



COMPLEXITY
SCIENCE
HUB
VIENNA

CSH WORKSHOP

AGENDA

Cities as Complex Systems



June 20–21, 2022

COMPLEXITY SCIENCE HUB VIENNA
PALAIS STROZZI
JOSEFSTAEDTER STRASSE 39
A-1080 VIENNA



Abstract

Cities and urban systems represent an interesting object to be studied by physics and complex systems researchers. As they combine tangible physical appearance (infrastructure) with intangible human activities (socioeconomic dynamics), they exhibit a particularly high degree of complexity in space and time. This workshop is dedicated to aspects that are either under-researched or not well linked. As cities are spatial objects, they have been studied by geography and planning disciplines for a long time. However, the complexity understanding only started surpassing a fractal description. The analogy of the city as an organism has a long history, but empirical analysis shows that scaling properties are different from metabolic systems. Reasons and consequences are a matter of ongoing research. Important ideas will be generated and exchanged during the workshop that are expected to substantially contribute to a better understanding.

Workshop Organizers

Diego Rybski, PIK Potsdam, Germany; Complexity Science Hub Vienna, Austria

Fabiano L. Ribeiro, UFLA, Lavras, Brazil

Invited Participants

Marc Barthelemy, Université Paris Université Paris-Saclay, France

Céline Rozenblat, University of Lausanne (UNIL), Switzerland

Frank Neffke, Complexity Science Hub Vienna, Austria

ABOUT THE COMPLEXITY SCIENCE HUB VIENNA

The objective of CSH is to host, educate, and inspire complex systems scientists who are dedicated to collect, handle, aggregate, and make sense of big data in ways that are directly valuable for science and society. Focus areas include smart cities, innovation dynamics, medical, social, ecological, and economic systems. CSH is a joint initiative of AIT Austrian Institute of Technology, IIASA International Institute for Applied Systems Analysis, Medical University of Vienna, Vienna University of Technology, Graz University of Technology, and Vienna University of Economics and Business.

AGENDA

June 20, 2022

09:00 **Arrival & registration**

09:30 **Welcome notes**

- Stefan Thurner, Diego Rybski, Charlotte Hofer

09:45 **Keynote (45+15)**

- **Marc Barthelemy**: *The growth and statistics of urban populations*

10:45 *Coffee break*

11:00 **Contributed talks (2x[20+10])**

- **Alvaro Corral**: *Finite-size scaling of population distributions over fixed-size cells, multifractality, and unfulfillment of Zipf's law over clusters of populated cells*
- **Hadrien Salat**: *Synthetic population generation and application to studying spatial inequality*

12:00 *Lunch break*

13:00 **Keynote (45+15)**

- **Céline Rozenblat**: *Resilience and transitions of global complex urban systems*

14:00 **Contributed talks (2x[20+10])**

- **Rafael Prieto Curiel**: *Central and intermediate cities in Africa*
- **Juste Raimbault**: *Integrating urban models and theories*

15:00 *Coffee break*

16:00 **Contributed talks (2x[20+10])**

- **Reik Donner**: *Urban road networks: Geometric characteristics and generative models*
- **Yurij Holovatch**: *Physicist's approach to public transportation networks: between data processing and statistical physics*

17:00 *End of day 1*

19:00 *Dinner (Stiegl Ambulanz)*

June 20, 2022

- 09:00 **Keynote (45+15)**
- *Frank Neffke: Cities and their workers*
- 10:00 **Contributed talks (2x[20+10])**
- *Fabiano L. Ribeiro: On the relation between transversal and longitudinal scaling in cities*
- *Diego Rybski: Urban scaling of carbon emissions*
- 11:00 *Coffee break*
- 11:15 **Discussion**
- *Perspectives of cities as complex systems*
- 12:15 *Closing notes*
- 12:30 *Lunch break & end of workshop*