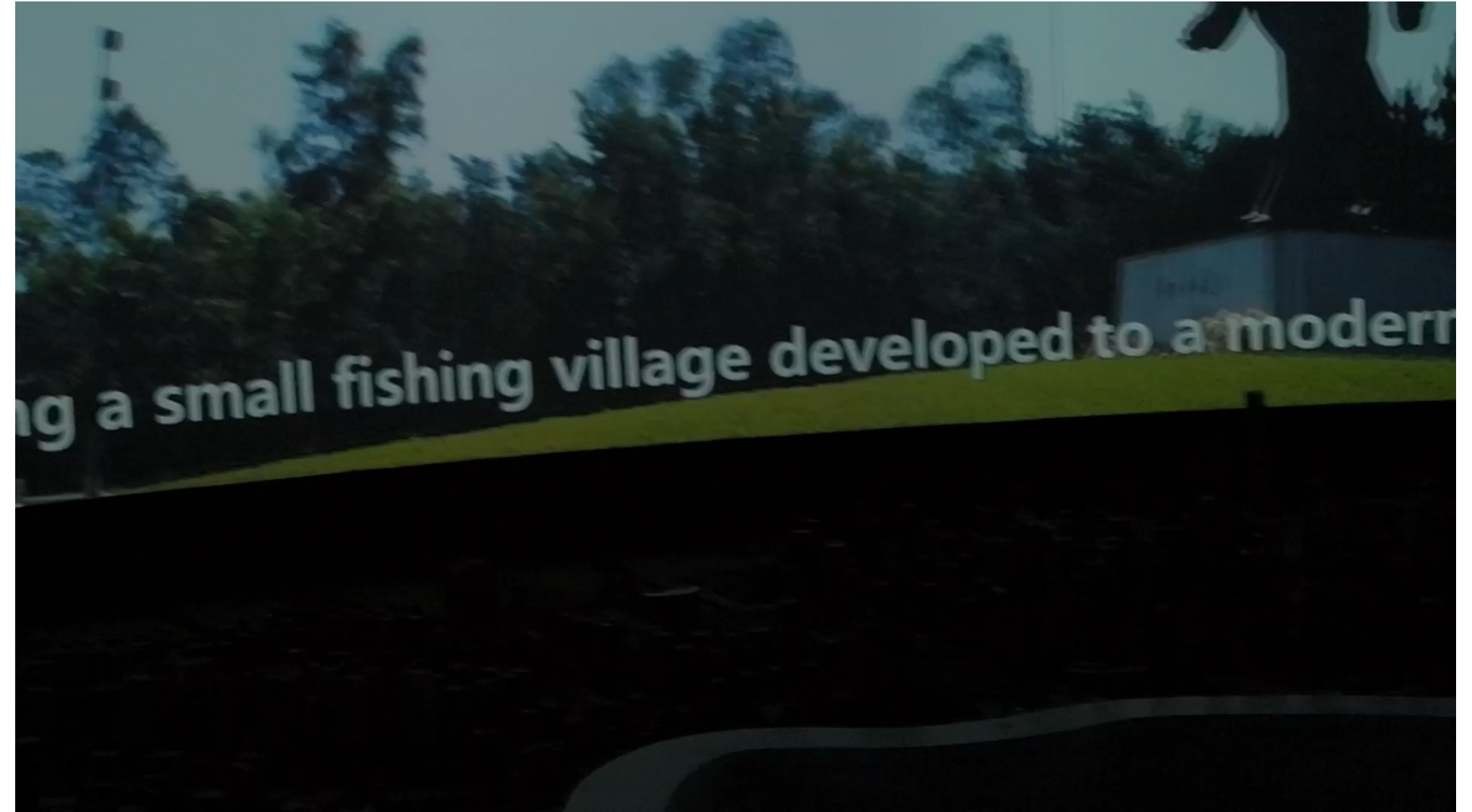
推動現代服務業發展

- 現代
- 香港
- 球三

领导关怀 LEADERS' ATTENTION

海關關長李俊卿在會後表示，國家領導人對海關工作給予了高度重視和肯定。習近平、張德江、溫家寶、李長春等中央領導同志多次視察，李俊卿同志赴港期間專門到前線視察，並作出重要指示。國家各部委和香港有關方面，全力支持和推動前海開發。





ng a small fishing village developed to a modern

地下空間 UNDERGROUND



圖例 LEGEND

- B1 商業設施 BUSINESS FACILITIES
- B2 換乘大廳與商業設施 TRANSFER HALL AND BUSINESS FACILITIES
- B3 城市軌道 URBAN RAIL

功能完備的保稅港區

Fully Functional Bonded Port Area

區位 Location

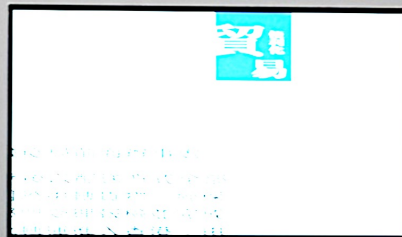
- 2008年10月18日，國務院批准設立前海灣保稅港區，規劃面積3.71km²；壹期圍網面積1.17 km²，由港區和圍區兩部分組成，港區內擁有3個10萬噸級泊位，並與深圳西部港區一體化運作；圍區內已建成現代化倉庫7棟，建築面積40萬平米，其中保稅冷庫約1.2萬平米，單位面積產出效益在全國保稅港區中名列第壹。
- On October 18th, 2008, the State Council approved to found Qianhai Bay Bonded Port Area with the planning area of 3.71 km²; the purse seine area of first phase was 1.17 km². It was composed of harbor district and parks, with three 100 thousand-tonnage berths in the harbor district which is in integrated operation with western harbor district of Shenzhen City; seven modern warehouses have been built in the parks with area of structure of 400 thousand m², of which the bonded cold store is 12,000 m², the output effect in unit area ranks first of the nationwide bonded port areas.

疊加政策 Superposed Policy

- 前海灣保稅港區位於前海深港合作區範圍內，既享有保稅港區特殊的稅收、外匯等監管政策和貿易便利化安排，又享有前海合作區財稅、金融、人才等先行先試政策，是中國國內政策最優惠、通關最便利、運作成本最低、國際化程度最高的海關特殊監管區域之壹。
- Qianhai Bay Bonded Port Area is situated in the scope of Qianhai Shenzhen-Hong Kong cooperation zone. It enjoys the supervision policies of special revenue, foreign currency and trade facilitation of bonded port area, and also benefits from the policies that is prior to carry and try such as finance and taxation, finance and talents of Qianhai cooperation area, boasting customs supervision areas with best favorable policies, most convenient customs clearance, lowest operating cost and highest degree of internationalization in domestic China.

定位和功能 Positioning and functions

- 前海灣保稅港區是前海深港合作區的先行啟動區和重要功能區，主要開展國際採購、國際配送、國際中轉、國際轉口貿易以及與之相應的金融、保險、代理、展示、檢測、維修、航運服務等服務貿易。
- Qianhai Bay Bonded Port Area is the antecedent promoter area and important functional zone of Shenzhen-Hong Kong Cooperation Zone of Qianhai. It mainly trades in international purchase, distribution, transfer, enter port trade and the corresponding service trade such as finance, insurance, agency, demonstration, inspection, maintenance and shipping service.





Prof. Dr. Gerhard Schmitt









Scales,

SPACE
ENERGY
MATERIALS
PEOPLE
CAPITAL
WATER
INFORMATION

SMALL
BUILDING TECHNOLOGY

MEDIUM
URBAN DESIGN

LARGE
TERRITORIAL PLANNING

LOW EXERGY

DIGITAL FABRICATION

A/P ARCHITECTURE & CONSTRUCTION

TRANSFORMING & MINING URBAN STOCKS

HOUSING

URBAN DESIGN STRATEGIES & RESOURCES

URBAN SOCIOLOGY

A/P ARCHITECTURE & URBAN PLANNING

TERRITORIAL ORGANISATION

LANDSCAPE ECOLOGY

MOBILITY & TRANSPORTATION PLANNING

A/P ARCHITECTURE & TERRITORIAL PLANNING

SIMULATION PLATFORM

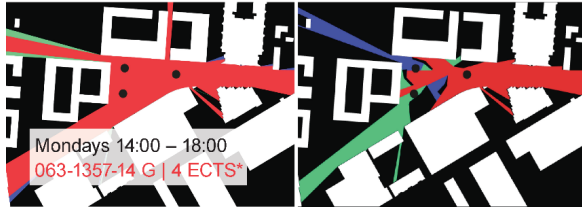
Information Architecture



Mondays 11:00 – 12:00
051-0723-14V | 2 ECTS

Other Course at the Chair of Information Architecture

Information Architecture



Digital Urban Simulation

A solid knowledge of computational methods is an increasingly important key competence for future architects or urban planners. In this course you will learn how to analyze and generate spatial configurations with advanced computational methods.

In a series of theory lectures we explore how designing and planning of cities could become evidence based by using scientific methods. Various exercises will provide training for your skills in working with state-of-the-art yet office proven design tools (Depthmap, Ecotect, and Rhino/Grasshopper). In an integral project work, you will deepen your knowledge in spatial analysis and simulation methods such as Space Syntax using Depthmap software and environmental analysis with the program Ecotect. In addition you will acquire skills for using analysis methods for generative design processes. Therefore we introduce you into the parametric design software Grasshopper for Rhino 3D.

Based on the methods introduced during the semester, you will learn and understand different effects of planning and design interventions on urban life. At the end of the course you will be able to interpret analysis and simulation results, and to apply corresponding computational methods for your own planning projects.

Where:
Lecture, HIT P22 - Value Lab
Exercise, HIT H12
When:
Mondays 14:00 to 18:00

Supervision:
Dr. Reinhard König
Estefania Tapias

reinhard.koenig@arch.ethz.ch
tapias@arch.ethz.ch

22.09.2014

Introduction to the course
IS - Intro/Grasshopper tutorial

29.09.2014

Generative systems workshop
P2 - Generative techniques

06.10.2014

Space syntax I
IS - Colours Map, Area Map of a small area

13.10.2014

Space syntax II
P2 - Depthmap & GIS: Prepare Data -> Import Data -> Analysis methods

20.10.2014

Seminar week (no lecture)

27.10.2014

Space syntax III
IS - Rhino/Grasshopper

03.11.2014

Empirical studies
IS - Colours data (evaluate existing materials)

10.11.2014

Microclimate analysis I
P2 - Colours, Terrain: Analysis of a small urban area

17.11.2014

Microclimate analysis II
IS - Rhino/Grasshopper

24.11.2014

Best practice examples - Guest lecture
Final consultation

01.12.2014

Final IA critique
Combined critique with the other IA courses

* 1st: 0.5h + 4 ECTS
Exercise: 20h (also mandatory)
Presentation: 20h (presented at the end)
Written documentation: 50h (optional)

The most recent outline will be found on www.is.arch.ethz.ch

Prof. Dr. Gerhard Schmitt
Chair of Information Architecture
Information Science Lab HIT P22-2
Wolfgang-Paul-Strasse 27, 8003 Zurich
www.is.arch.ethz.ch

IA Chair of
Information
Architecture

Information Architecture



Digital Urban Visualization. Understanding Dynamics

Abstract: At what extent do we need to know the instrument called 'computer' in order to not be ruled by it? The goal of this course is to learn the "language of the computer", a programming language to better understand urban dynamics by plausibly visualize publicly available urban data. The influence of the computer on urban analysis is being reflected in several discussions.

Objective: The participants learn the programming language Python. They learn how to use it as an instrument in design, specifically in urban analysis. Thereby urban data sources will be visualized in student's favorite visualization packages. Python is supported in most 3D software packages nowadays (Rhino, Maya, Vectorworks, Cinema4D, Blender). Complex websites are being programmed in Python. Still the language itself is as easy as using a (scientific) calculator.

Literature: <http://www.is.arch.ethz.ch>

Prerequisites / Notice: No programming skills are required. Skilled students will not be bored but can start with the second part of the course right away.

Where:
HIT H12

Supervision:
Lukas Treyer
Daniel Zund

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zund@arch.ethz.ch

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22.09.2014

Programming: Think like a Computer (Scientist) Basics I

29.09.2014

Programming: Basics II

06.10.2014

Use Programming as a tool: Using libraries.
Hear something about algorithms

13.10.2014

Display data on a web page

20.10.2014

Seminar week (No lecture)

27.10.2014

Display data in 3D: Blender

03.11.2014

Display data in 3D: Rhino

10.11.2014

Idea sketch: mimic the first two weeks of a design studio and try to justify your design with data

17.11.2014

Idea sketch: mimic the first two weeks of a design studio and try to justify your design with data

24.11.2014

Idea sketch: mimic the first two weeks of a design studio and try to justify your design with data

01.12.2014

Final IA critique
Combined critique with the other IA courses (14:00 - 18:00)

Information Architecture



Information Architecture and Future Cities

Understanding a city is fundamental for the meaningful design and management of a city. "Information Architecture and Future Cities" opens a holistic view on existing and new cities, with focus on Asia. The goal is to better understand the city by going beyond the physical appearance and by focusing on different representations, properties and impact factors of the urban system. We explore the city as the most complex human-made organism with a metabolism that can be modelled in terms of stocks and flows. We investigate data-driven approaches for the development of the future city, based on crowd sourcing and sensing. You will learn to see the consequences of citizen science and the merging of Architecture and Information space. The course describes origins, state-of-the-art, and applications of information architecture and simulation. Both rapidly gain importance in the design of buildings, cities and territories. As course requirement, there will be three short exercises.

Where:
HIT F22 (Value Lab)

Supervision:
Prof. Dr. Gerhard Schmitt
Denise Weber
Dongyuan Shi

gerhard.schmitt@arch.ethz.ch
denise.weber@arch.ethz.ch
shi@arch.ethz.ch

22.09.2014

Einführung und Überblick: Introduction and Overview

29.09.2014

Das System Gebäude – Klima: Building as a System - Climate (Guest Lecture by Estefania Tapias)

06.10.2014

Das System Gebäude – Konstruktion: Building as a System - Habitat (Guest Lecture by Prof. Dirk Hebel)

13.10.2014

Das System Gebäude – Energie & Habitat: Building as a System - Energy & Habitat

20.10.2014

Seminar week (No lecture)

27.10.2014

Das System Stadt – Soziologie: City as a System - Social Science (Guest Lecture)

03.11.2014

Stocks & Flows – Wasser & Material: Stocks & Flows - Water & Material

10.11.2014

Das System Stadt – Entwurf: City as a System - Design

17.11.2014

Stocks & Flows – Menschen & Informationen: Stocks & Flows - People & Information (Guest Lecture by Matthias Standfuss)

24.11.2014

Das System Territorium – Mobilität: Territory as a System - Mobility

01.12.2014

Das System Territorium – Organisation: Territory as a System - Organization (Guest Lecture by Prof. Dirk Hebel)

01.12.2014

Final IA critique
Combined critique with the other IA courses (14:00 - 18:00)

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IA Chair of
Information
Architecture

Guest Lecture 1 Monday, 06.10.2014, 18:00

Density: As we perceive it

Dafna Fisher-Gewirtzman

is an assistant Professor at the Faculty of Architecture & Town Planning at the Technion-Israel Institute of Technology. She is the Academic Director of the Visualization Laboratory.

Her research focus is in the field of Visual analysis and simulation of urban and architectural space aiming at a sustainable built environments. In addition, she is researching the design processes of adaptive reuse of existing buildings. Her research is financially supported by the Israeli Scientific Foundation (ISF). She was the recipient for the UNESCO fellowship.

Her research work is published in leading professional Journals, such as Environment and Planning B, Urban Design International, Journal of Architectural and Planning Research, Int. AR (Interior Architecture), Survey Review. These days she serves as guest editor of a special issue for CEUS. She presented her research in many international conferences in Europe and North America. And was an invited speaker to several conferences and universities.

Dafna enjoy teaching a lot and is extensively involved in architecture design courses. Her teaching focuses on adaptive reuse of existing buildings and interior architecture. Since she initiated the Visualization Laboratory at the faculty of Architecture at the Technion she integrated the 3D immersion (in virtual reality) capabilities in the design studio. In recognition of her excellence in academic teaching, she became a laureate of the prestigious Yanai prize in 2013.

In addition to her academic activities occasionally she practices Architecture and Interior Design and her work was published in local professional journals.

Information Architecture of Cities - Support

- The MOOC – Massive Open Online Course
 - <https://www.edx.org/course/ethx/ethx-fc-01x-future-cities-1821>
- The BOOK – Basic Open Offline Knowledge
 - Information Cities

Information Architecture and Future Cities

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Where

HIT F 22 (Value Lab)

Supervision

Prof. Dr. Gerhard Schmitt gerhard.schmitt@sl.ethz.ch
Denise Weber denise.weber@arch.ethz.ch
Dongyoun Shin shin@arch.ethz.ch

22.09.2014	Einführung und Überblick. Introduction and Overview
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01.12.2014	Final iA critique Combined critique with the other iA courses (14:00 - 18:00)