



COMPLEXITY
SCIENCE
HUB
VIENNA

CSH WORKSHOP AGENDA

IMPROVING RESILIENCE IN COMPLEX SYSTEMS

June 7–9, 2018

COMPLEXITY SCIENCE HUB VIENNA
SALON
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Abstract

Resilience denotes the capacity of a system to withstand shocks and the ability to recover from them. But how should it be quantified and measured for complex systems with a large number of degrees of freedom? Existing concepts of resilience, e.g. in engineering or population biology, do not lead us very far when it comes to highly volatile social organizations. To what extent can disciplinary approaches on robustness, stability and adaptation be applied in a different context? And how should Big Data analytics be utilized to better estimate the resilience of complex systems? To discuss such questions requires experts with the ability to cross scientific boundaries. To bring these people together in a stimulating environment is the aim of the workshop.

Workshop Organizers

Frank Schweitzer, ETH Zurich, Complexity Science Hub Vienna

Stefan Thurner, Complexity Science Hub Vienna, Medical University of Vienna, SFI, IIASA

Invited Participants (in alphabetical order):

1. Baruch Barzel (Tel Aviv) – Statistical Physics

<https://www.barzellab.com/>

2. Sebastian Bathiany (Wageningen) – Climate

<https://www.wur.nl/en/Persons/Sebastian-S-Sebastian-Bathiany-PhD.htm>

3. Rebekka Burkholz (Zurich) – Mathematics

<http://www.ml.inf.ethz.ch/people/person-detail.html?persid=194177>

4. Giona Casiraghi (Zurich)

<https://www.sg.ethz.ch/team/people/gcasiraghi/>

5. Vasilis Dakos (Montpellier) – Ecology

<http://www.vasilisdakos.info/>

6. Ingrid van de Leemput (Wageningen) – Ecosystems

<https://www.wur.nl/en/Persons/Ingrid-van-de-van-de-Leemput.htm>

7. Radosław Michalski (Wrocław) – Data Science

<https://www.ii.pwr.edu.pl/~michalski/>

8. Serguei Saavedra (MIT) – Biology

https://cee.mit.edu/people_individual/serguei-saavedra/

9. Odirilwe Selomane (Stockholm) – Environmental Systems

<http://www.stockholmresilience.org/contact-us/staff/2017-12-01-selomane.html>

10. Ramona Roller (Zurich)

<https://www.sg.ethz.ch/team/people/rroller/>

11. Frank Schweitzer (Zurich)

<https://www.sg.ethz.ch/team/people/fschweitzer/>

Local participants

Ulf Dieckmann (IIASA) – Population dynamics

<http://www.iiasa.ac.at/~dieckman/>

Michael Obersteiner (IIASA) – Ecology

<http://www.iiasa.ac.at/web/home/research/researchPrograms/EcosystemsServicesandManagement/Obersteiner--Michael.en.html>

AGENDA

THU 7 June – DAY 1: 15:00–18:00

OPEN COLLOQUIUM at TU Wien

Address: Boecklsaal, Karlsplatz 13, 1040 Vienna, Stair 1, 1st floor

<http://www.wegweiser.ac.at/tuwien/hoersaal/1334.html>

Public talks (45 min each) from three different perspectives, to attract also participants from the Vienna universities

1. Frank Schweitzer: The Resilience of Social Organizations
2. Odirilwe Selomane: Dancing with the Dynamics – Social-ecological Systems Insights for Sustainable Development
3. Stefan Thurner: Elimination of Systemic Risk in Financial Networks

FRI 8 June – DAY 2: Full day

Address: Complexity Science Hub Vienna
Josefstaedter Strasse 39
1080 Vienna

- 9:00 am Welcome & Coffee
- 9:30 am Workshop Start
- 5:00 pm Workshop End

Each session (90 min) is devoted to discussing one question.

There should be a short (15min) introduction given by one of the invited participants.

The aim is to have a discussion document of about 5 pages to summarize the problems and the outcome of each session.

Session 1

How should resilience be quantified? Is there a context independent metric?

(Ingrid van den Leemput)

Session 2

Is there a difference between robustness, stability and resilience?

(Serguei Saavedra)

Session 3

What data do we need to measure resilience of real world systems?

(Radosław Michalski)

Session 4 (90 min)

Can we control systems such that their resilience is maintained?

(Baruch Barzel)

SAT 9 June – DAY 3: Morning

- 9:00 am Welcome & Coffee
- 9:30 am Workshop Start
- 1:00 pm Workshop End

Working groups to finalize the four discussion documents. These should circulate in the community, to receive feedback.

The ultimate aim is to have an edited book which summarizes the state of the art about resilience. Springer Complexity is ready to consider this proposal for its series "Understanding complex systems".

Lunch at the CSH Vienna

After Lunch: Departure

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.