



# Kick-off

*Network Science '21: Session 1.1*

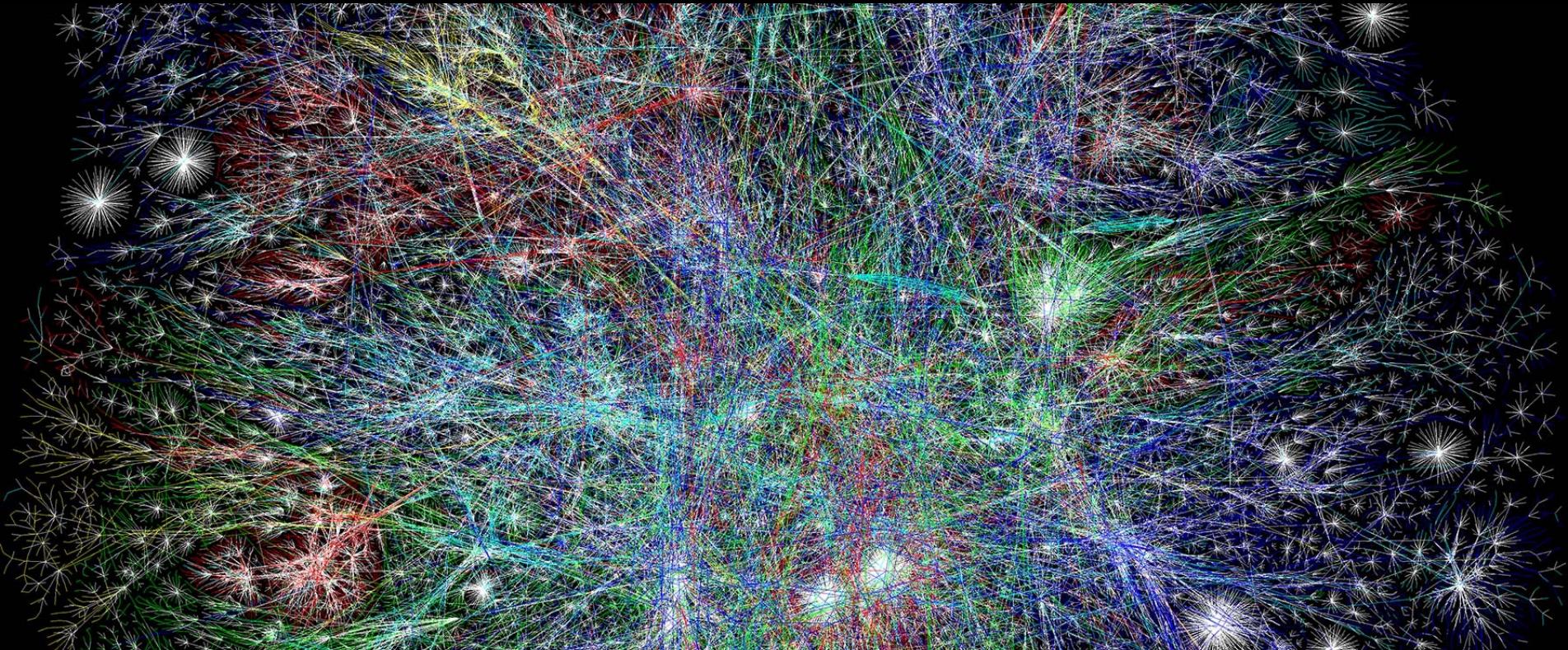
Claudio J. Tessone

Blockchain and Distributed Ledger Technologies

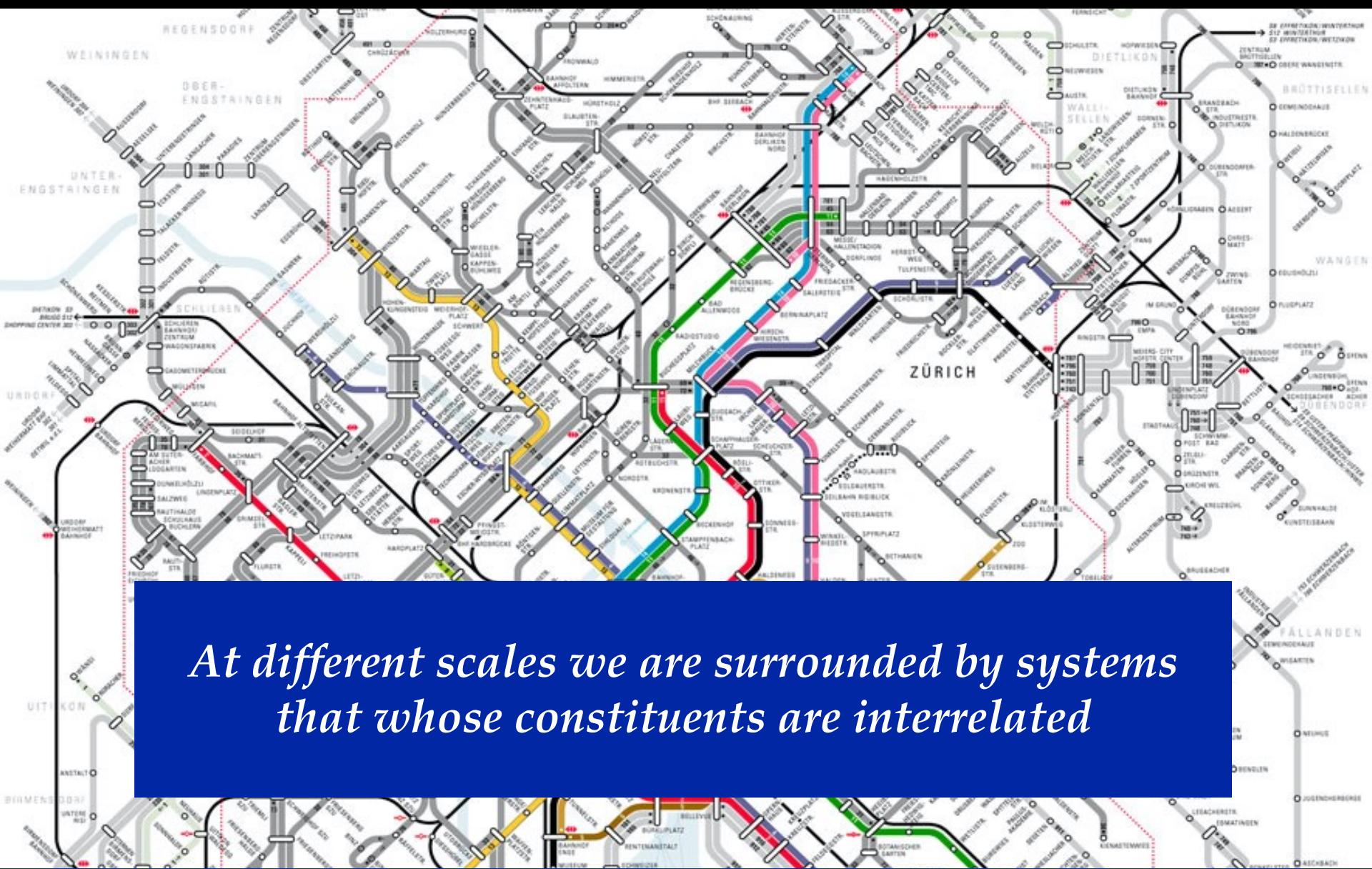
UZH Blockchain Center



*Why network science?*



*At different scales we are surrounded by systems  
that whose constituents are interrelated*





*At different scales we are surrounded by systems  
that whose constituents are interrelated*

# Clinton and Trump supporters live in their own Twitter worlds

- Follow only Trump
- Follow only Clinton
- Follow both
- Follow neither

Clinton  
Supporters

Hillary Clinton supporters in this user group are not as cohesive as Trump supporters and they interact more frequently with users who follow both or neither candidate. They have few mutual follower networks in common with the far-right conservative cluster.

Trump  
Supporters

This large cluster of Trump supporters on Twitter have little mutual follower overlap with other users and are a remarkably cohesive group. They exist in their own information bubble.

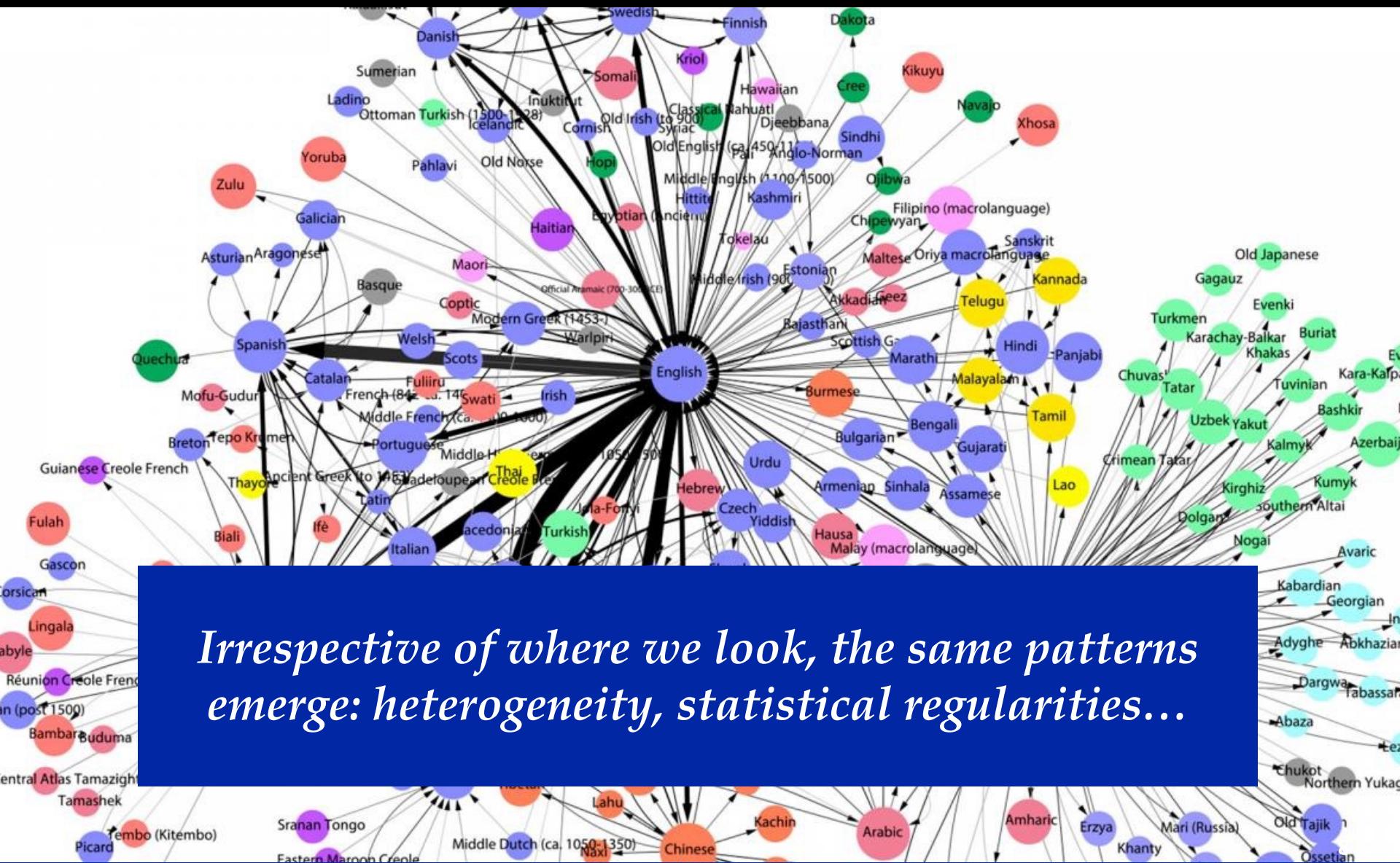


## Twitter Influencers

Search Keyword or Hashtag



*These connections unveil important properties of the actors involved and are powerful actionable information*





## Pandemics (2020)

Confirmed cases    Travel, but be careful    At-risk groups avoid travel    Avoid all non-essential travel

Canada: 22    U.S.: 88    Mexico: 5    Iceland: 3    UK: 36    Germany: 100+    France: 100+    Italy: 1,600+    China: 80,000+    Iran: 1,500+    India: 5    Japan: 900+    S. Korea: 4,300+    Algeria: 3    Nigeria: 1    Egypt: 2    Israel: 10

**ACTIVE CASES**  
Currently Infected Patients  
41,203  
33,828 (82%) in Mild Condition    7,375 (18%) Serious or Critical  
[Show Graph](#)

**CLOSED CASES**  
Cases which had an outcome:  
48,576  
45,507 (94%) Recovered / Discharged    3,069 (6%) Deaths  
[Show Graph](#)

**Total Cases (Linear Scale)**  
Total Coronavirus Cases  
Jan 22 - Feb 26

**Total Deaths (Linear Scale)**  
Total Coronavirus Deaths  
Jan 22 - Feb 27

**BBC News**  
Coronavirus cases grow outside China as deaths top 3,000  
4 hours ago

**The Guardian**  
New coronavirus cases jump sharply in Europe, with Italy worst hit  
Yesterday

**Sky News**  
Coronavirus: Risk in EU from outbreak rises from moderate to high  
15 minutes ago

**CNN**  
Trump announces new coronavirus screening procedures for travelers to US  
Yesterday

这场阻击战习近平全程指挥-中新网  
中国新闻网 · 3小时前

- 疫情简报：中国确诊病例超8万；习近平承认政府应对失误  
纽约时报中文网 · 9小时前
- 习近平《求是》发文回应质疑西媒：承认早期地方应对不力  
多维新闻网 · 3小时前
- 墙外文摘：蔡英文如何向习近平“抄作业”？  
Deutsche Welle · 昨天
- 战“疫”每日观察 | 习近平《求是》重要文章传递的深刻涵义  
新浪网 · 昨天

[查看完整报道](#)

AUSTRALIA: 29    NEW ZEALAND: 1



# Pandemics (2021)

COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University (JHU)

Global Cases  
**111,351,190**

Cases by Country/Region/Sovereignty

28,133,699	US
10,991,651	India
10,168,174	Brazil
4,127,574	United Kingdom
4,117,992	Russia
3,597,540	France
2,122,122	Spain

ACTIVE CASES

22,150,424

Currently Infected Patients

22,060,832 (99.6%)

in Mild Condition

93,917 (0.4%)

Serious or Critical

Show Graph

daily linear logarithmic

Daily New Cases

Cases per Day

Data as of 0:00 GMT+0

1,000k

750k

500k

250k

0

Jan 22, 2020 Feb 01, 2020 Mar 01, 2020 Apr 01, 2020 May 01, 2020 Jun 01, 2020 Jul 01, 2020 Aug 01, 2020 Sep 01, 2020 Oct 01, 2020 Nov 01, 2020 Dec 01, 2020 Jan 01, 2021

Das Neuste zur Coronakrise - Polizei löste am Wochenende illegale Partys und Versammlungen auf  
Schweizer Radio und Fernsehen (SRF) · Vor 27 Minuten

89,4 %

Coronavirus: Was wir zu den neuen Varianten wissen  
Neue Zürcher Zeitung · Vor 5 Tagen

Global Deaths  
**2,466,154**

498,879 deaths	US
246,504 deaths	Brazil
180,107 deaths	Mexico
156,302 deaths	India
120,810 deaths	United Kingdom
95,718 deaths	Italy
83,546 deaths	France
81,926 deaths	Russia
67,946 deaths	Germany

The Guardian  
Coronavirus live news: US death toll nears 500,000; England roadmap out of lockdown revealed  
10 minutes ago

Sky News  
COVID-19: UK reports another 215 coronavirus deaths as number of people jabbed hits 17.5 million  
12 hours ago

Corriere della Sera · 8 ore fa

Covid a Brescia: la provincia oltre la soglia della fascia rossa, boom di contagi

Corriere della Sera · 8 ore fa



## Course objectives

1. Understand how to represent interconnected systems as networks
2. Learn how to measure their most important features, and discern if they are significant
3. Get acquainted with the mechanisms that drive their evolution
4. Identify important actors and their influence



*We will see that these systems are  
“complex”*



*A complex system is one composed by many interacting/interconnected constituents. Its global properties are not the simple aggregation of individual behaviour, but a richer, emergent one*



## Paradigm of a complex system



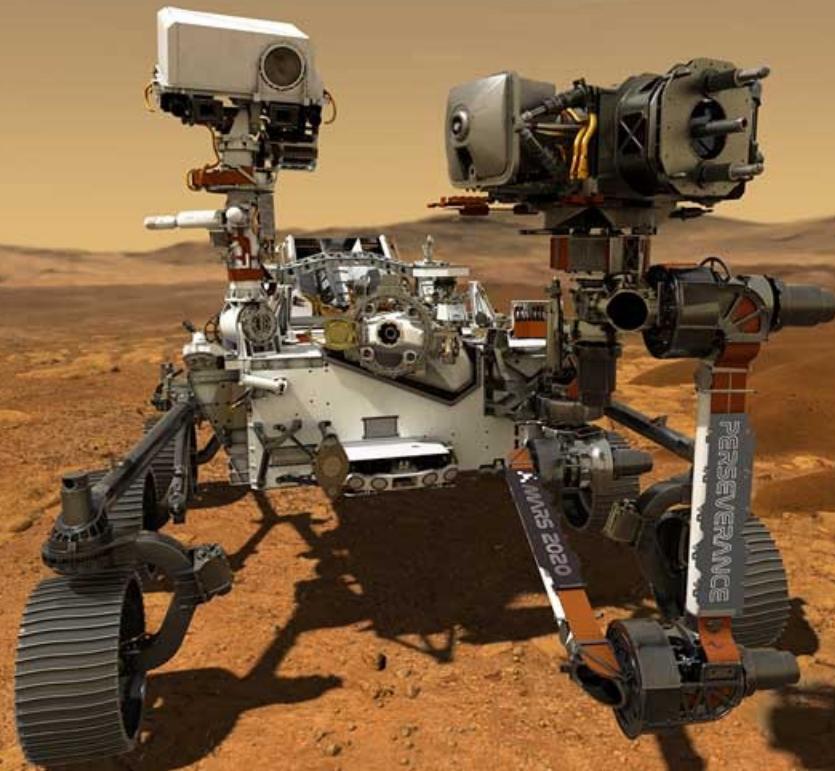


## Paradigm of a networked complex system





## Paradigm of a complicated system





*Bottom-up: On complex systems, order can emerge without any design or designer action.*



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*Questions / Comments?*



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