

Gerhard Schmitt, Jan Halatsch, Anastasia Koltsova, Antje Kunze







# The planning of future cities is one of the most challenging tasks

- built structures: up to 80% of CO2 emissions
- occupants: 60% of world population lives in cities
- globalization: identity of regional cities becomes obsolete
- cities are becoming 'generic' (Rem Koolhaas)







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# Goals

- significantly reduced CO2 emissions
- maintaining quality of life
- establishing urban ecosystem services

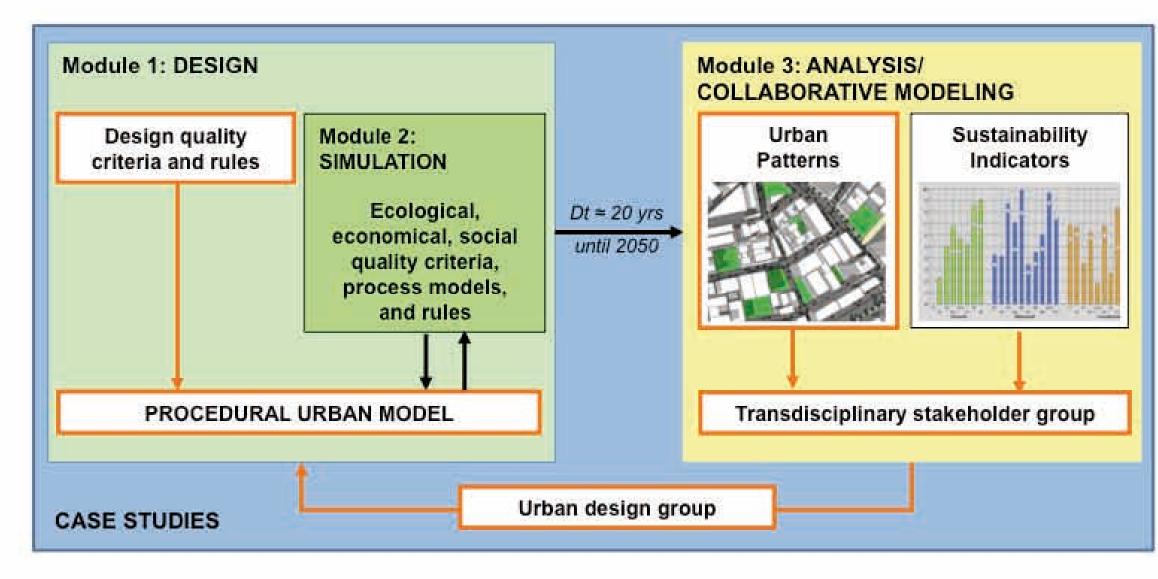




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# submitted NRP 65 New Urban Qualities proposal:

## "Sustainable Urban Patterns"





Collaborative procedural urban modeling and evaluation concept.





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# The following research questions will be studied:

- Urban design guidelines are rather abstract. How can we translate existing design guidelines into specific, formal shape grammars?
- How can quality criteria be made (inter-)operable?
- There is a lack of application of transportation, economical, ecological, and social knowledge by urban designers.
- How can the underlying rules be defined in order to be relevant for design?





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# The following research questions will be studied:

- A procedural urban model allows the integration of a set of rules for generating and visualizing urban development scenarios.
- Which urban patterns are possible in 2030 and 2050 based on the application of a set of rules including ecological, economical, social, and urban quality criteria?
- What is their visual quality on the regional and local scale?





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# The following research questions will be studied:

- An analysis of the resulting urban patterns with a set of sustainability indicators allows for an evaluation at local and regional scale under different urban development scenarios.
- Feedback from stakeholders can validate this assessment of the innovative urban patterns.
- Which of these urban patterns are the most sustainable?







## The following research questions will be studied:

- Integrated concepts for sustainable development of agglomerations and city centers at the local and at the regional level have to account for coordinating strategies at the upper level (top-down).
- At the same time they should be based on collaborative decision-making processes to meet the needs of the local and regional actors (bottom-up).
- In practice, there is a lack of approaches and tools that support a combined bottom-up/top-down dialogue in the urban planning processes.
- Does a collaboration platform with supporting procedural methods allow an effective cooperation between the different planning levels?





# Workshop "Architectural programming": Defining urban patterns



Gerhard Schmitt, Jan Halatsch, Anastasia Koltsova, Antje Kunze

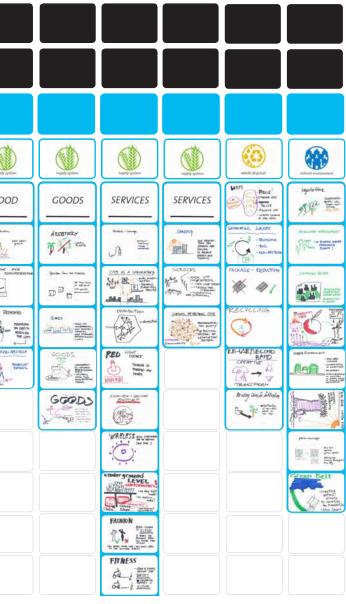




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# Workshop "Architectural programming": Defining urban patterns

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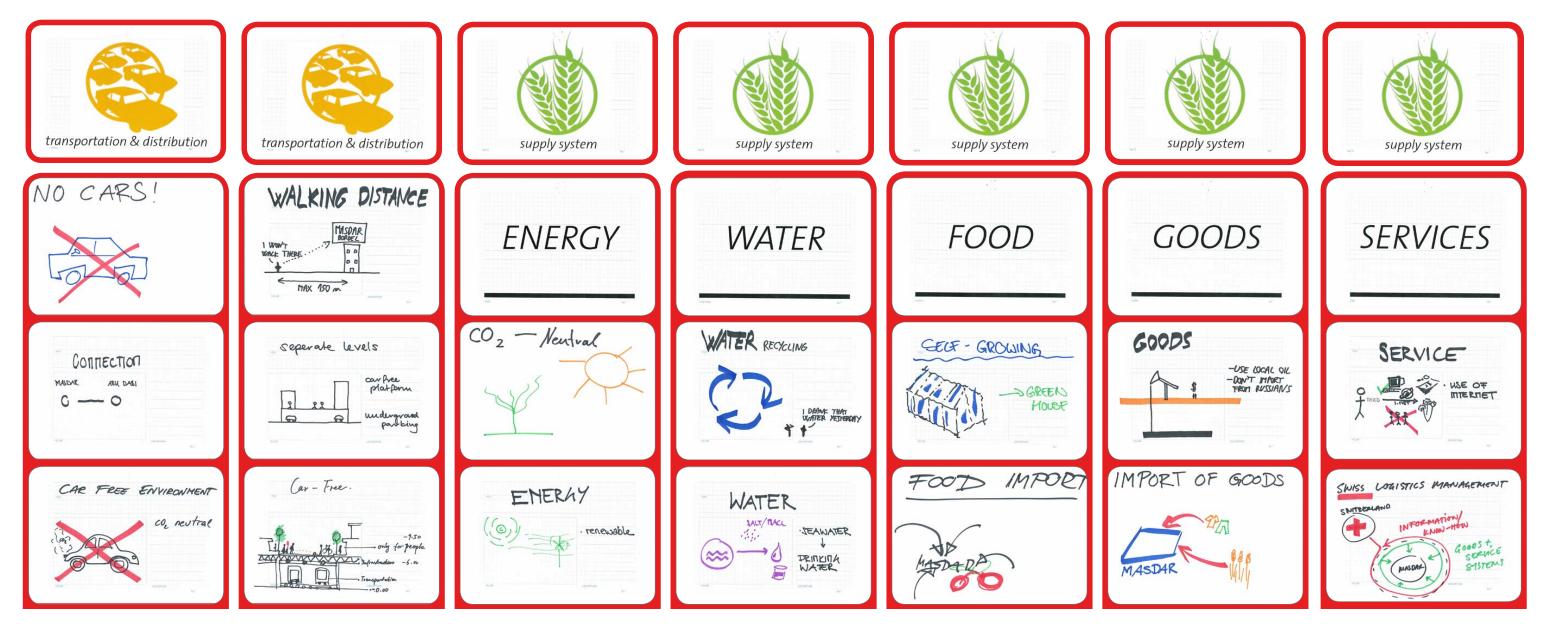






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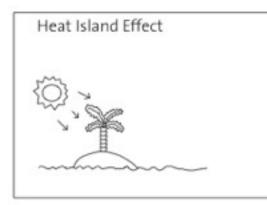
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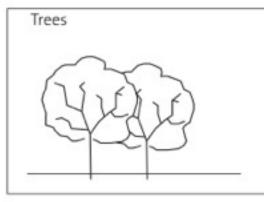


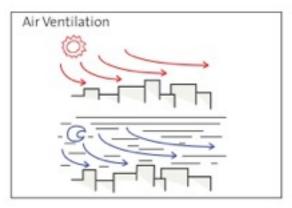


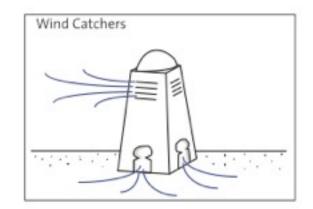


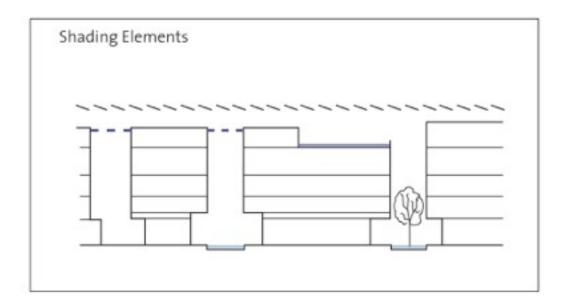
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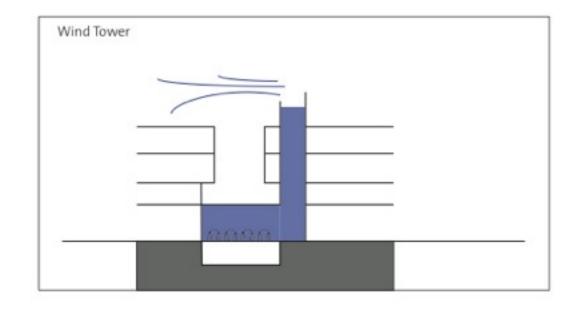








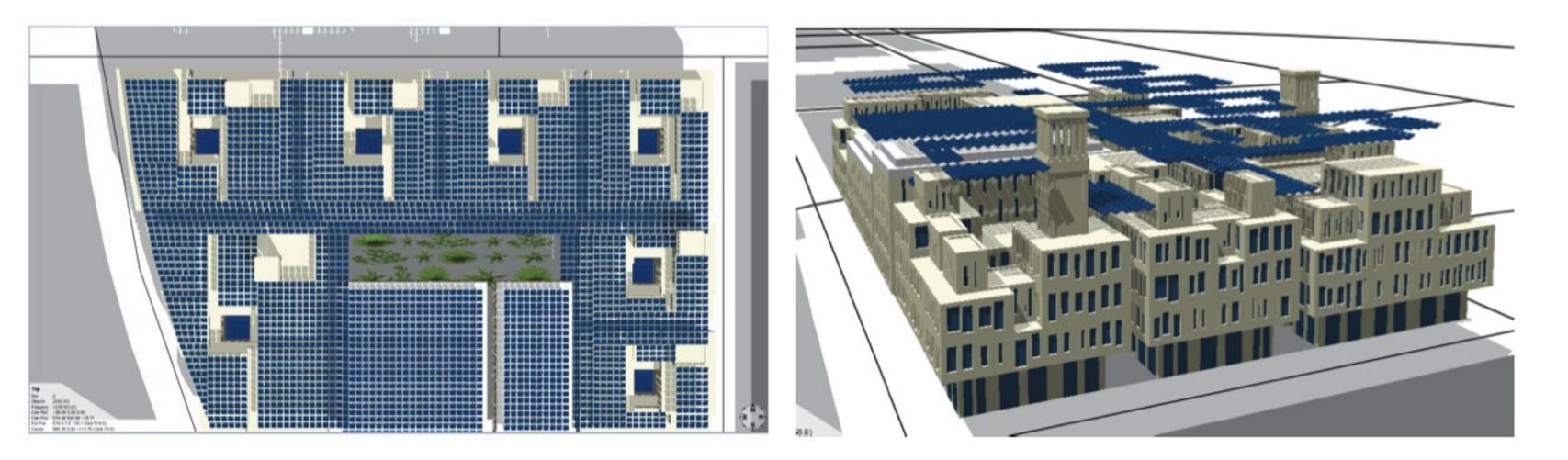








Workshop "Architectural programming": Defining urban patterns







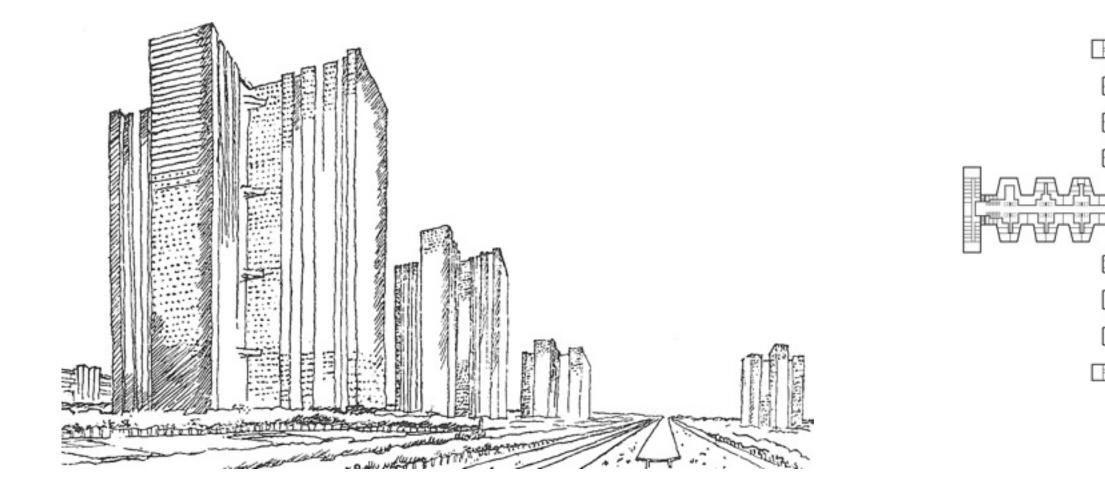
# (1) Building classification and generation: Procedural modeling

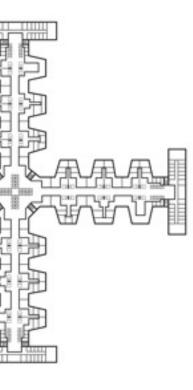
- fast & semi-automatic creation of urban layouts
- rule-based semantic description of parametric 3D geometry with associated meta data
- grammar-based automatic generation of 3D buildings
- results: interactive and interchangeable qualitative 3D models and quantitive analysis for reporting (e.g. building CO2 emissions on urban scale)





# (1) Building classification and generation: Procedural modeling



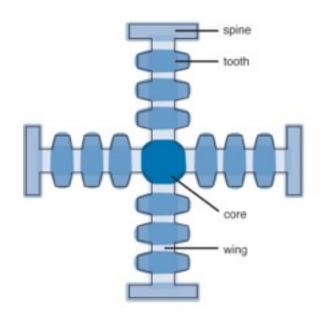


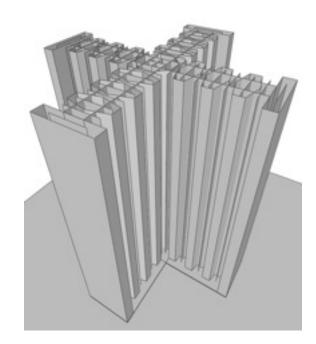




# (1) Building classification and generation: Procedural modeling

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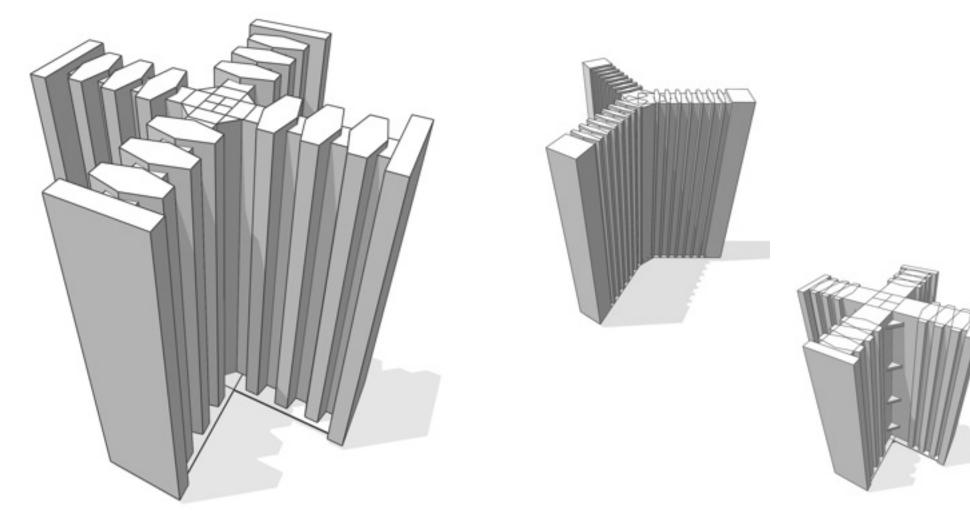




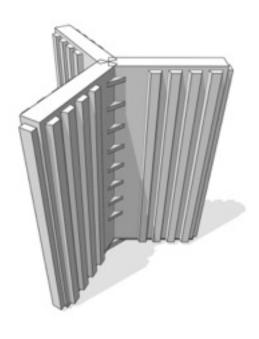


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# (1) Building classification and generation: Procedural modeling











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# (2) Semi-automatic generation of networks: Synthetic street network of Manhattan

- here: generation of transport networks
- technique can be easily extended to generate networks for white, grey, black water etc. or telecommunication infrastructure
- networks are generated based on constraints (obstacles, shortest path)
- technique will link urban plan by architect with city engineer



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# (3) Evaluation of urban patterns: Dubiocity

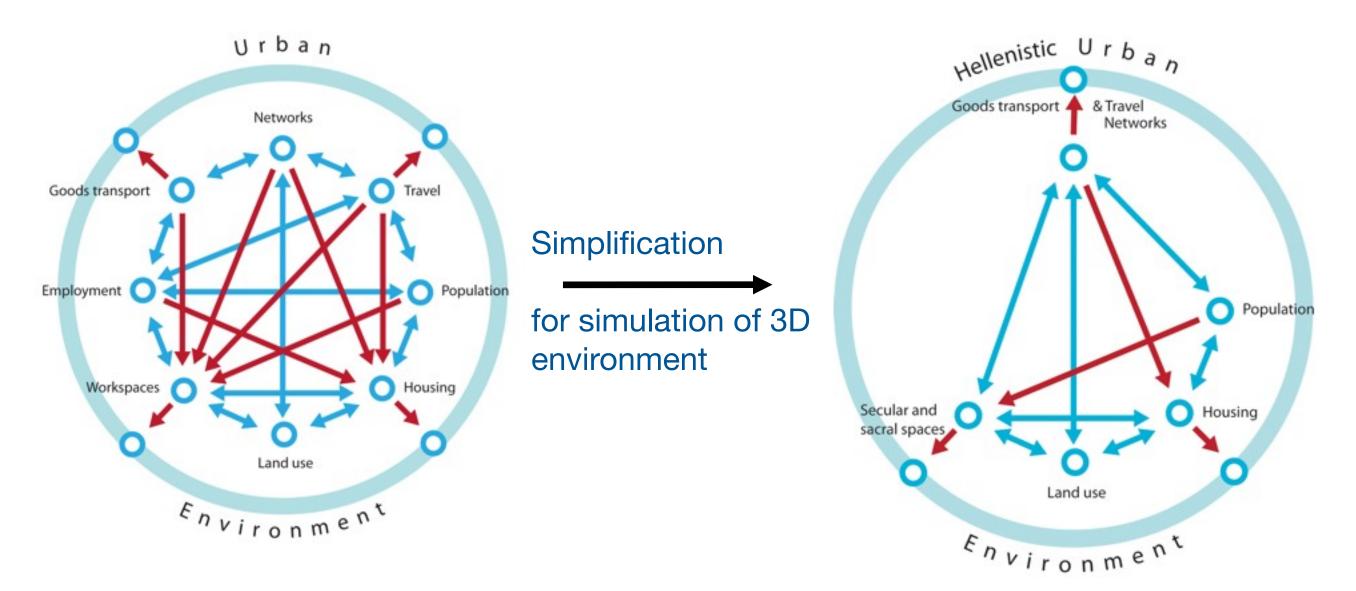


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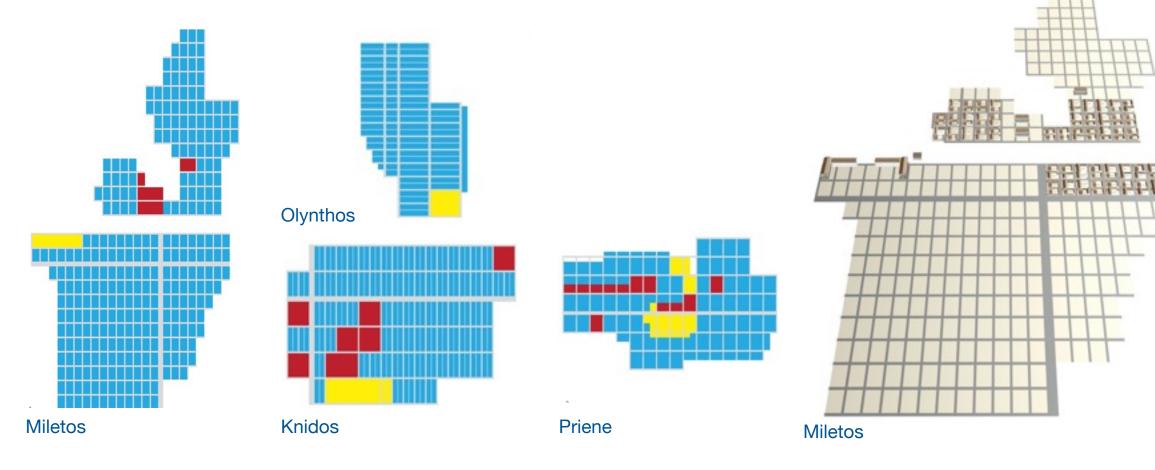
# (4) Evaluation of urban patterns: Procedural transport and land-use model





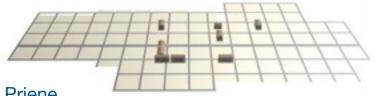


(4) Evaluation of urban patterns: Procedural transport and land-use model





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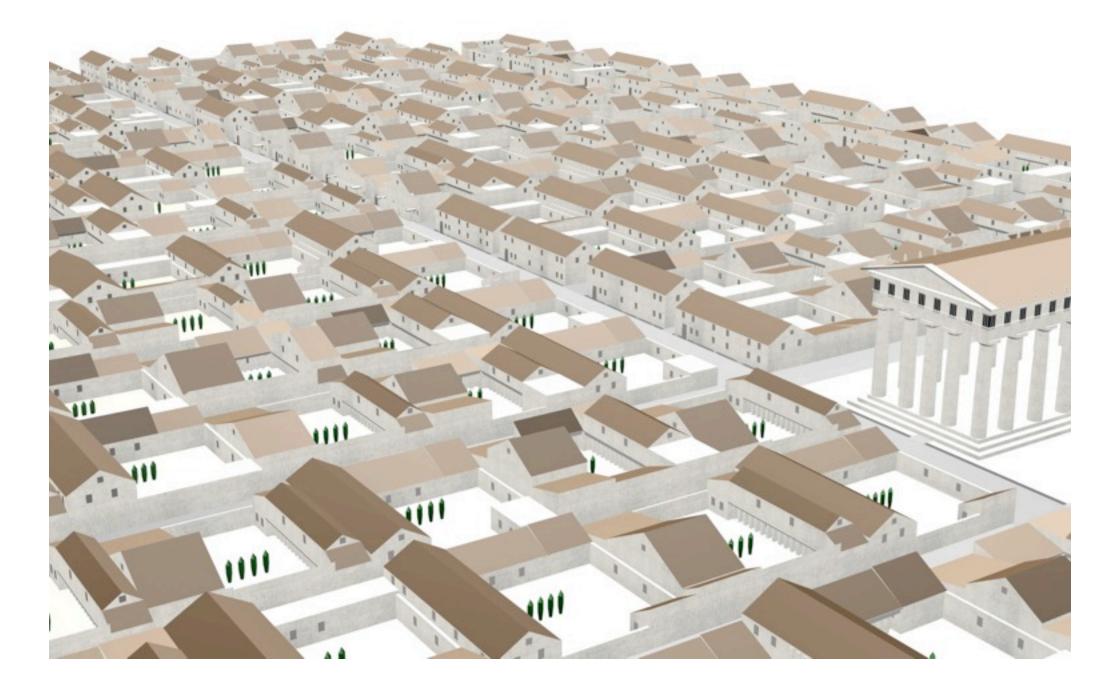


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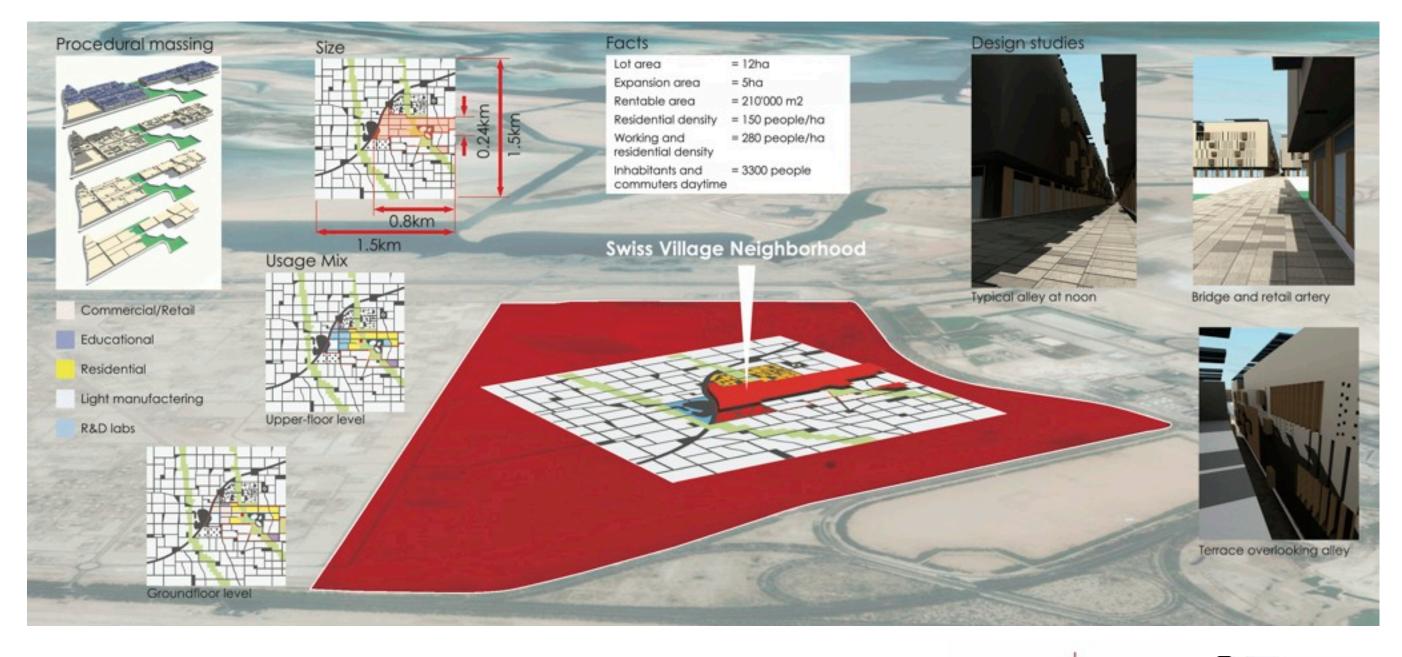


# UrbanSim User Meeting, 18.05.2010 **Collaborative Modeling Platform for Future Cities** (4) Evaluation of urban patterns: Procedural transport and land-use model







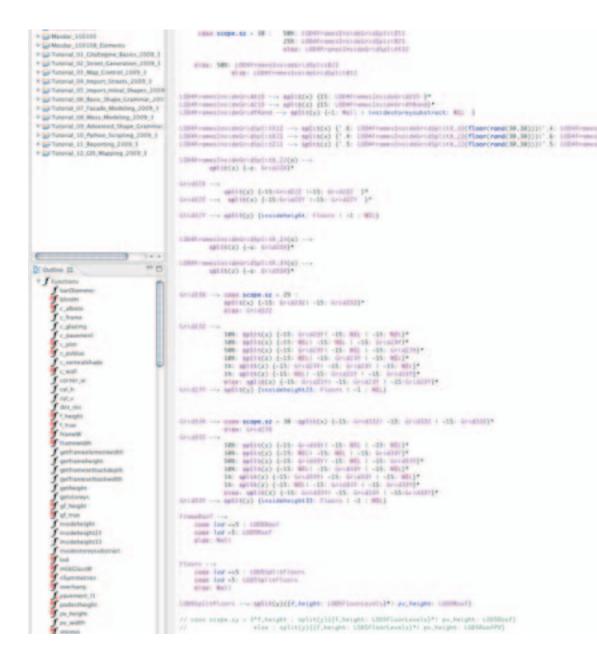


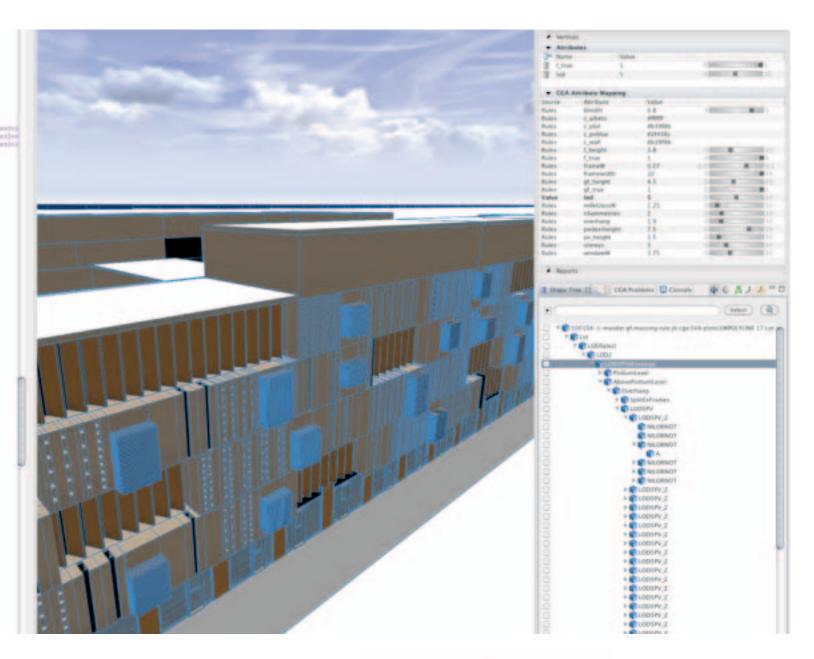


Information Architecture



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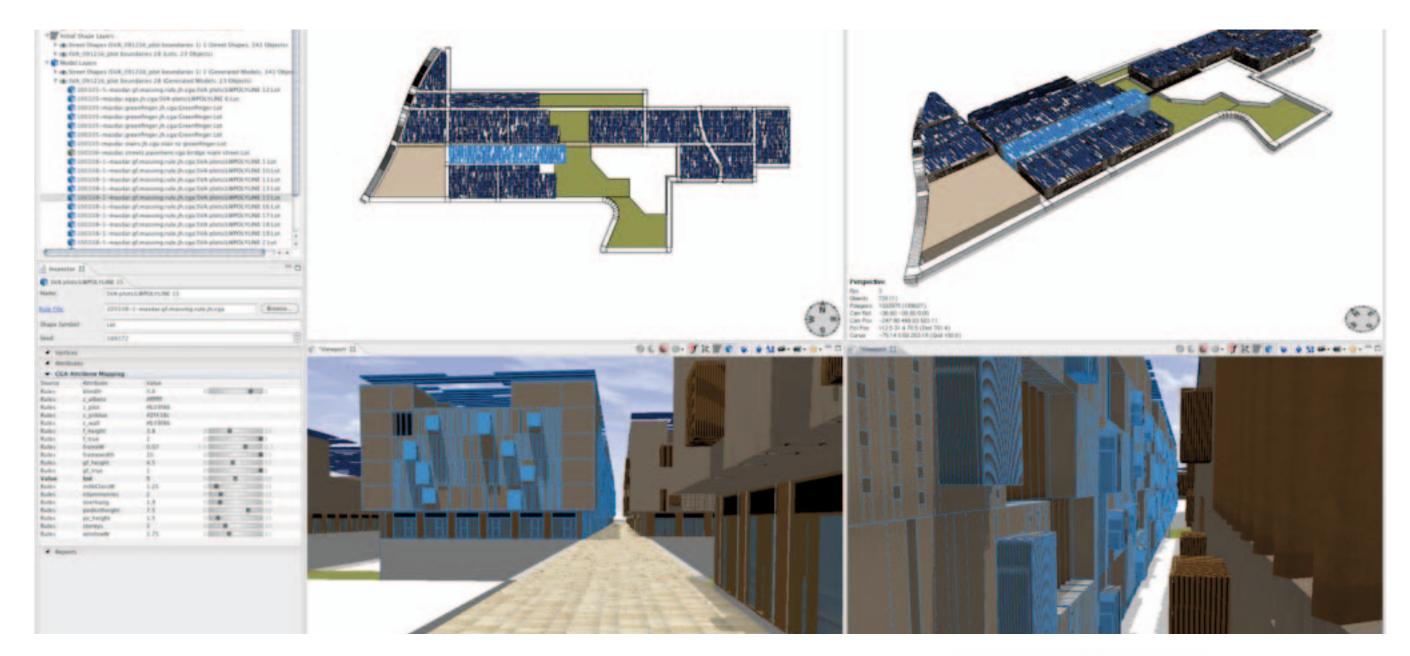
swiss village association ABU DHABI



Chair for Information Architecture



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Chair for Information Architecture



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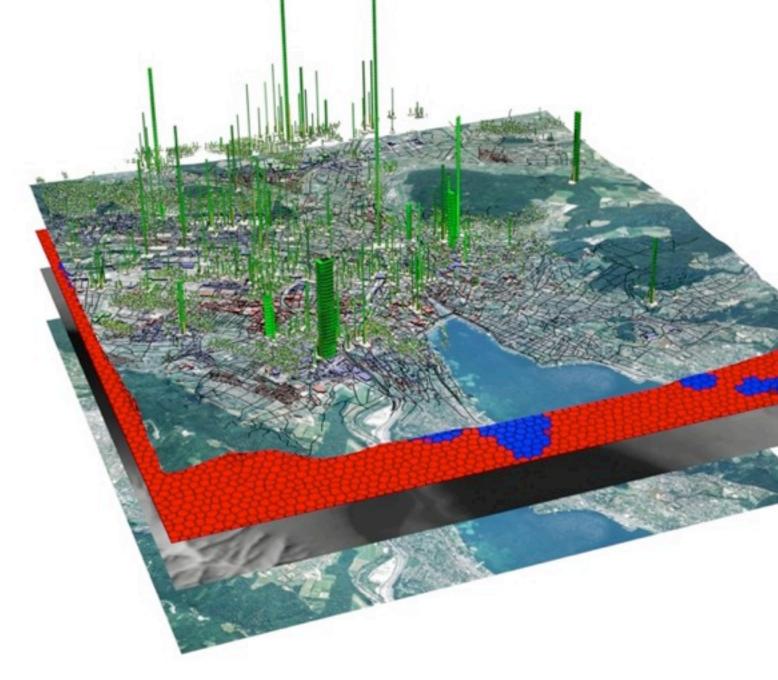


Information



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(5) CO2 emission prediction on urban scale: Procedural model of Zurich







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UrbanSim User Meeting, 18.05.2010 Collaborative Modeling Platform for Future Cities (6) Scenario of a fossil fuel free Zurich



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# Final presentation FS2010 – New methods in urban simulation and modeling **Scenarios for the Swiss Village Abu Dhabi**







Final presentation ES2010 - Marc Warrington, Rujun Jia, Wei Hou, Ming Shan Ng, Santiago Espitia

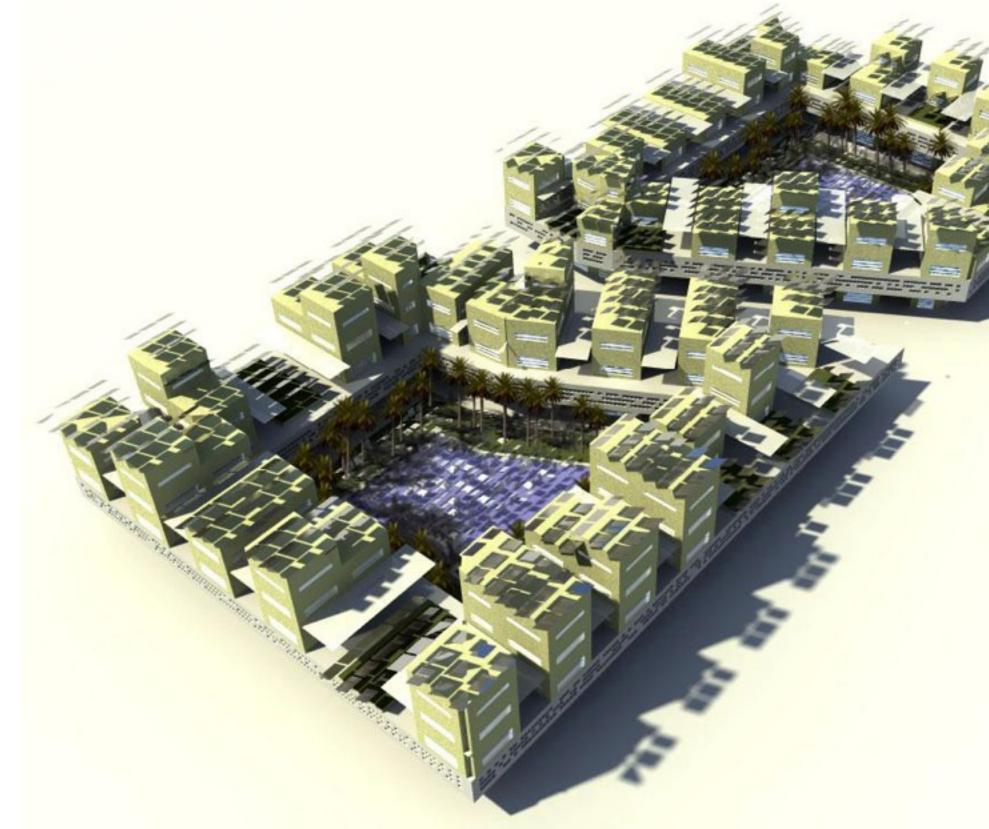


Final presentation FS2010 – T. Demiral, C. Hoene, S. Kraus, N. Luginbühl, A. Perronnet



#### Final presentation – D. Meyer | L. Piskorec | M. Sedlar | F. Waldburger | H-13 | FS2010 Scenario: residential block - bird's eye view

Chait for Information Architecture

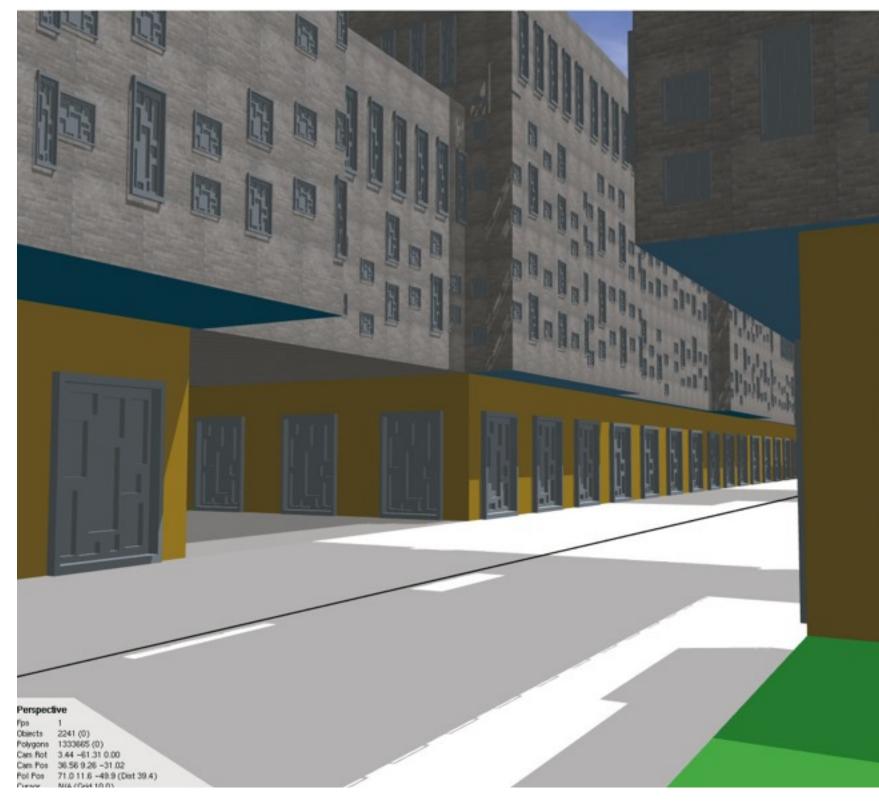




G.C.: 68% (65%) G.F.A: 13850 m2 (16950 m2)

Residential:91%Office:4%CMY:3%Retail:1%

# Final presentation FS2010 – Anna Ebneter - Benjamin Heller - Florian Strohmaier - Levin Meraner **Scenario for Lot I-08**







Final presentation\_Aguayo Christian\_McWalters Teresa\_Perrinjaquet Xavier\_Zimmermann Katrin\_Lot I-09 - FS2010 **Scenario for Lot I-09** 



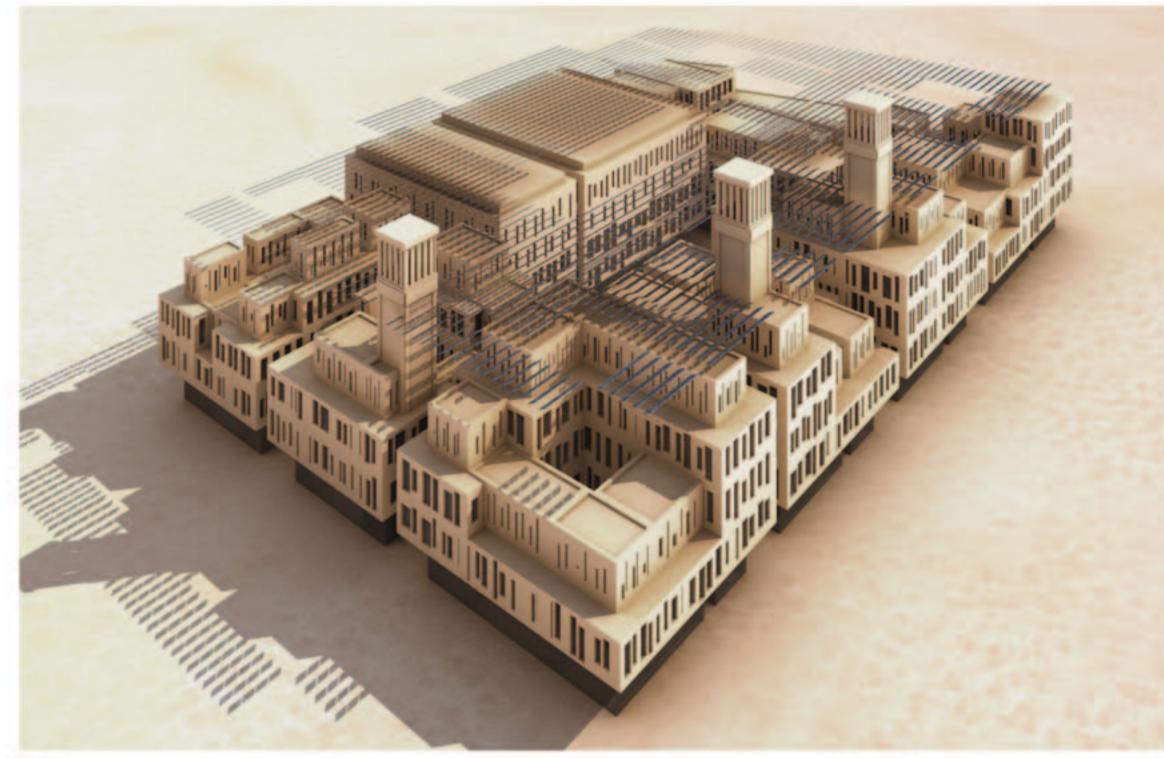




6



### New Methods in Urban Simulation | FS2010 | Final presentation | Aiste Plentaite | Corinne Huerlimann | Linda Mueller | Yuliya Schlegel **Scenario for Lot I-13**





#### 85 **Design Proposal**

#### - visualization of information

- translating the data in architectural design

- parameterized model



Final presentation FS2010 – Thi Pham, Konrad Braun, Dirk Rinker, Manuel Rohrhofer, Damien Romanens, Daria Blaschkiewitz **Scenario for Rochor, Singapore** 







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