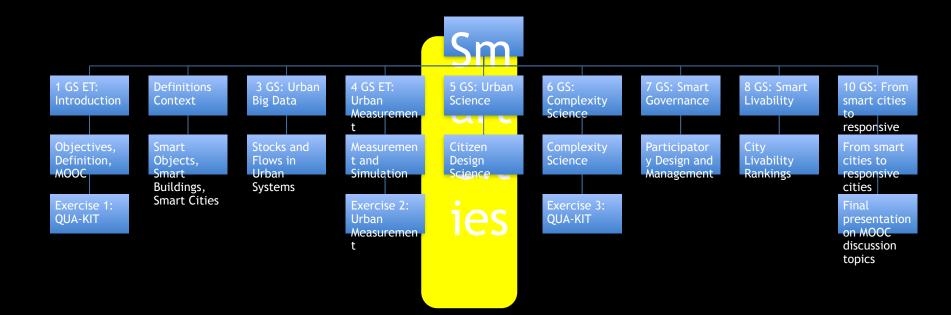




### Exercises

- Exercise 2: measuring due
- Discussion group inscription due



### The story so far:

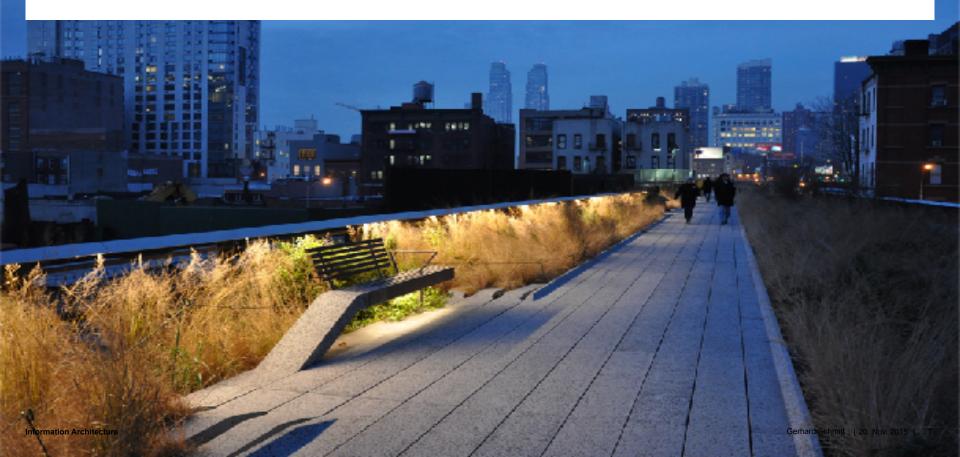
- 27.3.2017 Citizen Design Science as a future urban development method
- 13.3.2017 Can you improve what you do not measure?
- 6.3.2017 Big Data as new urban raw material, made useful with Information Architecture and with the Stocks and Flows concept
- 27.2.2017 From smart houses to smart cities emerging criteria for smart cities as urban systems
- 20.2.2017 Cities are complex systems. Ideally, they are sustainable, resilient, livable, smart, and finally responsive – from production machines to human habitat

- When was the last time you heard of Citizen Science?
- When was the last time you used a "Home Planner" software from a company?



#### **ETH** zürich

#### Recent example for Citizen Design Science: "Highline"New York



# Citizen Design + Citizen Science + Design Science

Citizen Design + Citizen Science + Design Science







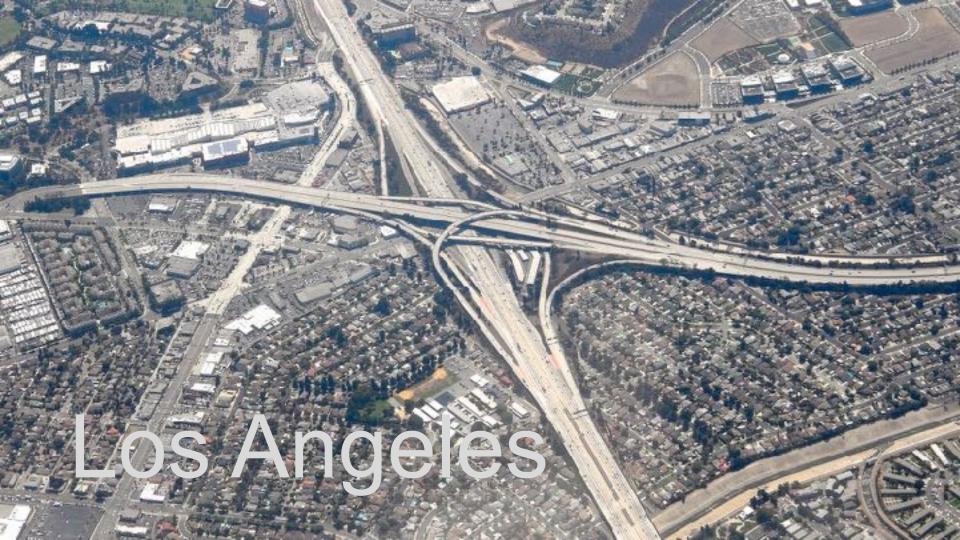
















Citizen Design + Citizen Science + Design Science









# social city share your desires

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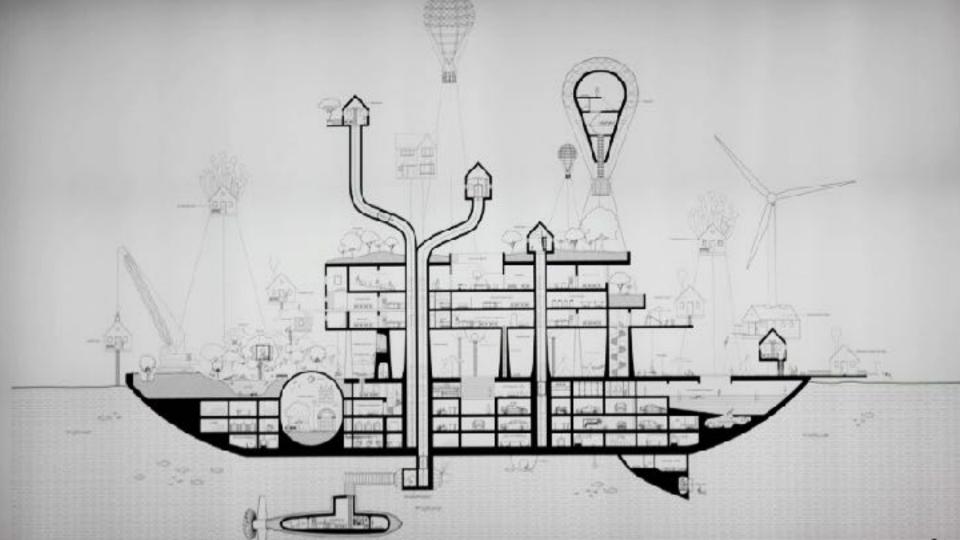
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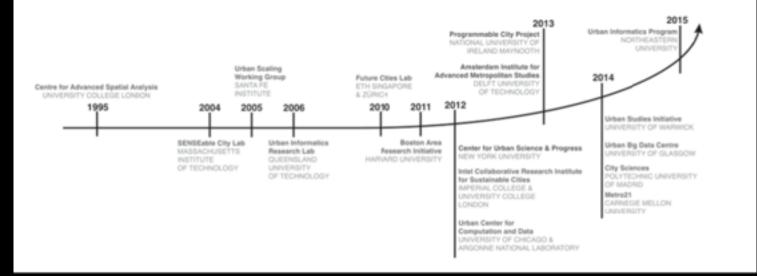
# Citizen Design + Citizen Science + Design Scienc







### **Urban Science Centers**



http://www.citiesofdata.org/wp-content/uploads/2015/04/Making-Sense-of-the-New-Science-of-Cities-FINAL-2015.7.7.pdf

### **Urban Science**

#### Science

"knowledge about the structure and behaviour of the natural and physical world, based on facts that you can prove, for example by experiments "http:// www.oxforddictionaries.com/de/definition/learner/science

#### **Urban Science**

Knowledge about the structure and behaviour of an urban system, based on facts that you can prove, for example by theory, experiments, and simulation

### **Urban Science: Structure**

"A city is not a tree" revisited:

The tree of my title is not a green tree with leaves. It is the name of an abstract structure. I shall contrast it with another, more complex abstract structure called a semilattice. In order to relate these abstract structures to the nature of the city, I must first make a simple distinction.

I want to call those cities which have arisen more or less spontaneously over many, many years *natural cities*. And I shall call those cities and parts of cities which have been deliberately created by designers and planners artificial cities. Siena, Liverpool, Kyoto, Manhattan are examples of natural cities. Levittown, Chandigarh and the British New Towns are examples of artificial cities.

It is more and more widely recognized today that there is some essential ingredient missing from artificial cities. When compared with ancient cities that have acquired the patina of life, our modern attempts to create cities artificially are, from a human point of view, entirely unsuccessful.

Both the tree and the semilattice are ways of thinking about how a large collection of many small systems goes to make up a large and complex system. More generally, they are both names for structures of sets.

Christopher Alexander, http://www.rudi.net/pages/8755

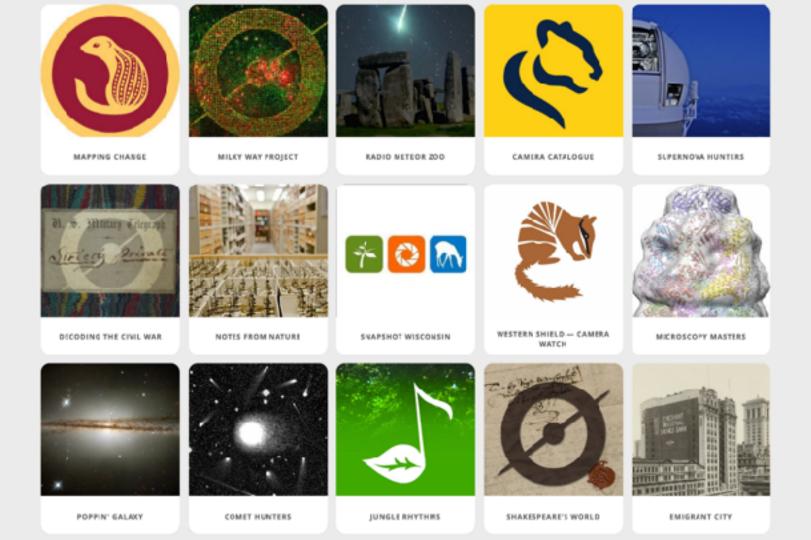
### Urban Science: Behaviour Example: Future Cities Laboratory

"For instance, the head of ETH's Future Cities Lab in Singapore — arguably the largest urban science center by far — is a plant ecologist who started his career in a rainforest! Peter Edwards was the dean of environmental sciences at ETH and saw the lab as an opportunity to advance the agenda he had helped craft as coordinator of the Alliance for Global Sustainability over many years previously." http://www.citiesofdata.org/wp-content/uploads/2015/04/Making-Sense-of-the-New-Science-of-Cities-FINAL-2015.7.7.pdf

### Capacity used

### **Cognitive Capacity**





## **CITIZEN DESIGN SCIENCE**

#### 协同参与型城市设计

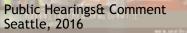
Design Thinking in Urban Design

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#### **Public Participation**









#### **Decision Makers**

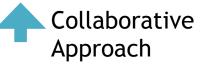
Public Hearings Questionnaire Focus Group Public Survey

- Bottom-up Initiatives
- Urban Creative Practice
  - Participatory Workshops



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Source: City of Seattle Land Use & Zoning Committee http://www.seattlechannel.org/mayor-and-council/city-council/ 20162017-planning-land-use-and-zoning-committee?videoid=x69269



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Source: Lecture from Urban Stories, U\_TT FTH

#### **Collaborative Approach in Public Participation**



Public Engagement Projects for Redevelopment of Waterfront area HongKong, 2015

Participatory Planning workshops With architect students and local residents Zurich, 2016

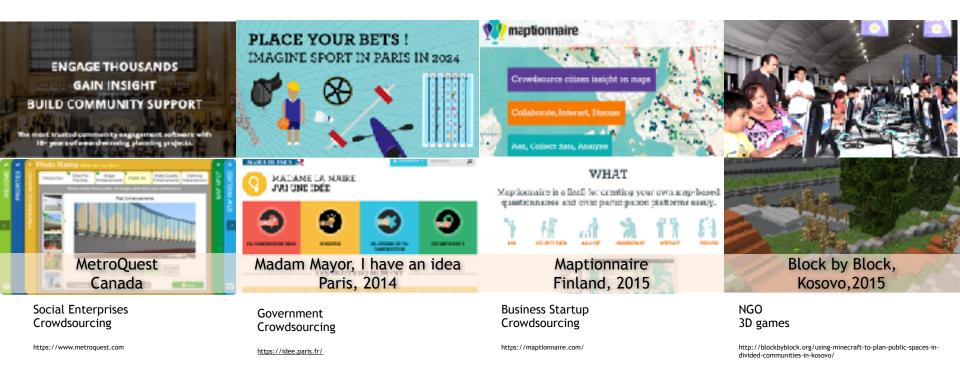
Photo taken at Glattpark participatory Planning workshop with U-TT and Wunderkamer, Nov. 2016

Source: http://www.wcnnpuds.hk/web/public.php?lang=en

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#### Public Participation(Collaborative) with Supporting Tools



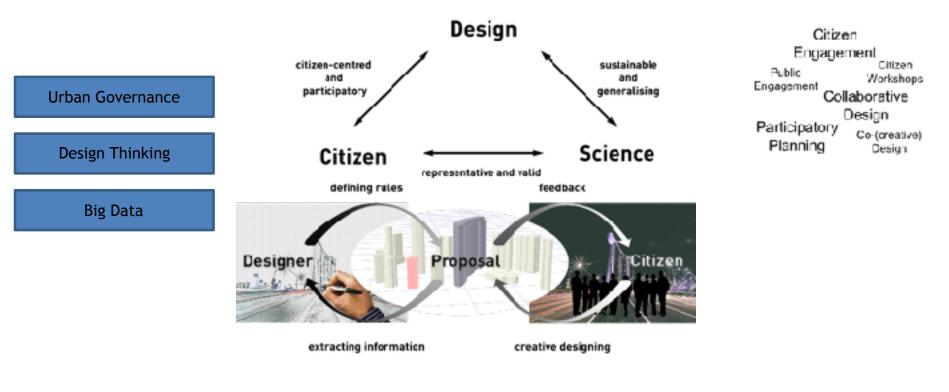
#### **Takeaways of Existing Methods**

- Effectiveness:
  - Unilateral vs collaborative
  - Who is informed?
- Limited Resources
  - Representativeness
  - Finance/Times
  - Data (Text, Collages, 3D models, voting)
  - Limited use of Technologies
- Participation Level
  - Lack Continuously Active Feedback
  - Lack of Analysis



- Support from Urban Governance
- Add New Forms
  - Urban Challenges Competitions for Citizens
  - Open sourced activities: Hackathons
- Add New Ideas
  - Enhance participation experiences
  - Immersive Interactions: gamification, feedbacks
- Add New Technologies
  - Crowdsourcing
  - Internet of Things
  - Urban Computing
  - Interaction Technologies/Interactive Architecture
  - Big Data/VR/AR etc.

#### **Citizen Design Science**



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### Citizen Design Science Project around the World

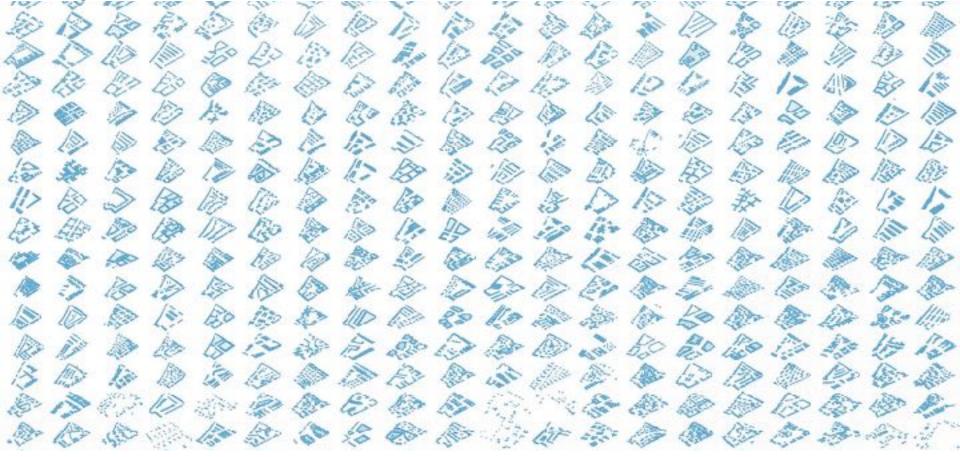
Design with Citizens in South Africa, Singapore, and East Europe



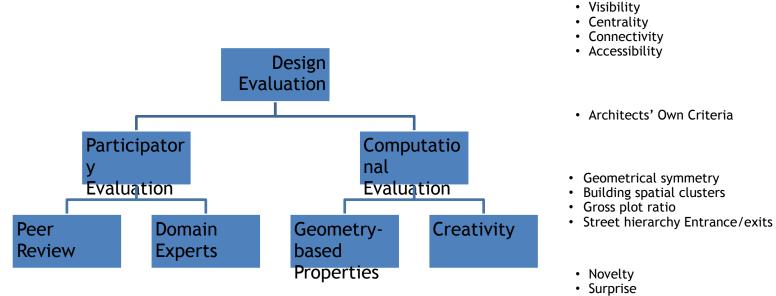
Informal Settlement Design with MOOC students Government lead master Plan Design with local residents

NGO/Research Initiatives Design with different stakeholders

#### **Design Evaluation Framework**

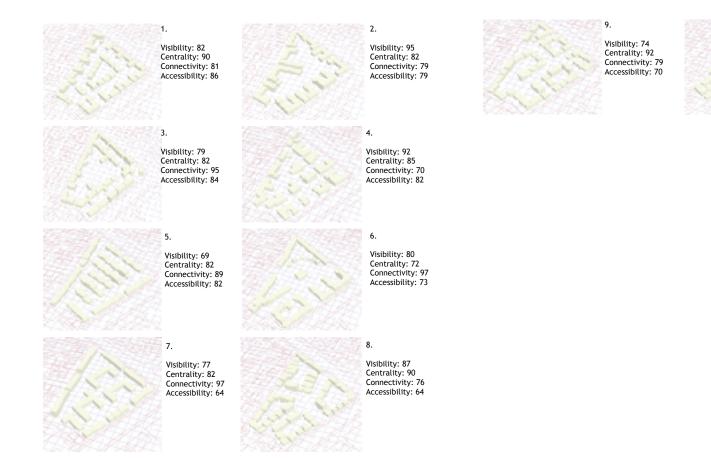


#### **Design Evaluation Framework**



Creativity

#### Top10 from Users' voting



Visibility: 85 Centrality: 92 Connectivity: 68 Accessibility: 70

10.

#### Top10 from Experts' voting

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Source: Scott Lloyd, Urban-Think Tank

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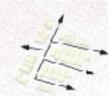
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#### Designer's Criteria

- 1. Clear public space hierarchy: Main path, secondary path, open spaces
- 2. Equal private household access to public space
- Highly visible public space with clear sight-lines and entrances/ exits
- 4. Public and private scale spaces
- 5. Clearly defined facades to main streets
- 6. Permeability and connections to existing street networks
- 7. Efficient use of space with limited interstitial spaces
- 8. Daylight Light to all built form
- 9. Appropriate response to existing site geometry



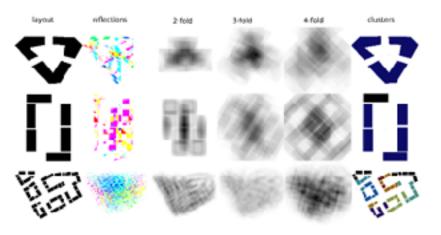
Main path

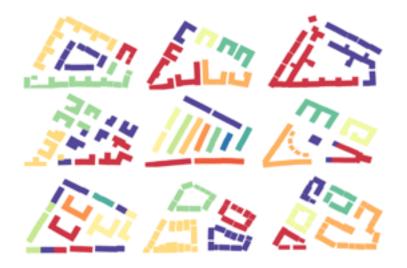
Public space

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## **Geometry based Properties**





Geometrical Symmetry Detection

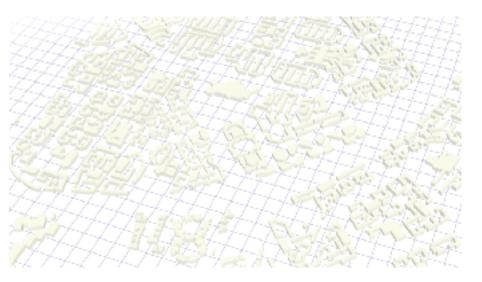
Neighborhood Clustering Analysis

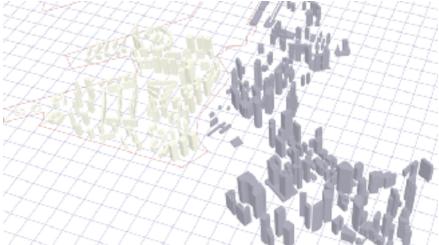
## Singapore Project: Tanjong Pagar Renovation





(FCL) FUTURE 未来 CITIES 城市 LABORATORY 实验室 Research





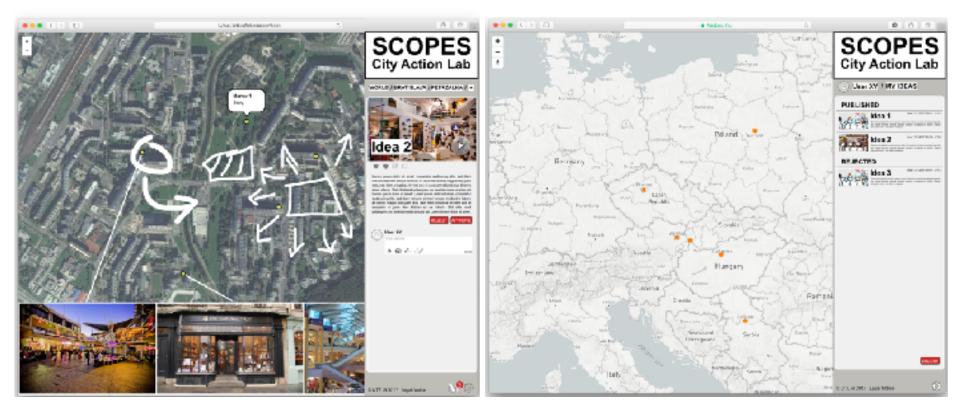
#### Dakota, Singapore

#### Tanjong Pagar Waterfront, Singapore

3/27/2017

Hangxin Lu

## **Project: City Action Lab**



The cognitive and design capacities of citizens in different cultures and geographic locations are comparable. At the same time, they are hardly employed effectively nor efficiently to support the planning and design process.

# Towards citizen design science

Design science exists since the 1960's when scientists tried to find a description for the processes in the human brain when designers design. This turned out to be much more difficult than anticipated, and until today, there is no complete description of the human design process. We want to propose Citizen Design Science as a concept that adds the strength of thousands of citizens in terms of observation, human cognition, experience and local knowledge into a scientific framework.

# Conclusions

- Urban science has been an active area of research since the 1960s
- From the beginning, there was a mismatch between top down decisions and the capability of the population to react appropriately
- Citizen Design Science is our proposal to combine the advantages of evidence-based long-term planning and the design capabilities and experiences of citizens