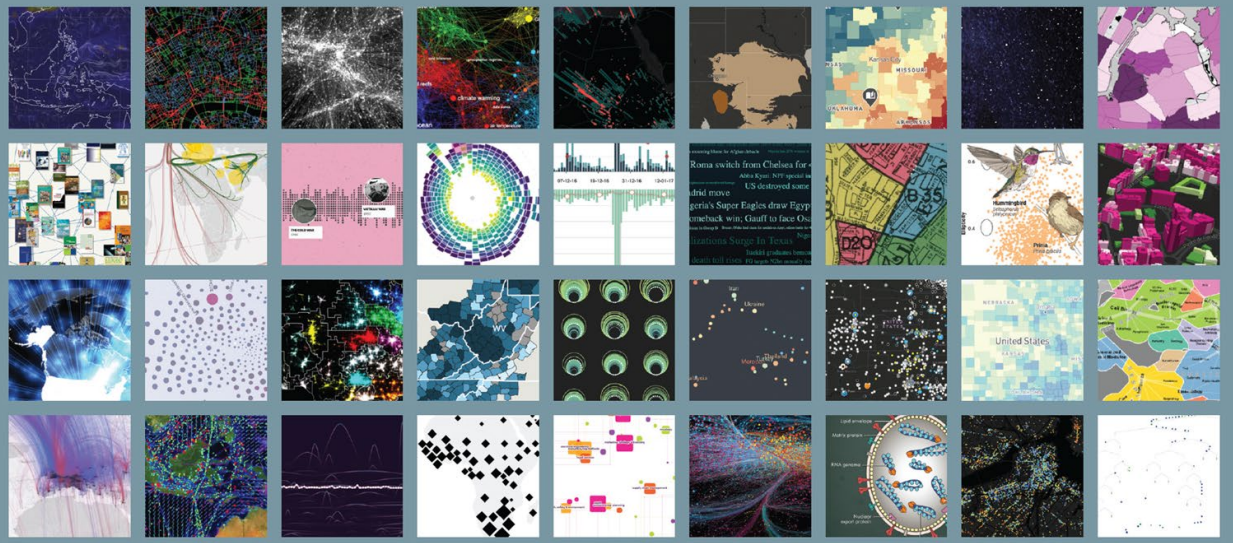
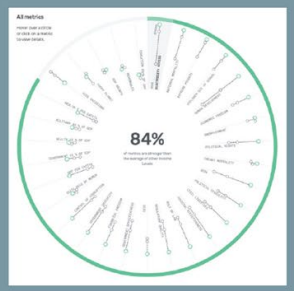
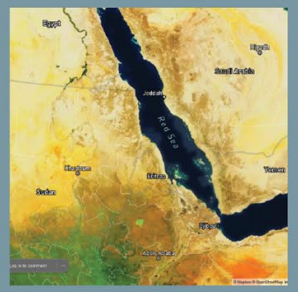
Program will begin at 4:15pm ET

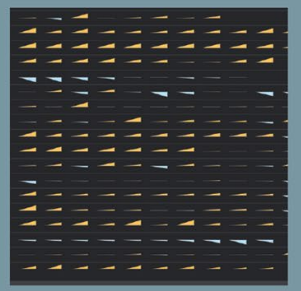
Website



Macroscopes for a Global Future







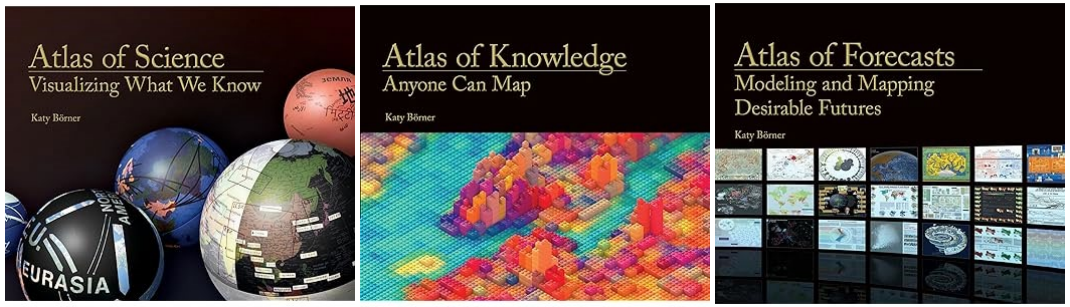
Press

Agenda

Thursday June 6, 2024, all times are ET

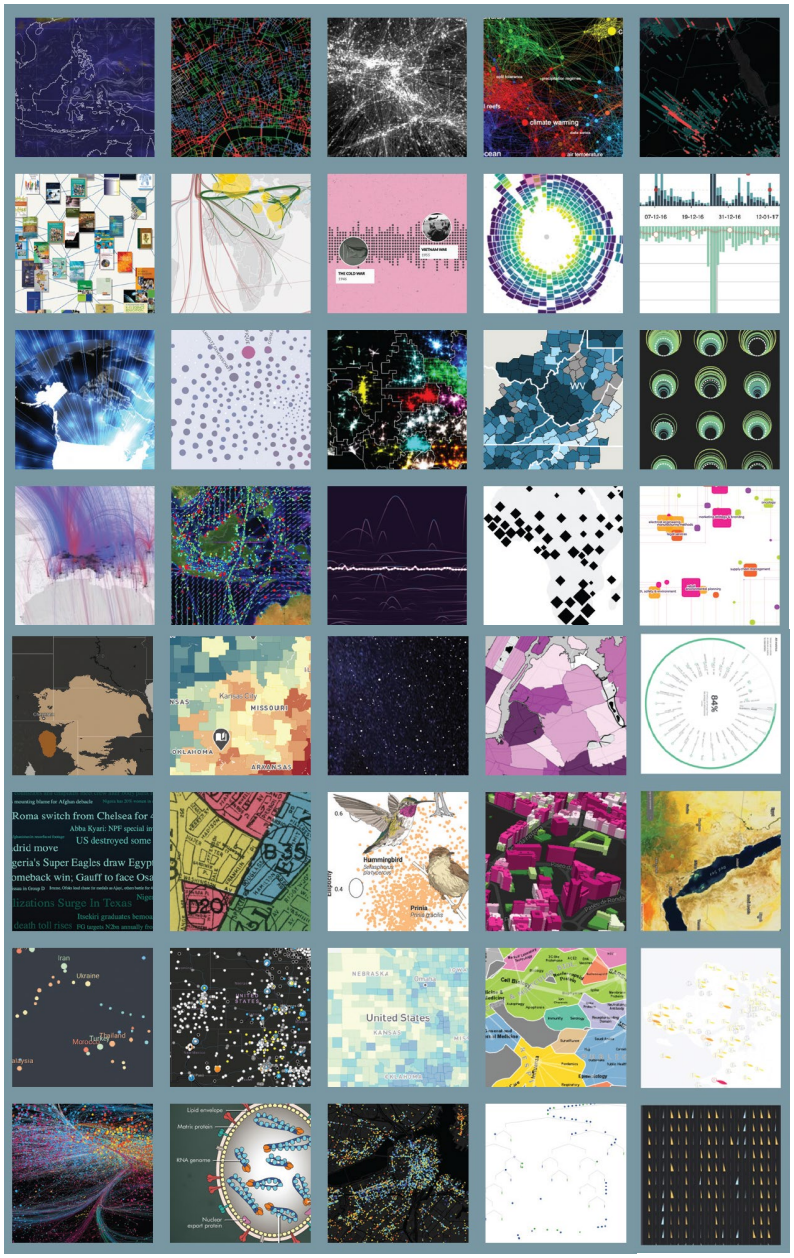
4:15 pm	Welcome by Katy Börner
4:20 pm	Introduction to *Places & Spaces: Mapping Science* Exhibit by Katy Börner
4:25 pm	Introduction to the 20th Exhibit Iteration by Lisel Record
4:30 pm	*The Shape of Change* presented by Beatriz Malveiro and Rita Costa
4:40 pm	*River Runner* presented by Sam Learner
4:50 pm	*The Whole Picture* presented by Liuhuaying Yang
5:00 pm	*How Do We Compare?* introduced by Lisel Record
5:05 pm	The 3rd Decade of the Exhibit by Katy Börner
5:10 pm	Acknowledgements by the Curatorial Team
5:15 pm	Drop by Seminar Room 120 for *Lateral Thinking Gone VR*
	Visit the theater to watch *Humanexus*

1st Decade of *Places & Spaces*: 100 Maps (2005-2014)



https://scimaps.org/maps

2nd Decade of *Places & Spaces*: 40 Macroscopes (2015-2024)



MACROSCOPES
Atlas of Epic Data Adventures

Katy Börner
Todd Theriault
Elizabeth G. Record

https://scimaps.org/macroscopes

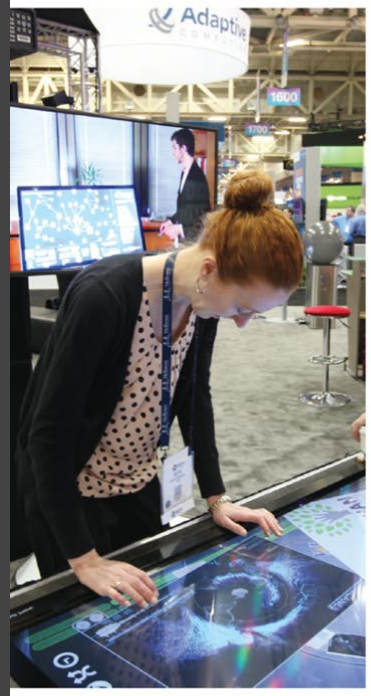
Places & Spaces: Mapping Science

Introduction to the Exhibit

Created by experts in science, humanities, and the arts, the works collected in the *Places & Spaces: Mapping Science* exhibit convey the excitement of scientific progress and discovery. Maps of science chart the more abstract spaces of data and knowledge, helping us forecast new fields of inquiry and enabling us to tell stories that we can all understand and act upon. An interdisciplinary and international advisory board chose each of these exhibited works as an outstanding example of how visualization can bring patterns in data into focus.

As of 2020, 100 maps by 215 mapmakers have been displayed at 396 venues, in more than 28 countries, on 6 continents. Each unique venue adds its own value. Ultimately, the exhibit is like the eponymous stone in the story of stone soup—with experts around the globe contributing singular visualizations that ask new questions while offering solutions to meet local contexts and needs.

The *Atlas of Forecasts* features maps designed for kids—the next generation of experts and leaders; maps showing trends and dynamics in the past, present, and future; and maps that foreshadow the future of science mapping. The 30 maps featured here communicate complex data; help bridge gaps between experts in academia, industry, and government; and help align forces toward the identification and implementation of desirable futures.



Places & Spaces maps on a touch table at the International Conference for High Performance Computing, Networking, Storage, and Analysis, New Orleans, LA

The exhibit team: Lisel Record, Katy Börner, and Todd Theriault

Illuminated Diagram display at the Smithsonian Folklife Festival, Washington, D.C.

Geoffrey West, distinguished professor and past president, Santa Fe Institute, introduces Börner's Betazone talk at the World Economic Forum, Davos, Switzerland

Places & Spaces digital display in the iPearl Immersion Theater, James B. Hunt Jr. Library, North Carolina State University, Raleigh, NC

The *Visionary Approaches Timeline* from the *Atlas of Science* on display at the Mundaneum, Mons, Belgium

"New Trends in eHumanities Research" workshop at the Royal Netherlands Academy of Arts and Sciences, Amsterdam, Netherlands

Ken Kennedy Institute for Information Technology, Rice University, Houston, TX

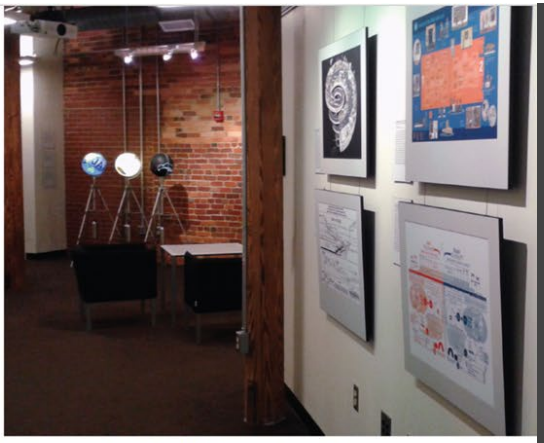


Exhibit maps and Ingo Günther's WorldProcessor globes on display at Duke University, Durham, NC

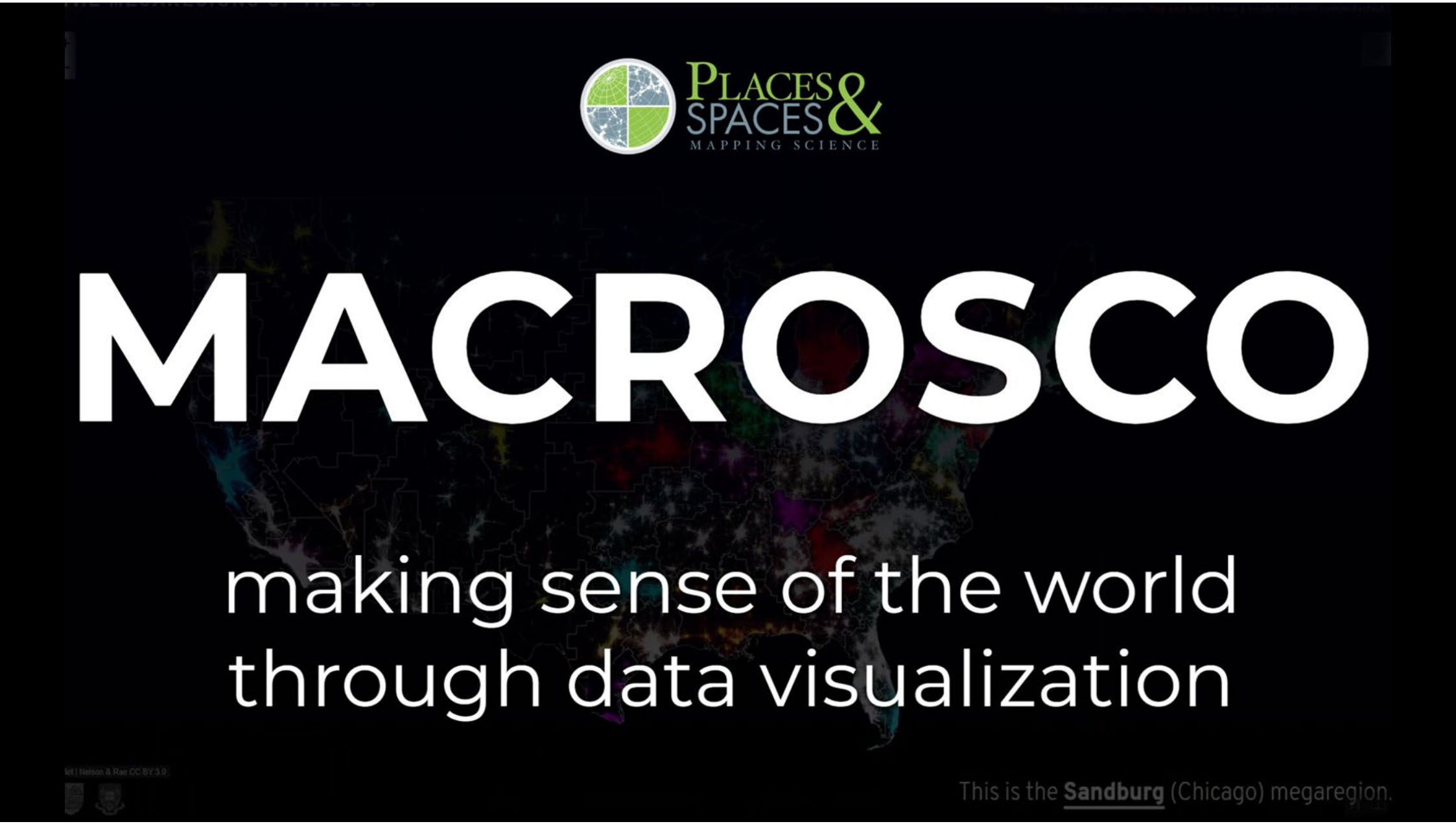
Katy Börner debuts the exhibit at the University of Miami, Coral Gables, FL

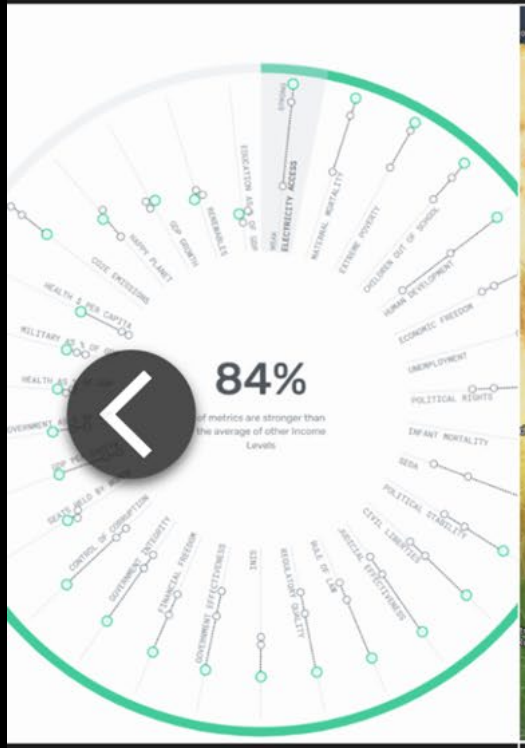
100 science maps on display at the University of Miami, Coral Gables, FL

Maps on display at the European Commission, Directorate-General for Research and Innovation, Brussels, Belgium

Jax and the Big Data Beanstalk theater piece introduces visitors to data visualizations and science maps at the Science Museum of Minnesota, St. Paul, MN

Katy Börner presents "Maps & Macroscopes" at TEDxBloomington, Bloomington, IN


PLACES & SPACES
MAPPING SCIENCE
MACROSCO
making sense of the world
through data visualization
let | Nelson & Rae CC BY 3.0
This is the Sandburg (Chicago) megaregion.

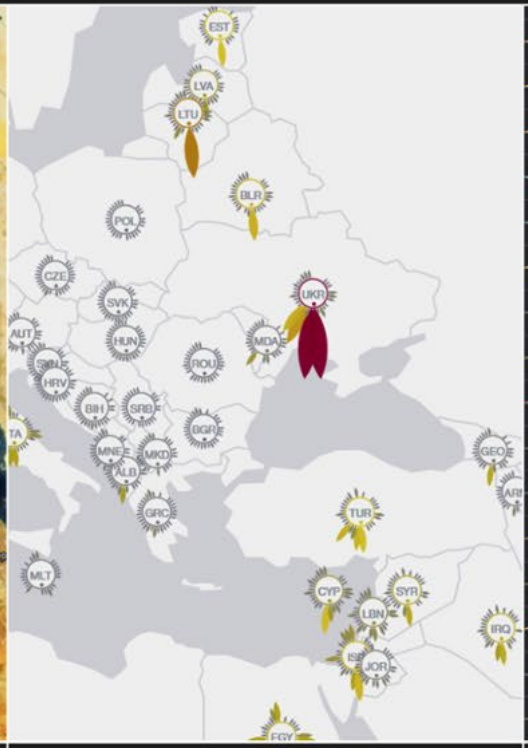


How Do We Compare?

Using metrics for global good

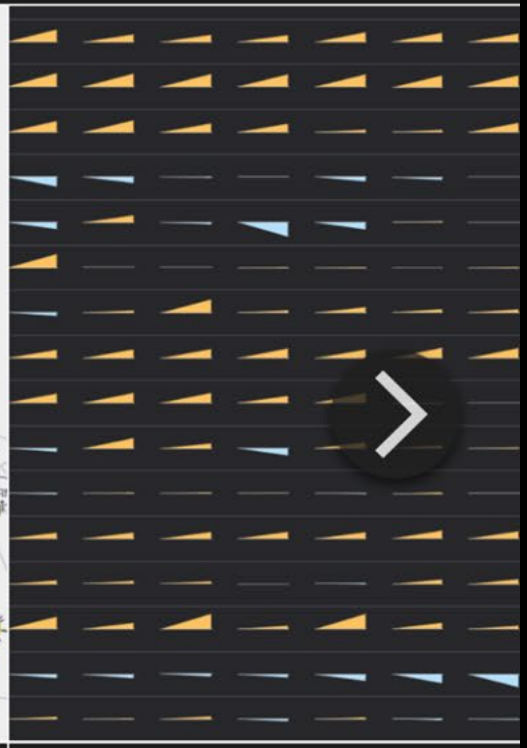
River Runner

Don't stop that drop



The Whole Picture

The cost of connectedness



The Shape of Change

A global progress report

2010

Explosion on the Deepwater Horizon Oil Rig

2010, April 20

On April 20th 2010, the world learned about an oil spill in the Gulf of Mexico. Nine days later, the New York Times was saying that the disaster was "larger than thought". It became the largest marine oil spill in history.

1 / 5

INTERACTIVE

*Drag the **purple circle** in the chart up or down to guess the value in 2020*

Can you guess how much has our dependency on oil changed?

as a % of global electricity production

Submit guess

The Shape of Change

Beatriz Malveiro
Rita Costa

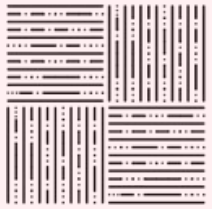
The Shape of Change

ORIGIN

World Data Visualization Prize 2023

2023 prize focused on the past, present and future – of society, of governments, of populations.

Choose one or of three datasets and create visualizations that tell a story or reveal something interesting about the data



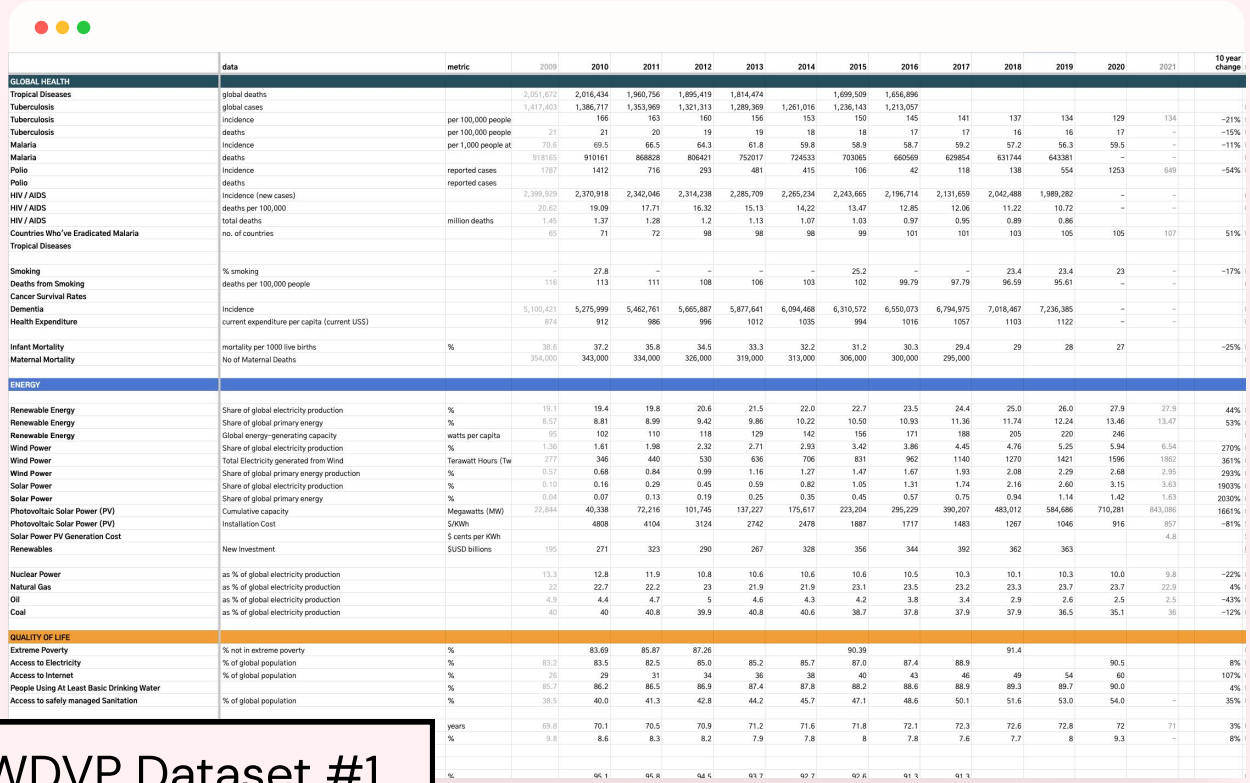
الجائزة العالمية لفن عرض البيانات

WORLD DATA VISUALIZATION PRIZE

ORIGIN

“What Just Happened?”

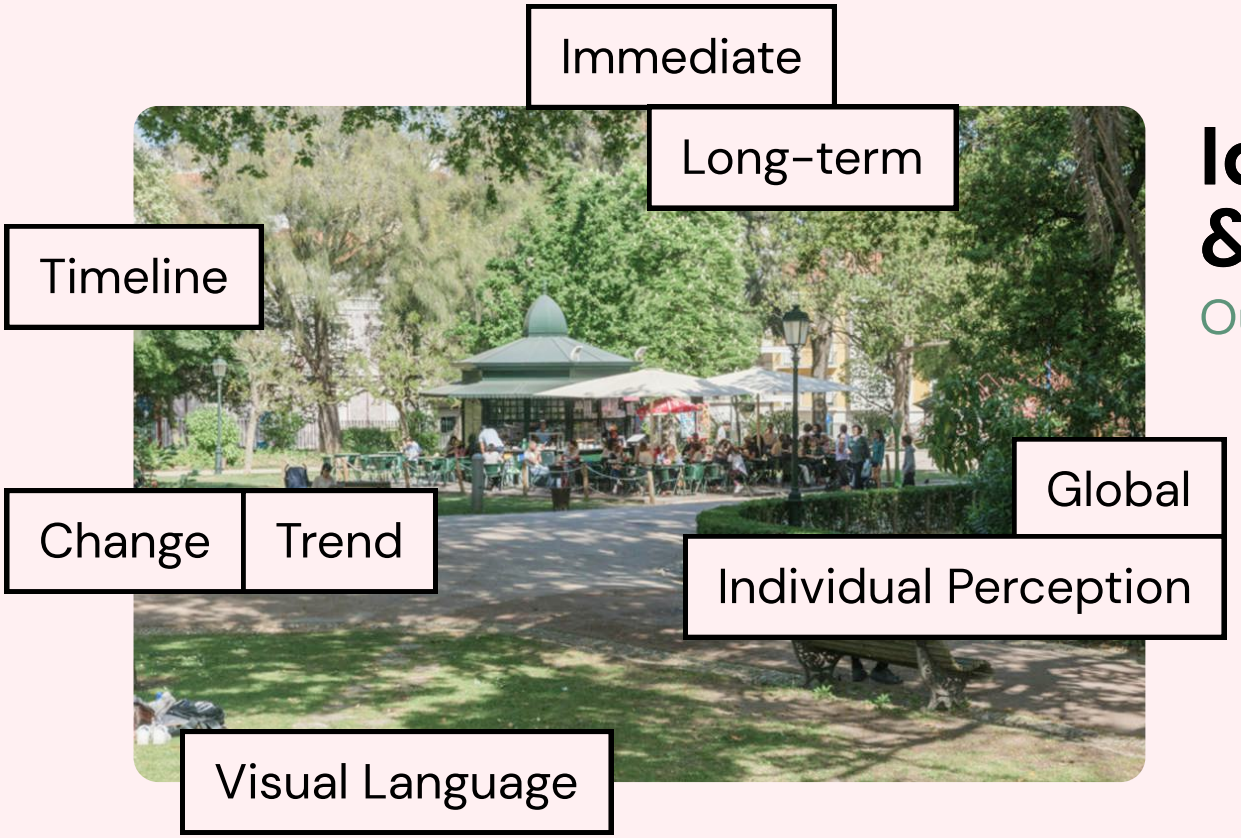
What's improved? What's broken through? What's gone supernova? Charting our development across many different metrics over a 10 year period to highlight the successes - and the bottlenecks.



	data	metric	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	10 year change
GLOBAL HEALTH																
Tropical Diseases	global deaths		2,051,672	2,016,434	1,960,756	1,895,419	1,814,474		1,699,509	1,656,896						
Tuberculosis	global cases		1,417,403	1,386,717	1,353,969	1,321,313	1,289,369	1,261,016	1,236,143	1,213,057						
Tuberculosis	incidence	per 100,000 people		166	163	160	156	153	150	145	141	137	134	129	134	-21%
Tuberculosis	deaths	per 100,000 people	21	21	20	19	19	18	18	17	17	16	16	17	–	-15%
Malaria	Incidence	per 1,000 people at	70.6	69.5	66.5	64.3	61.8	59.8	58.9	58.7	59.2	57.2	56.3	59.5	–	-11%
Malaria	deaths		918165	910161	868828	806421	752017	724533	703065	660569	629854	631744	643381	–	–	
Polio	Incidence	reported cases	1787	1412	716	293	481	415	106	42	118	138	554	1253	649	-54%
Polio	deaths	reported cases														
HIV / AIDS	Incidence (new cases)		2,399,929	2,370,918	2,342,046	2,314,238	2,285,709	2,265,234	2,243,665	2,196,714	2,131,659	2,042,488	1,989,282	–	–	
HIV / AIDS	deaths per 100,000		20.62	19.09	17.71	16.32	15.13	14.22	13.47	12.85	12.06	11.22	10.72	–	–	
HIV / AIDS	total deaths	million deaths	1.45	1.37	1.28	1.2	1.13	1.07	1.03	0.97	0.95	0.89	0.86			
Countries Who've Eradicated Malaria	no. of countries		65	71	72	98	98	98	99	101	101	103	105	105	107	51%
Tropical Diseases																
Smoking	% smoking		–	27.8	–	–	–	–	25.2	–	–	23.4	23.4	23	–	-17%
Deaths from Smoking	deaths per 100,000 people		116	113	111	108	106	103	102	99.79	97.79	96.59	95.61	–	–	
Cancer Survival Rates																
Dementia	Incidence		5,100,421	5,275,999	5,462,761	5,665,887	5,877,641	6,094,468	6,310,572	6,550,073	6,794,975	7,018,467	7,236,385	–	–	
Health Expenditure	current expenditure per capita (current US$)		874	912	986	996	1012	1035	994	1016	1057	1103	1122	–	–	
Infant Mortality	mortality per 1000 live births	%	38.6	37.2	35.8	34.5	33.3	32.2	31.2	30.3	29.4	29	28	27		-25%
Maternal Mortality	No of Maternal Deaths		354,000	343,000	334,000	326,000	319,000	313,000	306,000	300,000	295,000					
ENERGY																
Renewable Energy	Share of global electricity production	%	19.1	19.4	19.8	20.6	21.5	22.0	22.7	23.5	24.4	25.0	26.0	27.9	27.9	44%
Renewable Energy	Share of global primary energy	%	8.57	8.81	8.99	9.42	9.86	10.22	10.50	10.93	11.36	11.74	12.24	13.46	13.47	53%
Renewable Energy	Global energy-generating capacity	watts per capita	95	102	110	118	129	142	156	171	188	205	220	246		
Wind Power	Share of global electricity production	%	1.36	1.61	1.98	2.32	2.71	2.93	3.42	3.86	4.45	4.76	5.25	5.94	6.54	270%
Wind Power	Total Electricity generated from Wind	Terawatt Hours (Tw	277	346	440	530	636	706	831	962	1140	1270	1421	1596	1862	361%
Wind Power	Share of global primary energy production	%	0.57	0.68	0.84	0.99	1.16	1.27	1.47	1.67	1.93	2.08	2.29	2.68	2.95	293%
Solar Power	Share of global electricity production	%	0.10	0.16	0.29	0.45	0.59	0.82	1.05	1.31	1.74	2.16	2.60	3.15	3.63	1903%
Solar Power	Share of global primary energy	%	0.04	0.07	0.13	0.19	0.25	0.35	0.45	0.57	0.75	0.94	1.14	1.42	1.63	2030%
Photovoltaic Solar Power (PV)	Cumulative capacity	Megawatts (MW)	22,844	40,338	72,216	101,745	137,227	175,617	223,204	295,229	390,207	483,012	584,686	710,281	843,086	1661%
Photovoltaic Solar Power (PV)	Installation Cost	$/KWh		4808	4104	3124	2742	2478	1887	1717	1483	1267	1046	916	857	-81%
Solar Power PV Generation Cost		$ cents per KWh													4.8	
Renewables	New Investment	$USD billions	195	271	323	290	267	328	356	344	392	362	363			
Nuclear Power	as % of global electricity production		13.3	12.8	11.9	10.8	10.6	10.6	10.6	10.5	10.3	10.1	10.3	10.0	9.8	-22%
Natural Gas	as % of global electricity production		22	22.7	22.2	23	21.9	21.9	23.1	23.5	23.2	23.3	23.7	23.7	22.9	4%
Oil	as % of global electricity production		4.9	4.4	4.7	5	4.6	4.3	4.2	3.8	3.4	2.9	2.6	2.5	2.5	-43%
Coal	as % of global electricity production		40	40	40.8	39.9	40.8	40.6	38.7	37.8	37.9	37.9	36.5	35.1	36	-12%
QUALITY OF LIFE																
Extreme Poverty	% not in extreme poverty	%		83.69	85.87	87.26			90.39			91.4				
Access to Electricity	% of global population	%	83.2	83.5	82.5	85.0	85.2	85.7	87.0	87.4	88.9			90.5		8%
Access to Internet	% of global population	%	26	29	31	34	36	38	40	43	46	49	54	60		107%
People Using At Least Basic Drinking Water		%	85.7	86.2	86.5	86.9	87.4	87.8	88.2	88.6	88.9	89.3	89.7	90.0		4%
Access to safely managed Sanitation	% of global population	%	38.5	40.0	41.3	42.8	44.2	45.7	47.1	48.6	50.1	51.6	53.0	54.0	–	35%
		years	69.8	70.1	70.5	70.9	71.2	71.6	71.8	72.1	72.3	72.6	72.8	72	71	3%
		%	9.8	8.6	8.3	8.2	7.9	7.8	8	7.8	7.6	7.7	8	9.3	–	8%
		%		95.1	95.8	94.5	93.7	92.7	92.6	91.3	91.3					

WDVP Dataset #1

PROCESS



Ideate & Sketch

Outside

PROCESS

Moments vs. Trends

Challenge how our perceptions impact our estimation of long-term trends

PROCESS

Visual Language

Develop a distinct visual representation from the data.

PROCESS

Learn

Use reader interaction for introducing the visual representation and to improve data recall.

PROCESS

Explore

Allow for reader to analyse the larger dataset through the same visual elements.

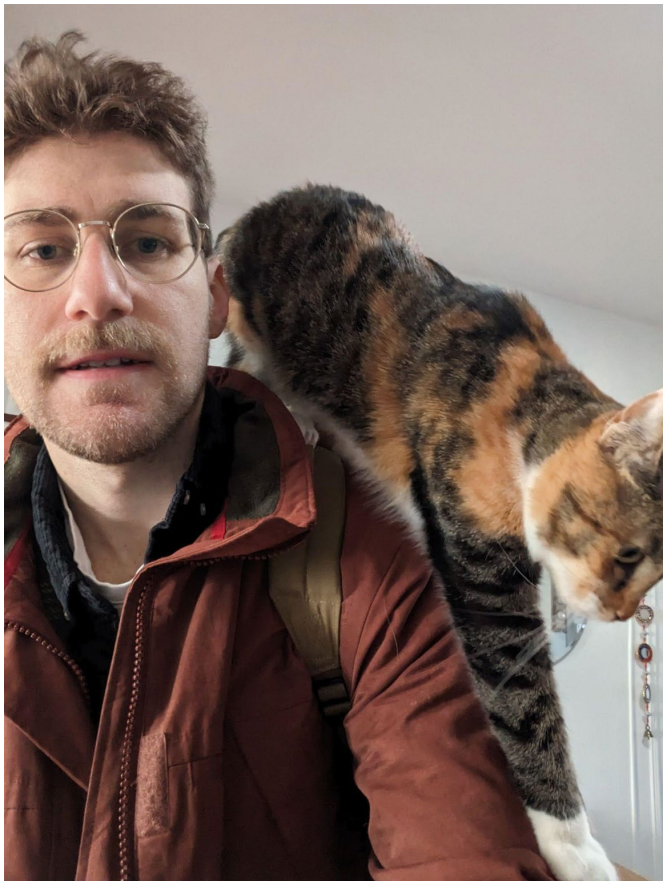
Thank You!

River Runner

River Runner

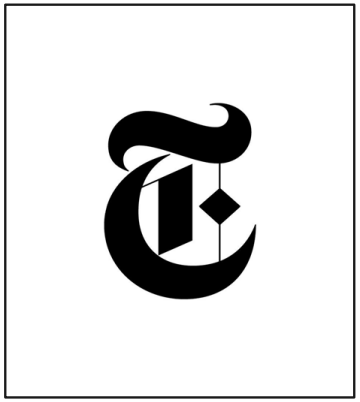
Places & Spaces Macroscope

Hi, I’m Sam!



Work

- Data and graphics journalist at the FT on our visual storytelling team
- Cover a wide range of topics (science, politics, international coverage)
- Previously worked at the New York Times (Interactive News Team)

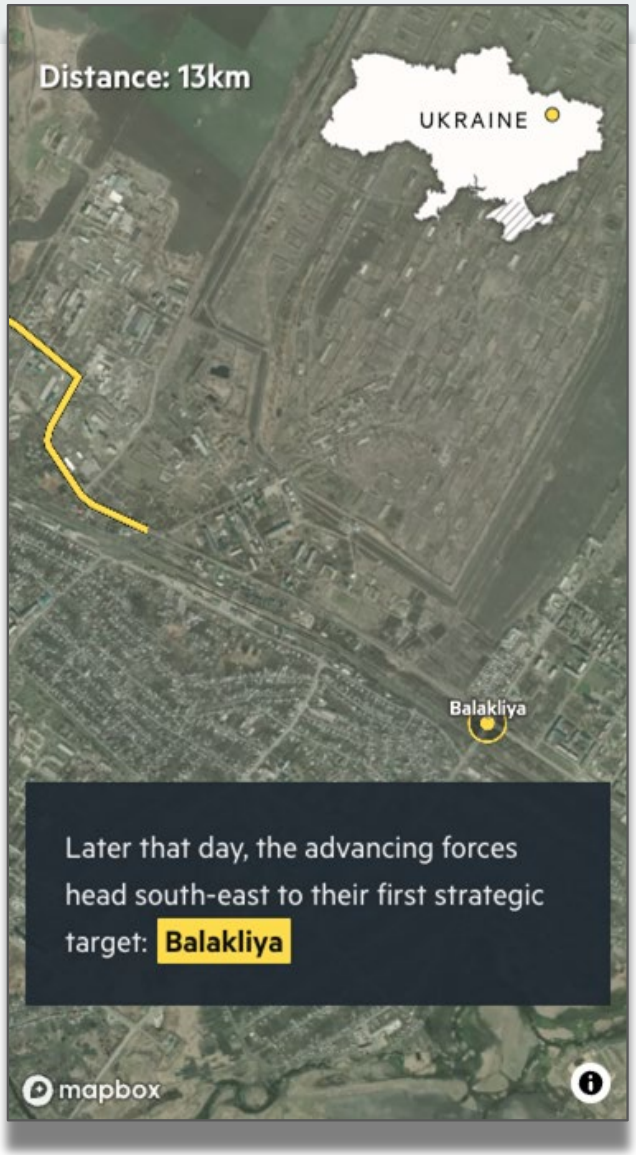


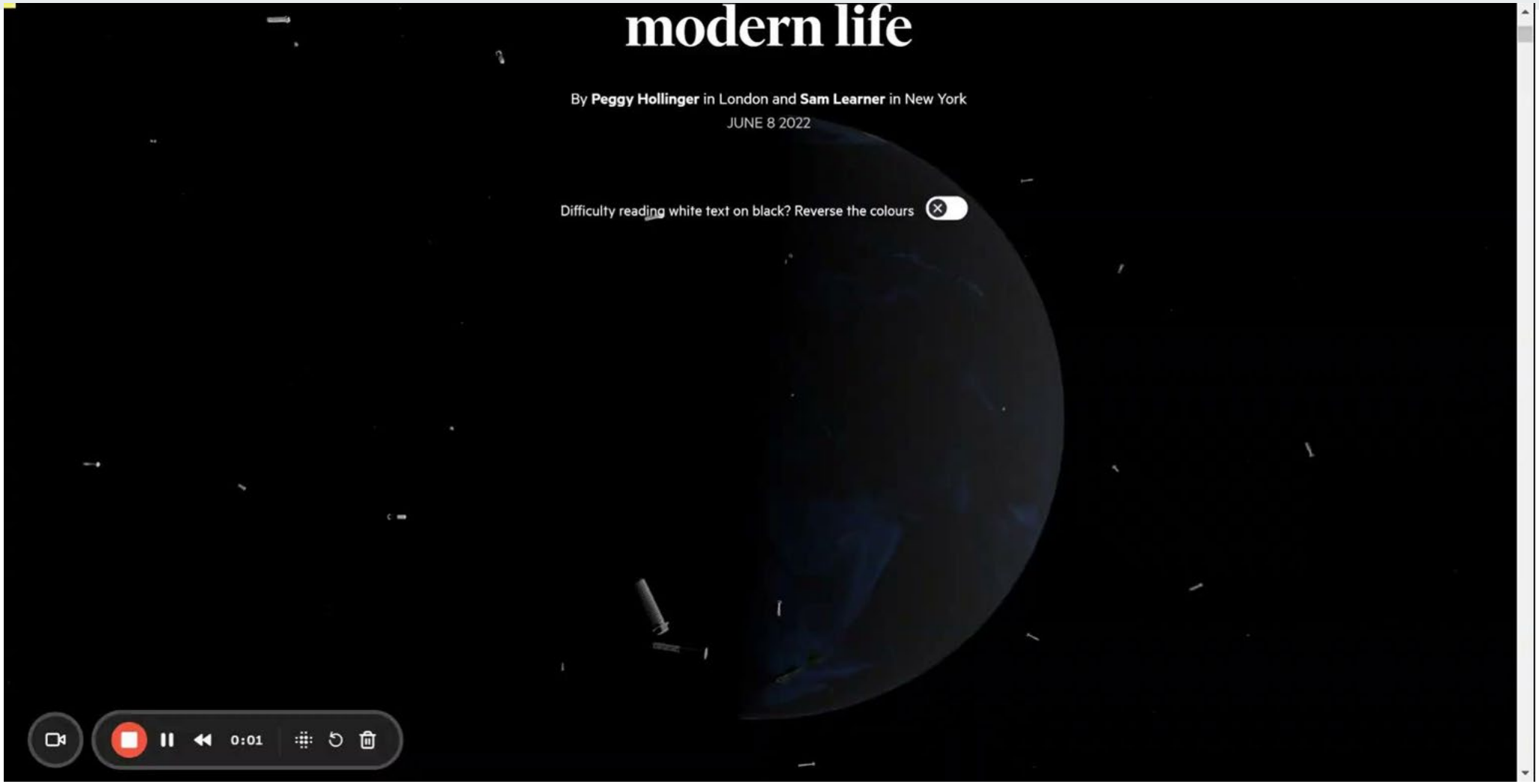
“Visual storytelling”

- Work on stories that are better told in a visual format, rather than through words alone
- Incorporates:
  - Reporting/writing
  - Data gathering
  - Graphics/mapping
  - Web development/design


FINANCIAL TIMES
A lightning assault by Ukrainian forces in the first half of September decimated Russia's defences in north-eastern Ukraine and saw Kyiv reclaim as much territory in a few days as Moscow had captured in months.
SCROLL
© TikTok user Lubov

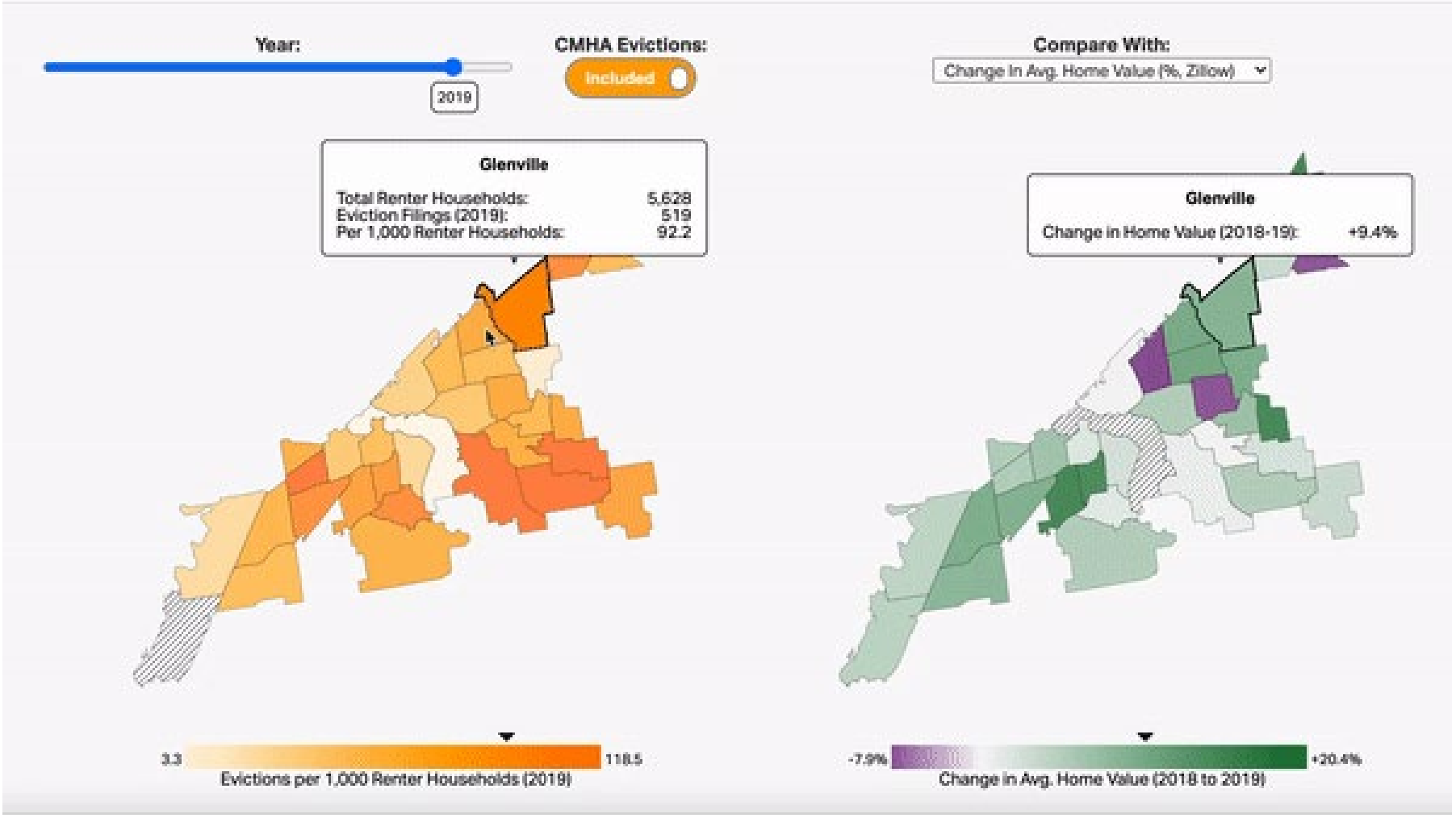

5 Sept 2022
UKRAINE
Sumy
Kharkiv
Poltava
UKRAINE
Kremenchuk
Kramatorsk
Dnipro
Donetsk
Kherson
Russia responded by moving a significant amount of its forces from the north-east down to Kherson.
mapbox


Distance: 13km
UKRAINE
Balakliya
Later that day, the advancing forces head south-east to their first strategic target: Balakliya
mapbox


modern life
By Peggy Hollinger in London and Sam Learner in New York
JUNE 8 2022
Difficulty reading white text on black? Reverse the colours
0:01

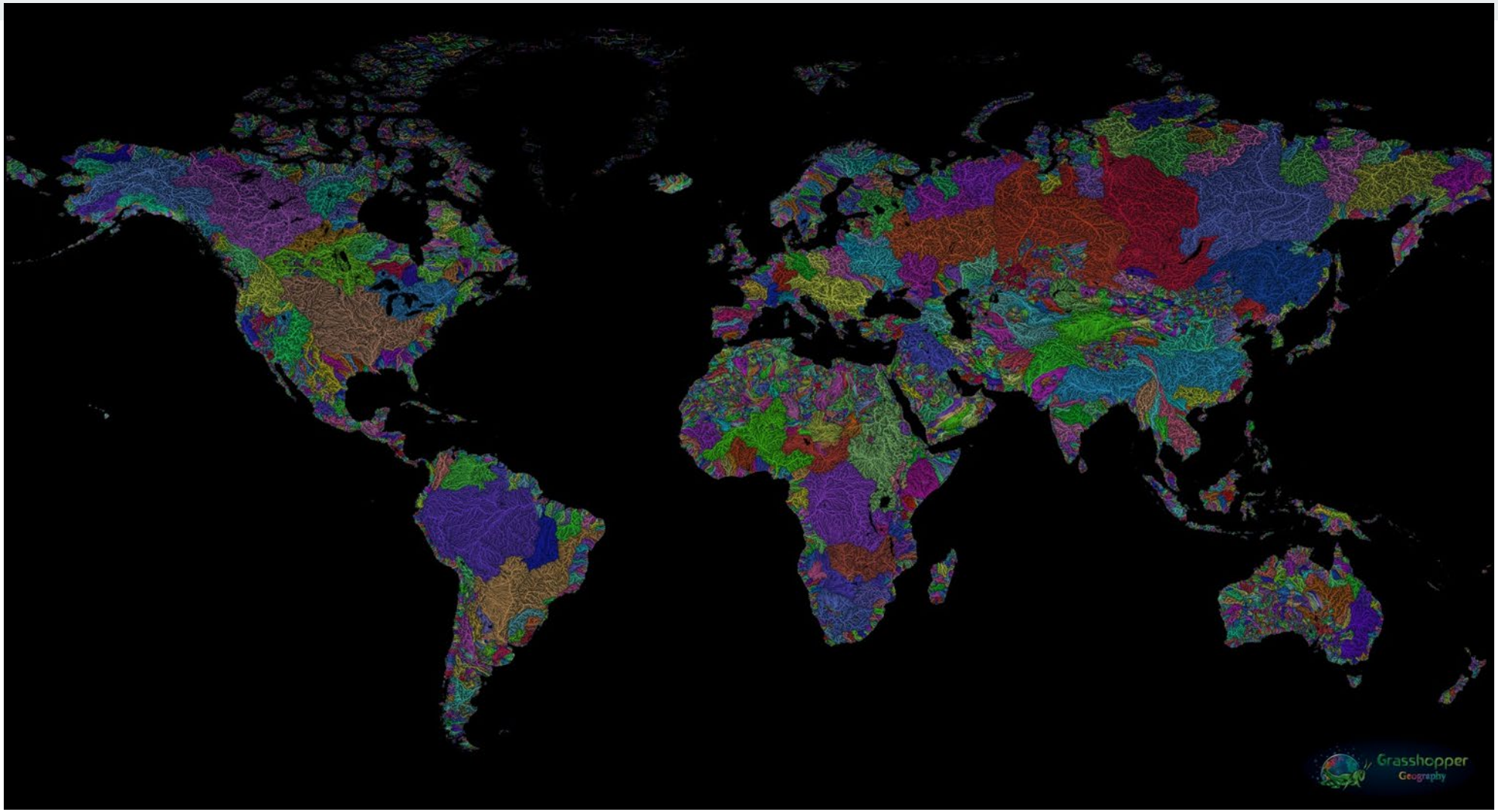
Open-source data projects

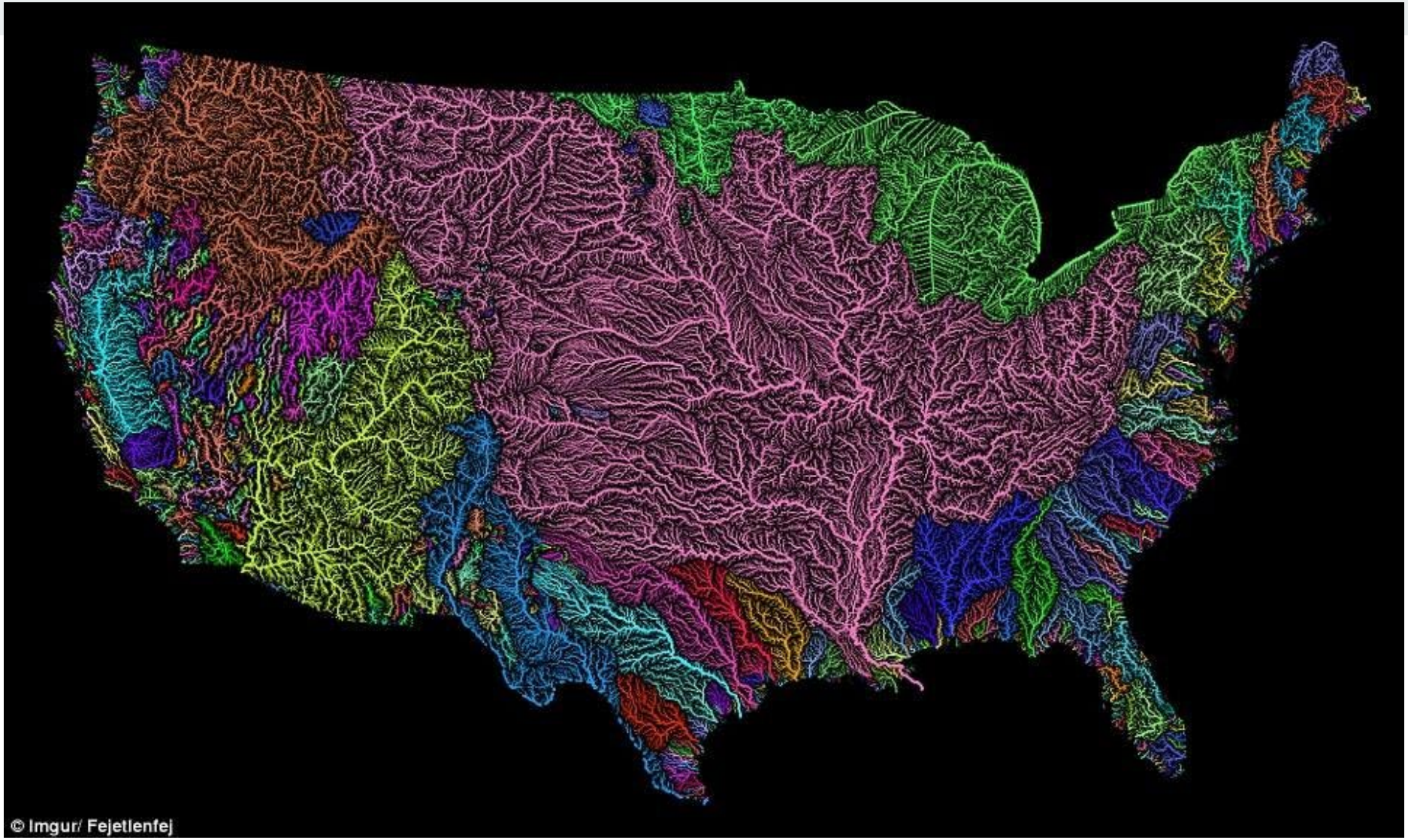
- Goal of making public/civic data accessible
- Projects generally focused on cities
- Data that is accessible, but “under-exposed” or that is newly-compiled

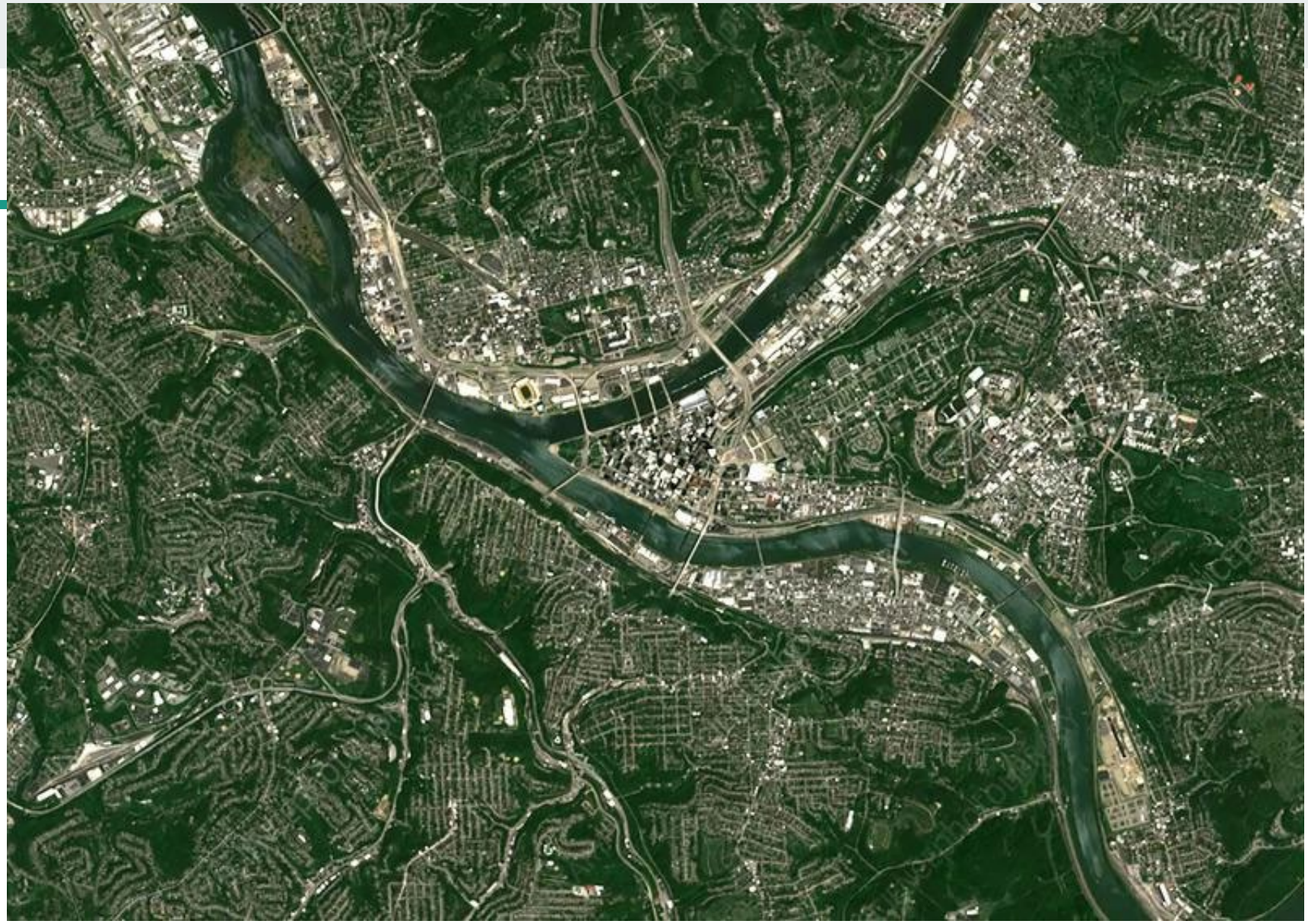

Year:
2019
CMHA Evictions:
Included
Glenville
Total Renter Households: 5,628
Eviction Filings (2019): 519
Per 1,000 Renter Households: 92.2
3.3
118.5
Evictions per 1,000 Renter Households (2019)
Compare With:
Change in Avg. Home Value (%, Zillow)
Glenville
Change in Home Value (2018-19): +9.4%
-7.9%
+20.4%
Change in Avg. Home Value (2018 to 2019)

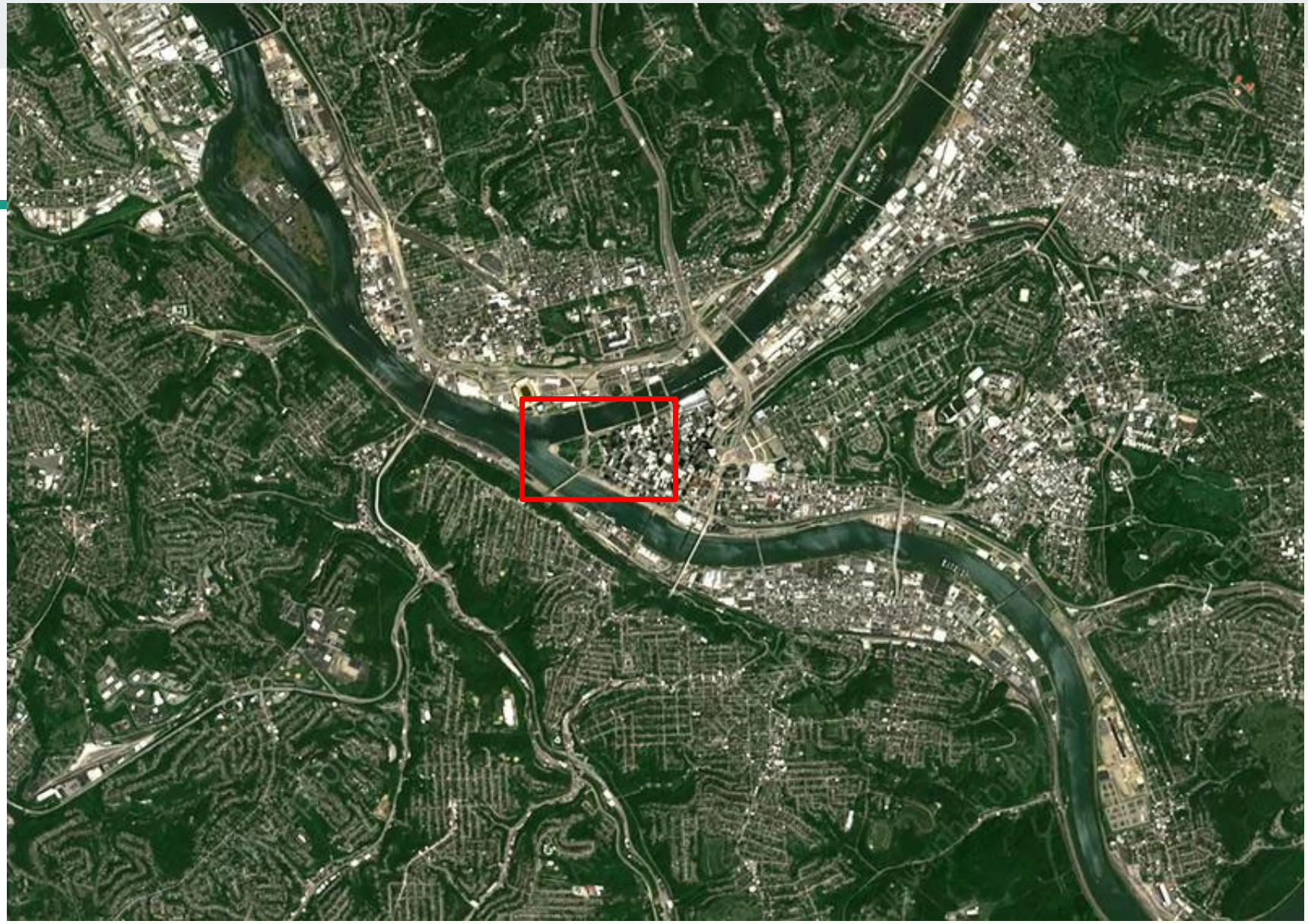
River Runner

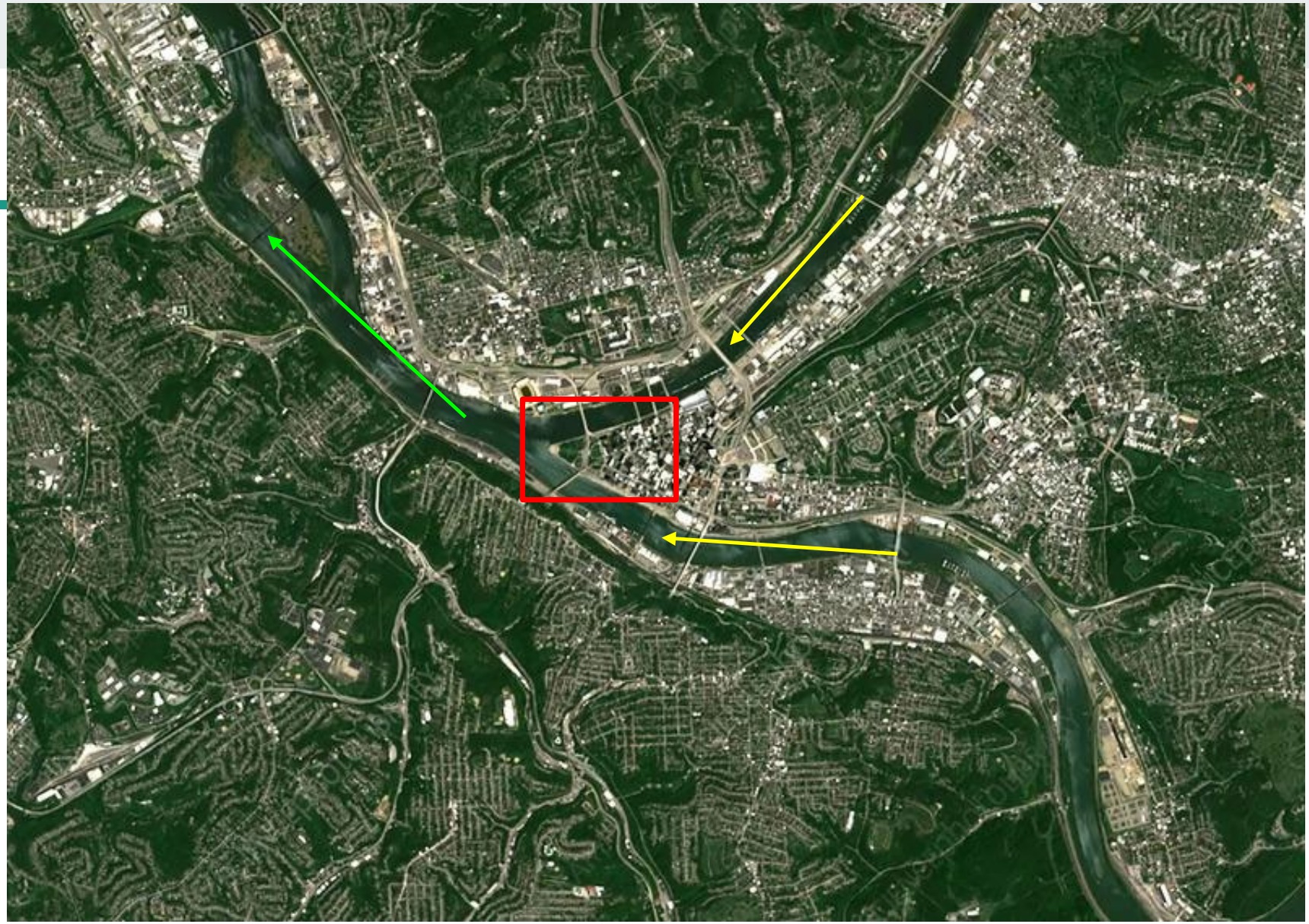
- Visualizes downstream flow paths through watersheds from anywhere on earth
    - 2020: Freelance project based on USGS data (US only)
    - 2022: Global coverage
- Goal of communicating the interconnectedness of watersheds (“what you do impacts those downstream of you”)


Grasshopper
Geography


© Imgur/ Fejetlenfej







Data

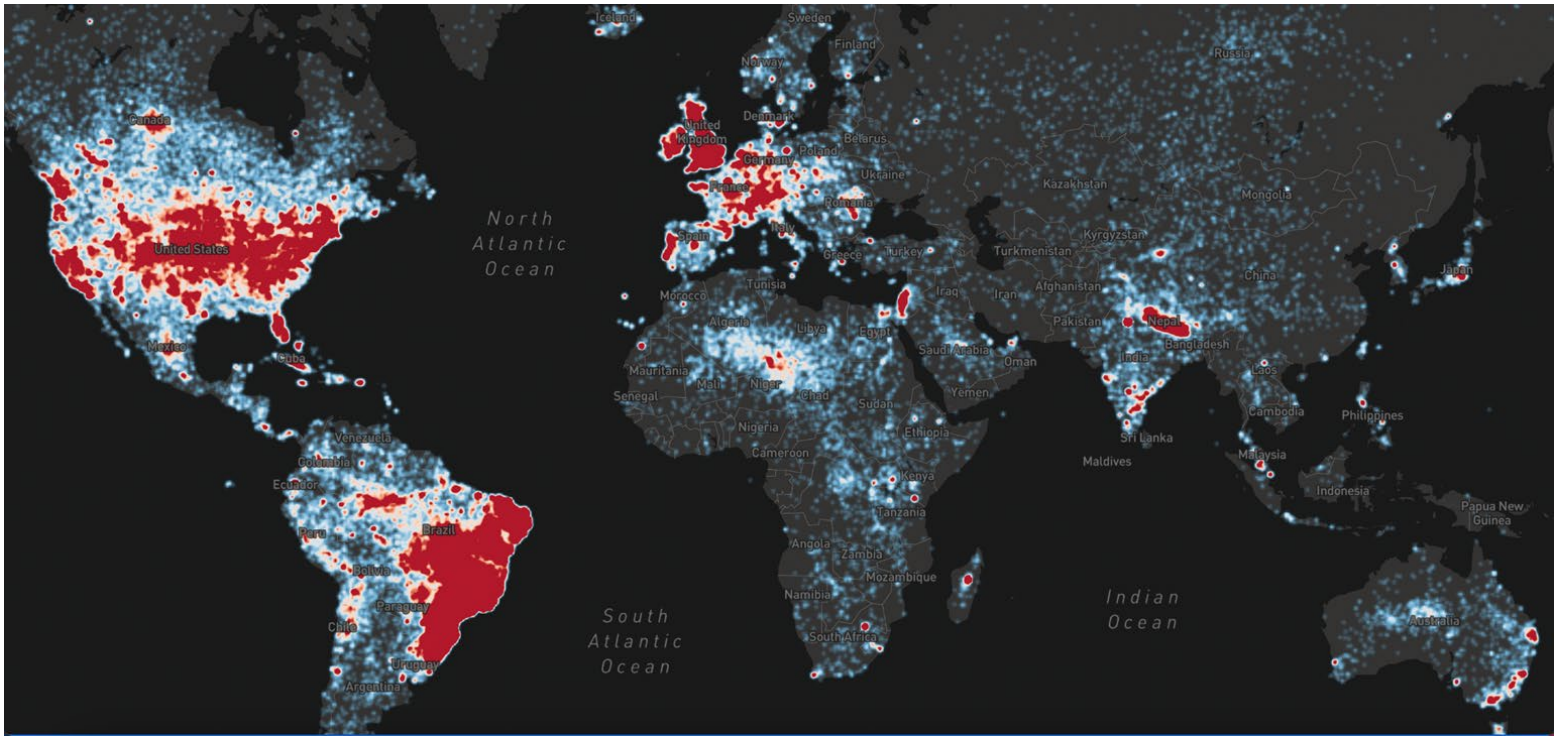
- Original version used USGS NLDI
- Global version was developed with some people from USGS/Internet of Water, based on MERIT Basins data

Webpage

- Mapbox
- Svelte.js
- Turf.js
- Lots of small UI/UX challenges

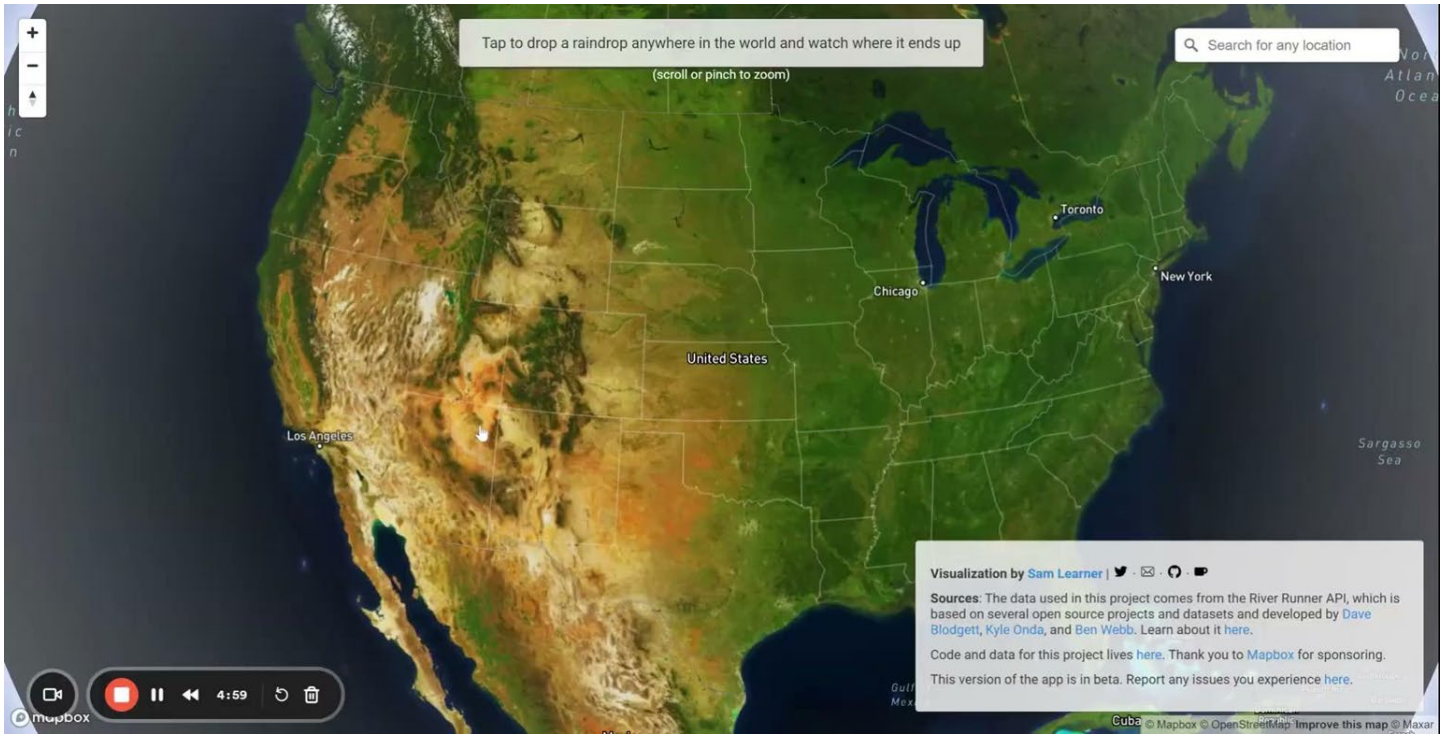

Finding downstream path from Galtür, Tyrol, Austria
Deutschland
France
Česko
Slovensko
Magyarország
Slovenija
Hrvatska
România
Moldova
Україна
Black Sea
Mediterranean Sea
Malta
Ελλάδα
Visualization by Sam Learner |
Sources: The data used in this project comes from the River Runner API, which is based on several open source projects and datasets and developed by Dave Blodgett, Kyle Onda, and Ben Webb. Learn about it here.
Code and data for this project lives here. Thank you to Mapbox for sponsoring.
This version of the app is in beta. Report any issues you experience here.
mapbox

Where people searched

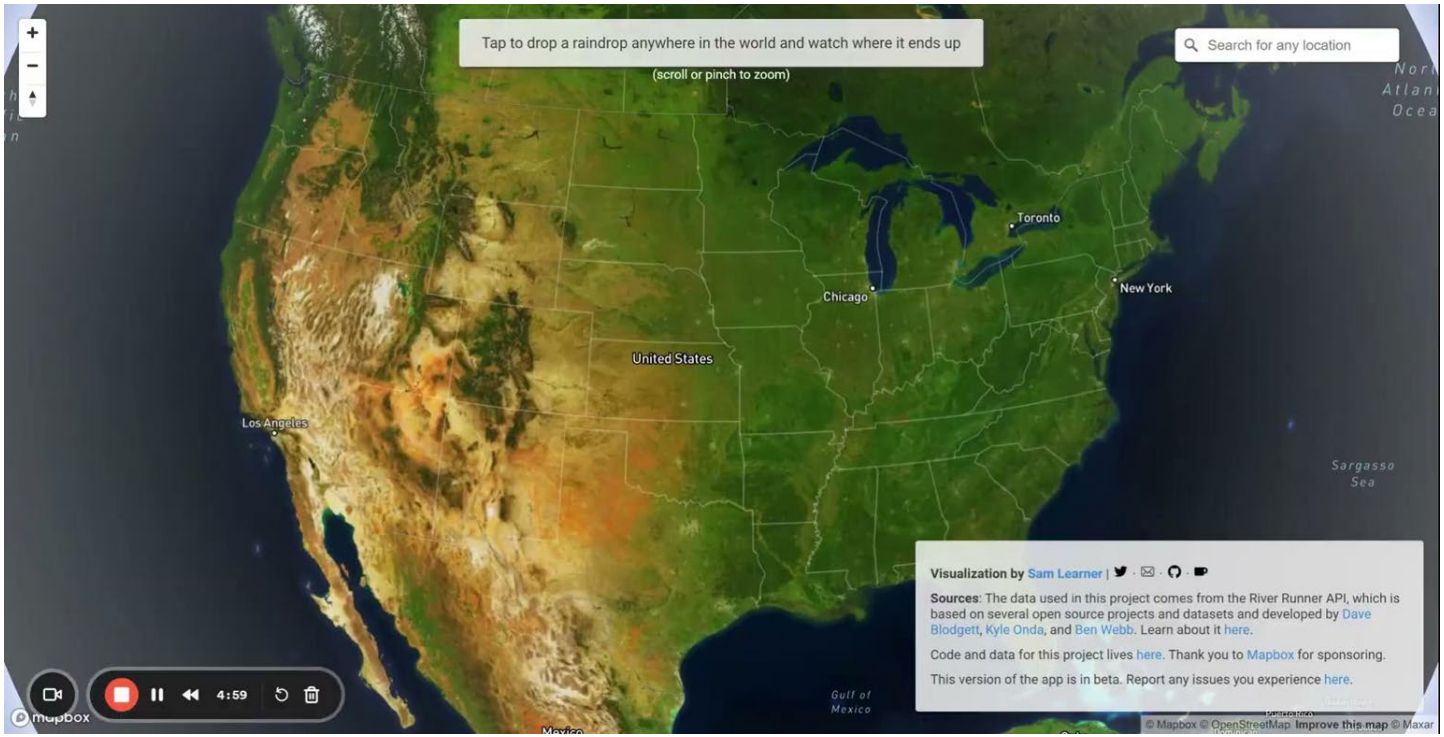


Tips for using the tool

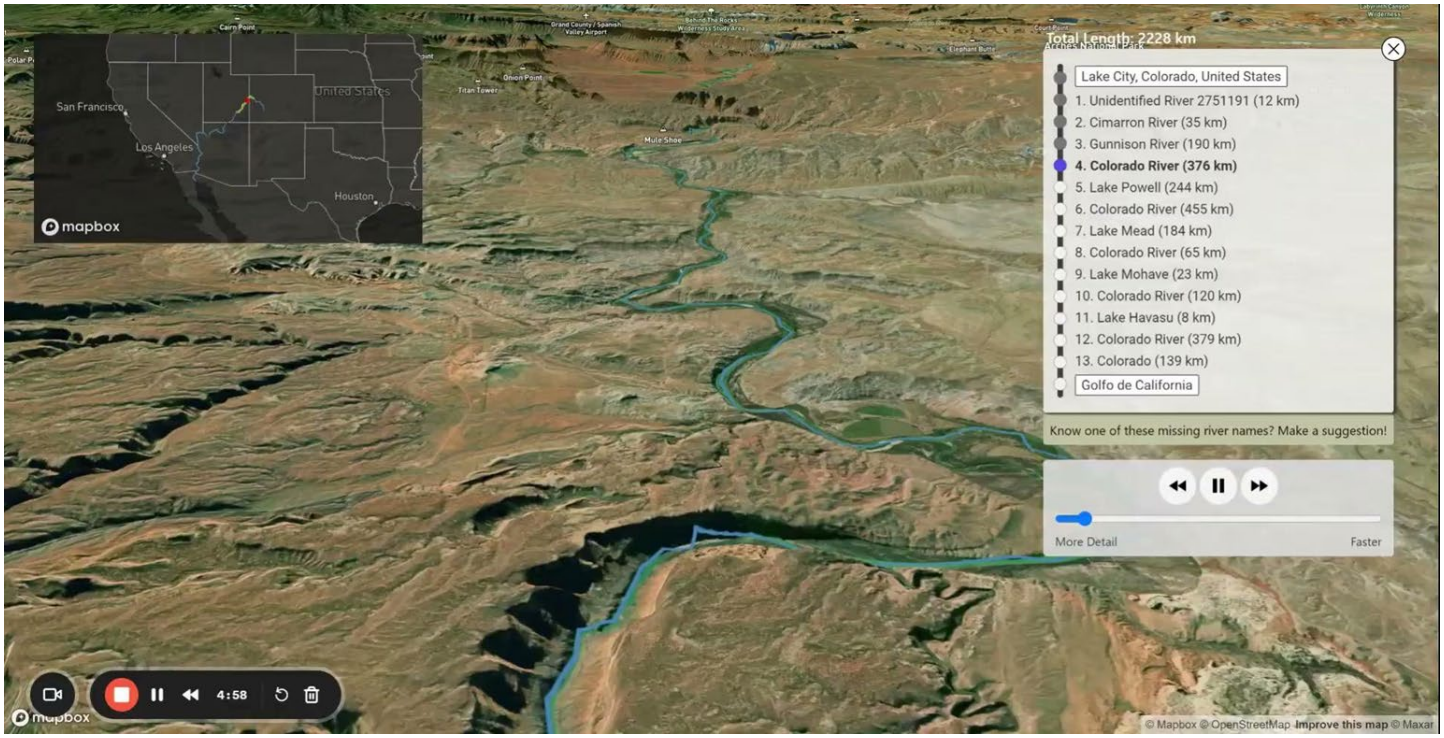
Start by clicking



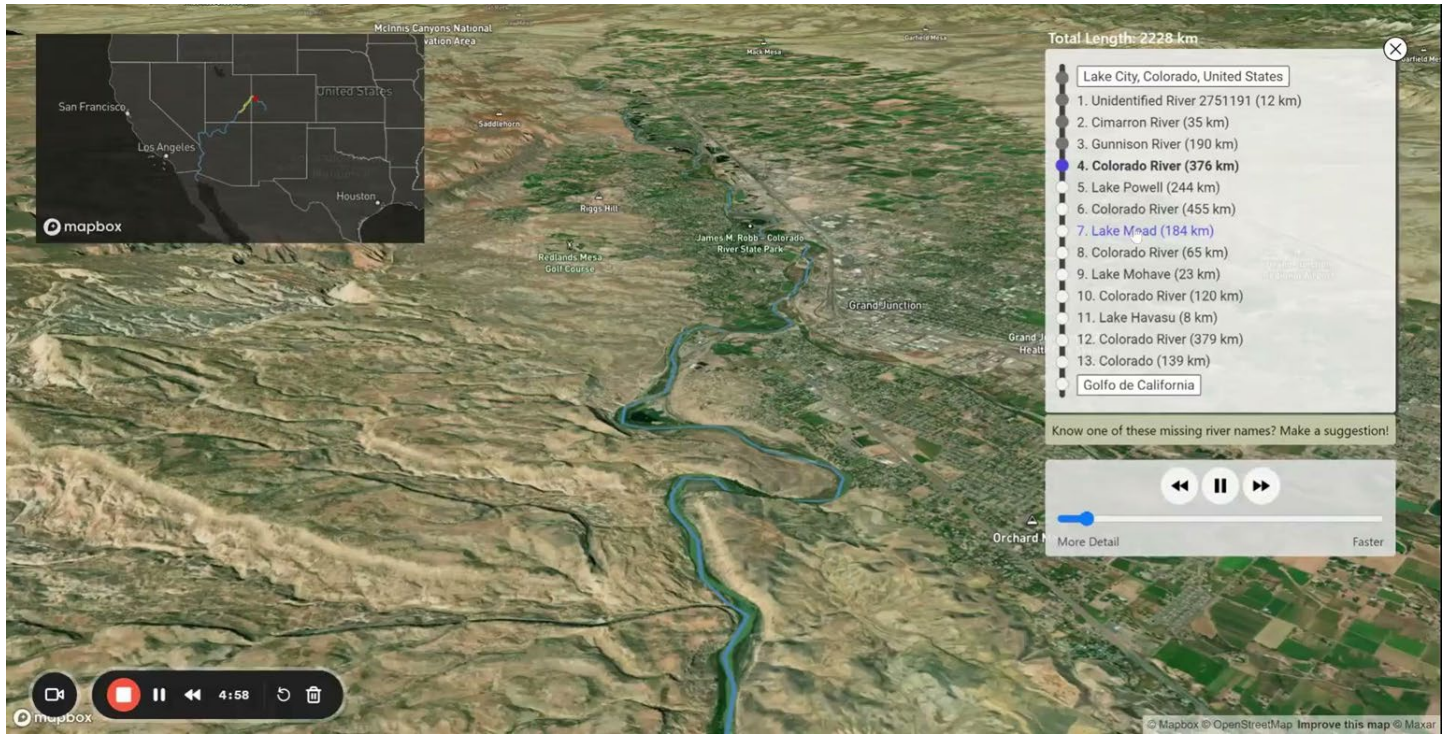
...or by searching



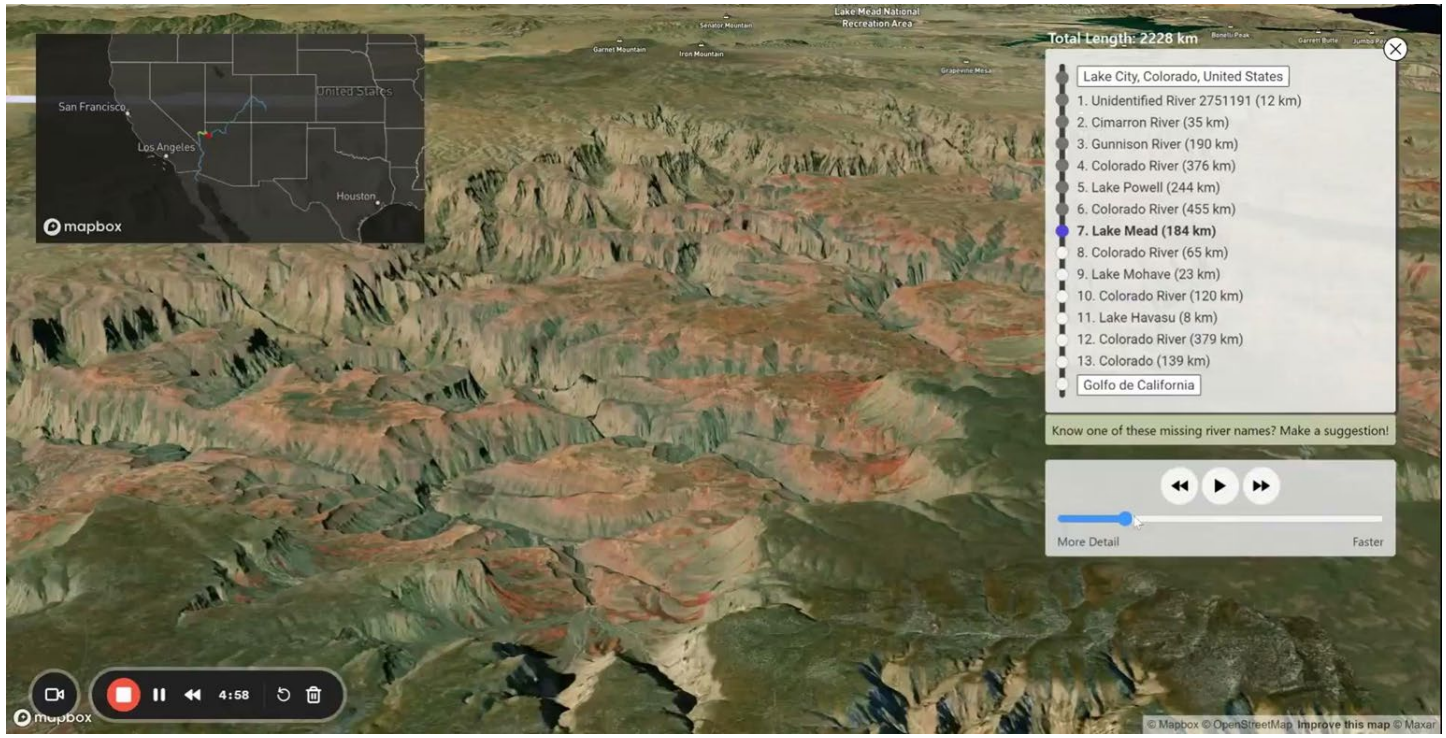
Playback controls



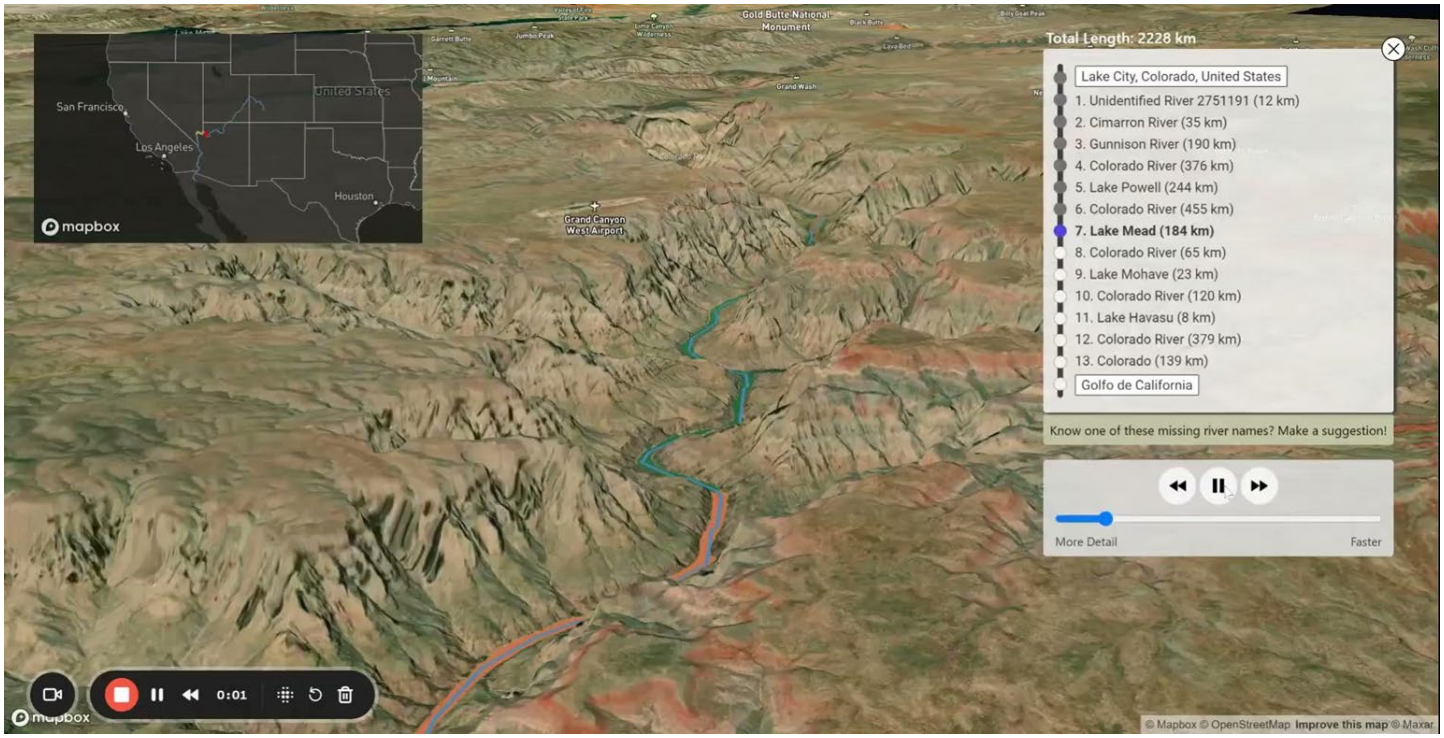
Jump to different water features



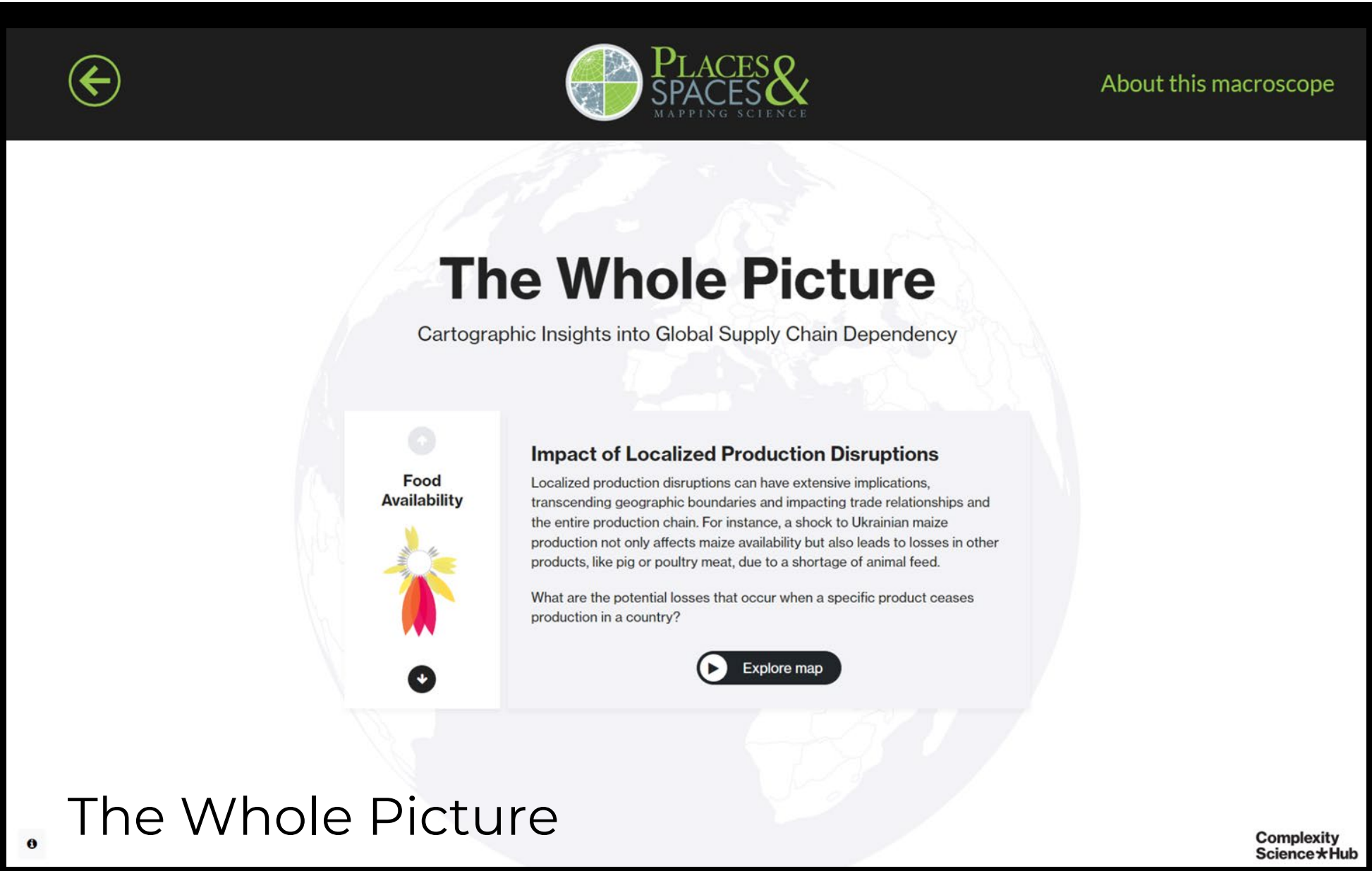
Control zoom/speed



Exit to overview



Some favorite paths



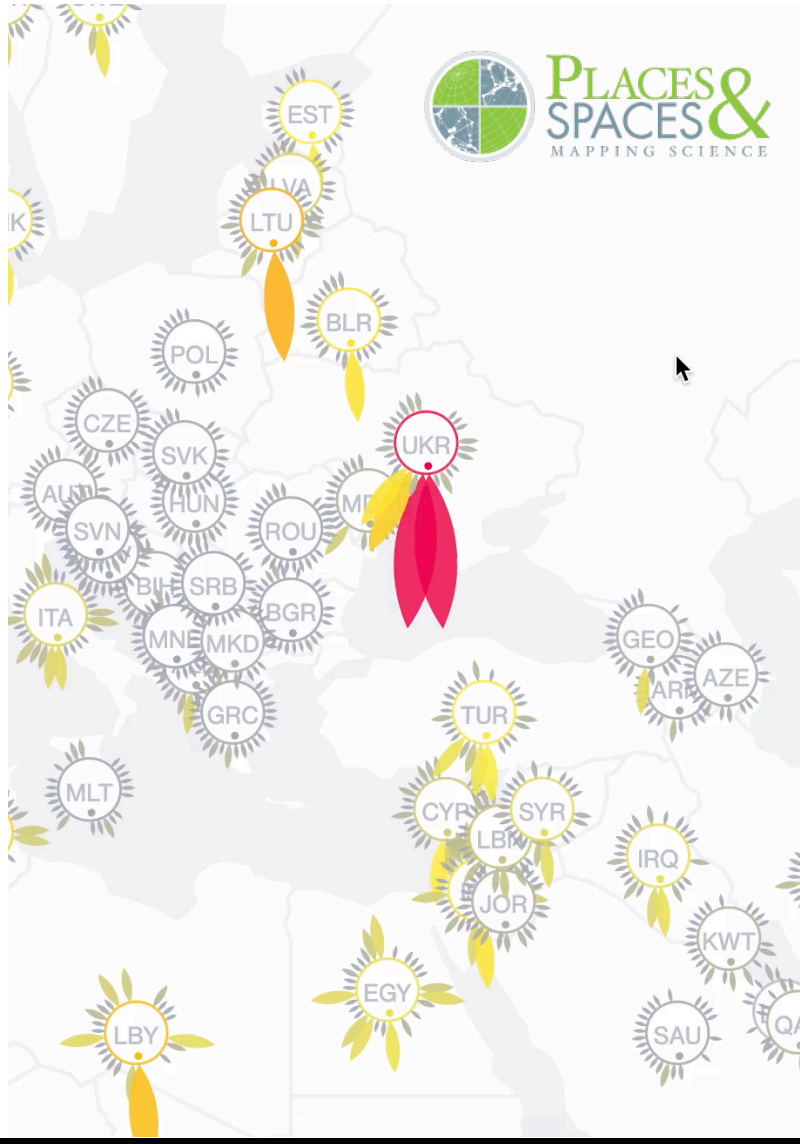
The Whole Picture

Complexity Science Hub

The Whole Picture

Liuhuaying Yang

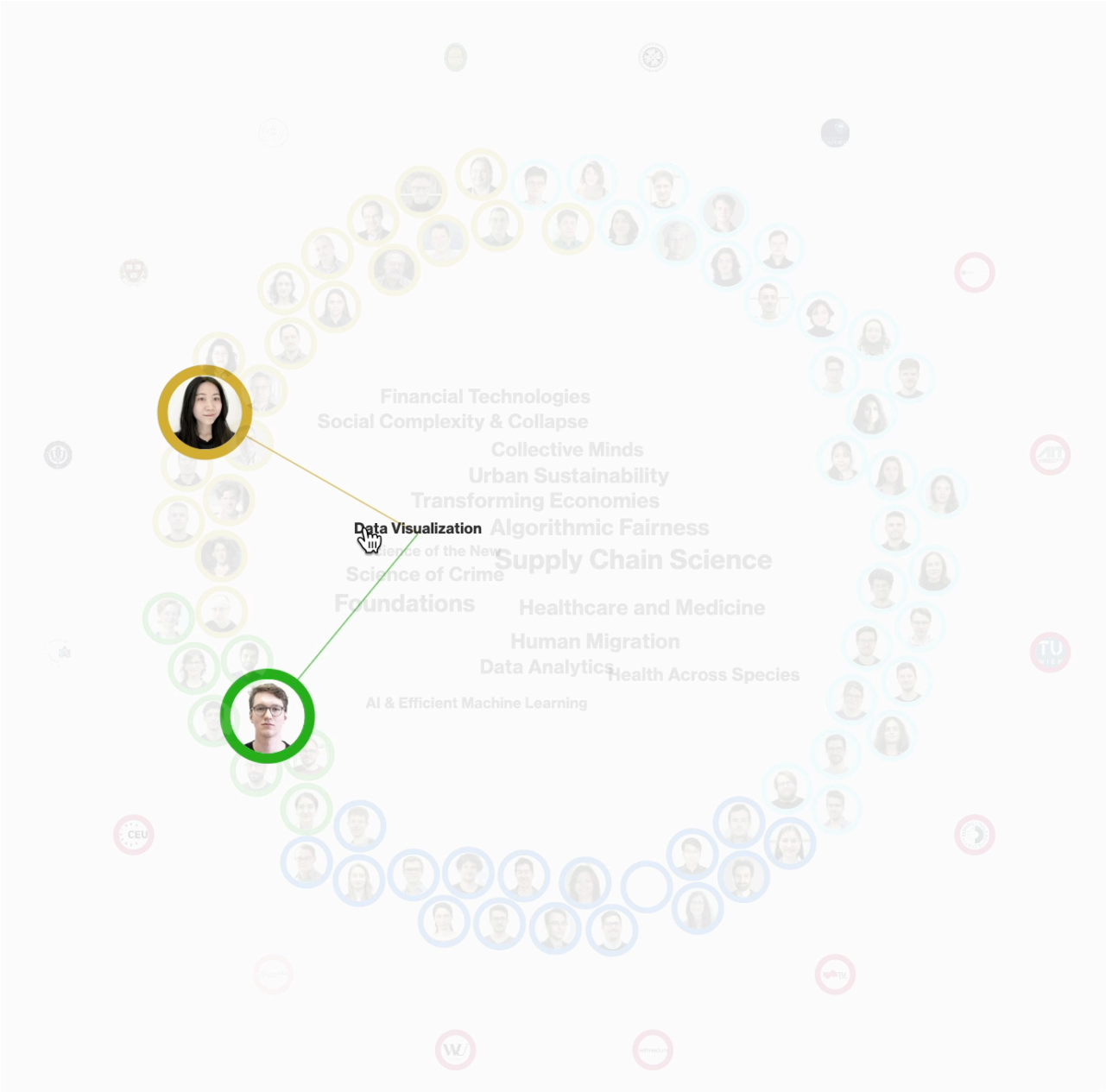
Data visualization practitioner



Liuhuaying Yang

Lead visualization team at

Complexity Science★Hub



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CSH Visuals

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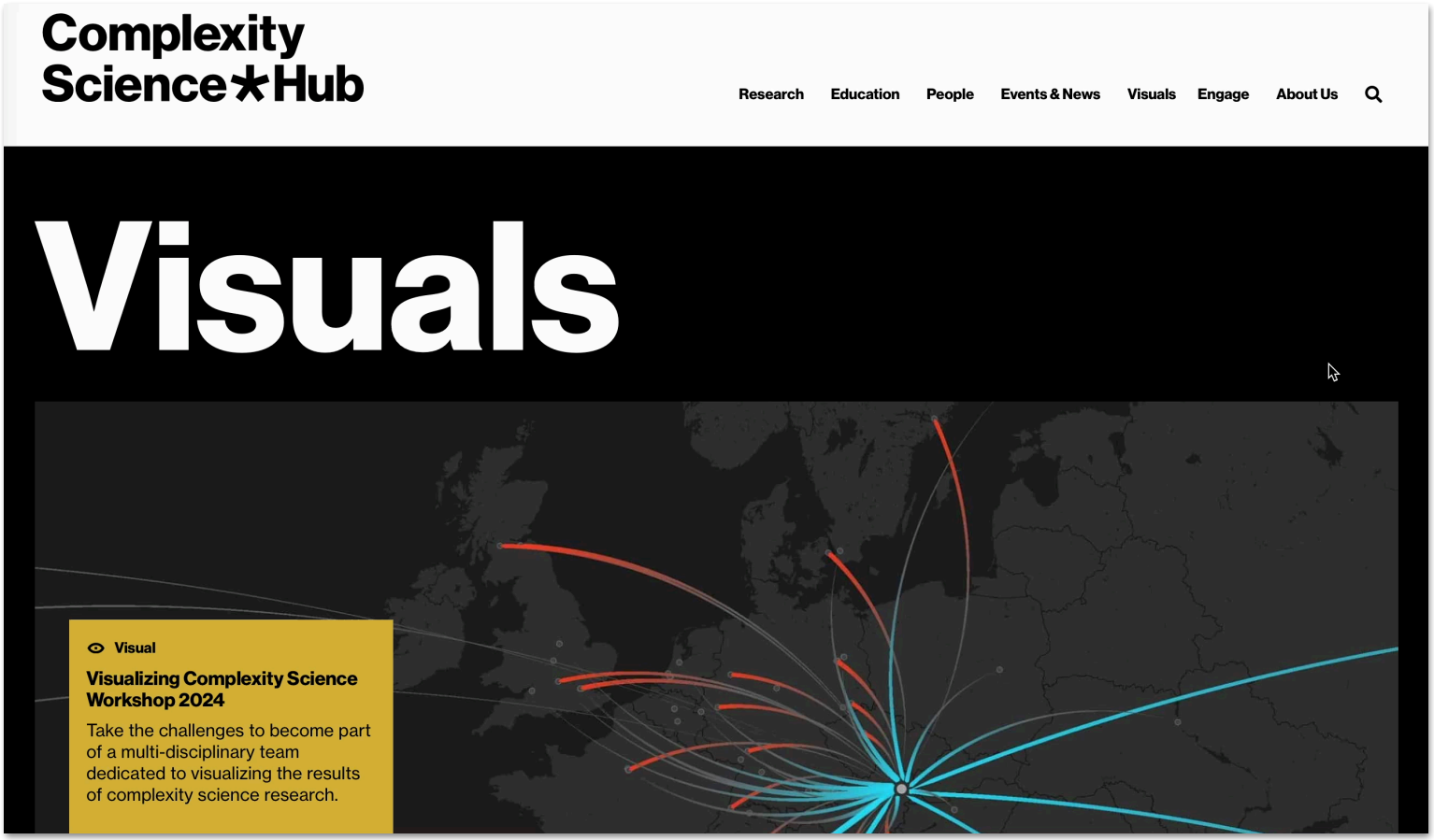
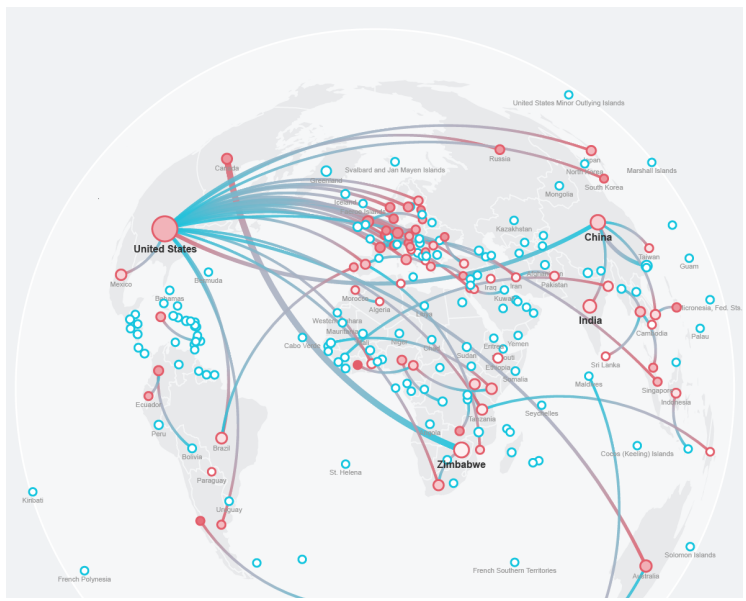
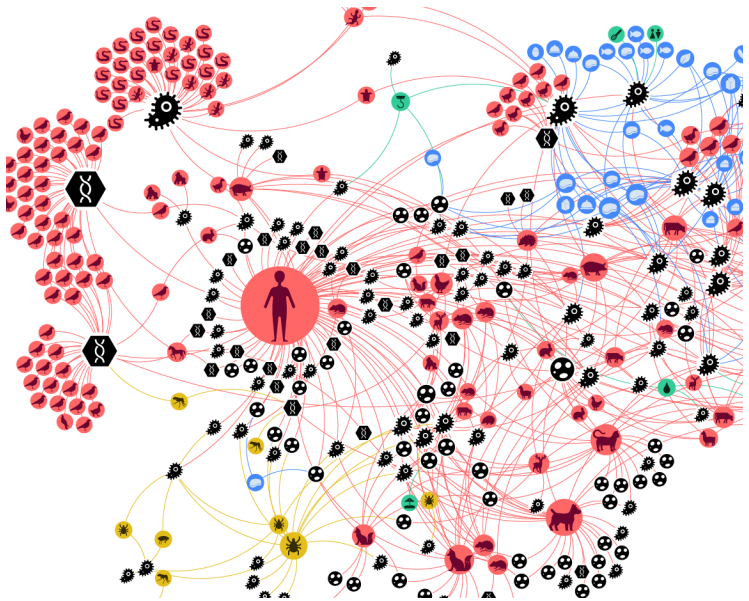
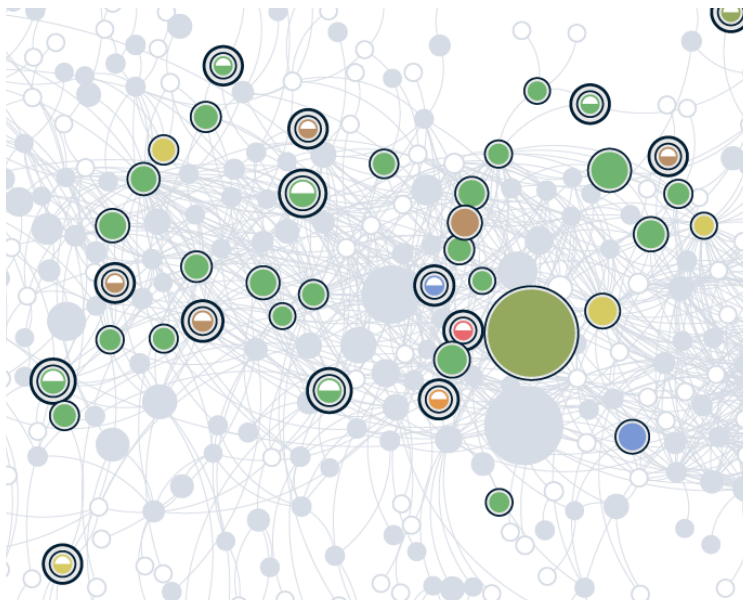
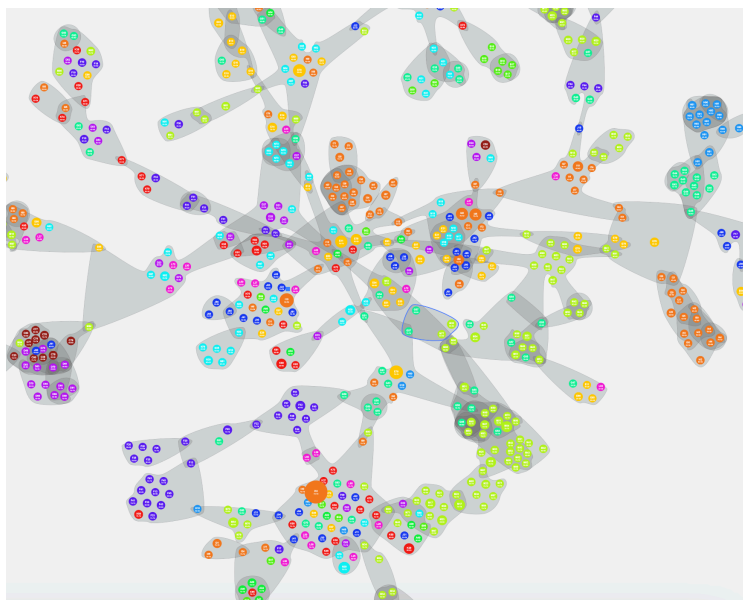


Visualizing complex systems









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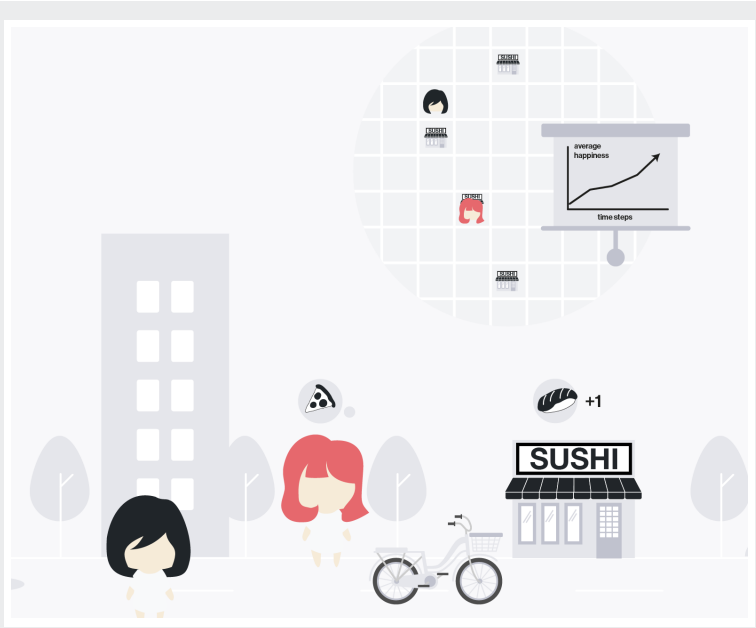
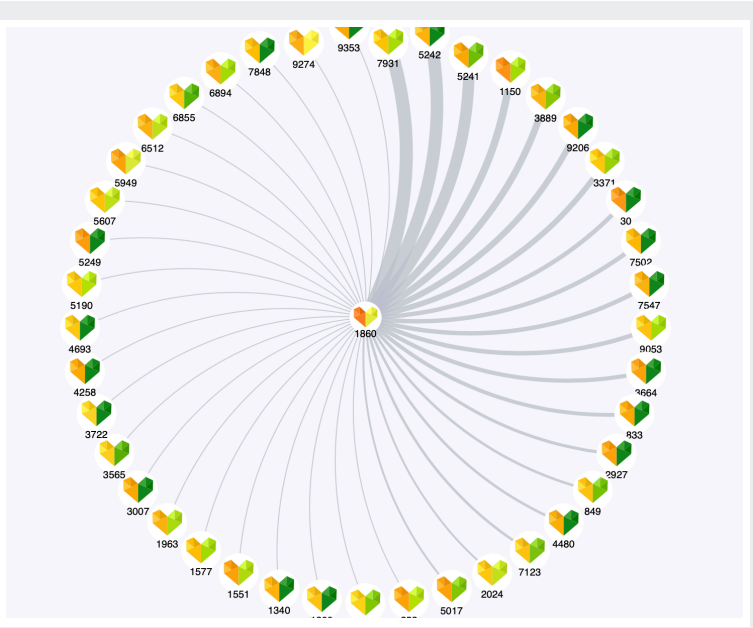
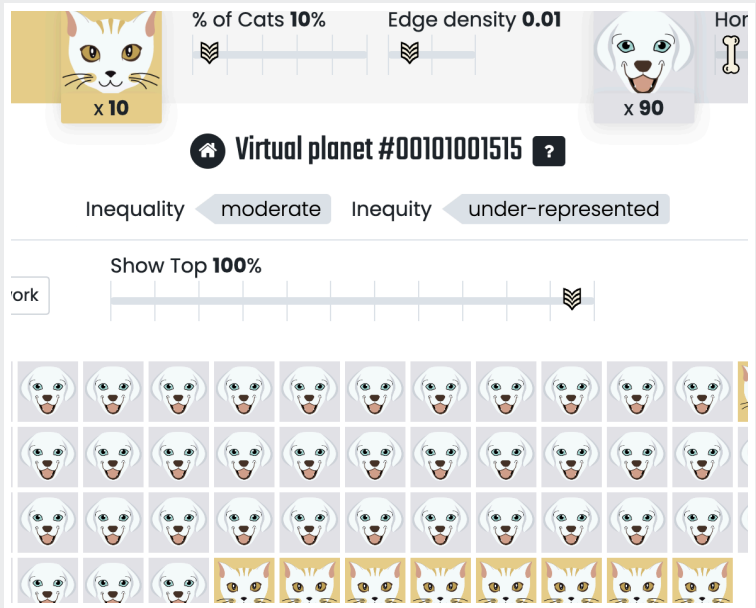
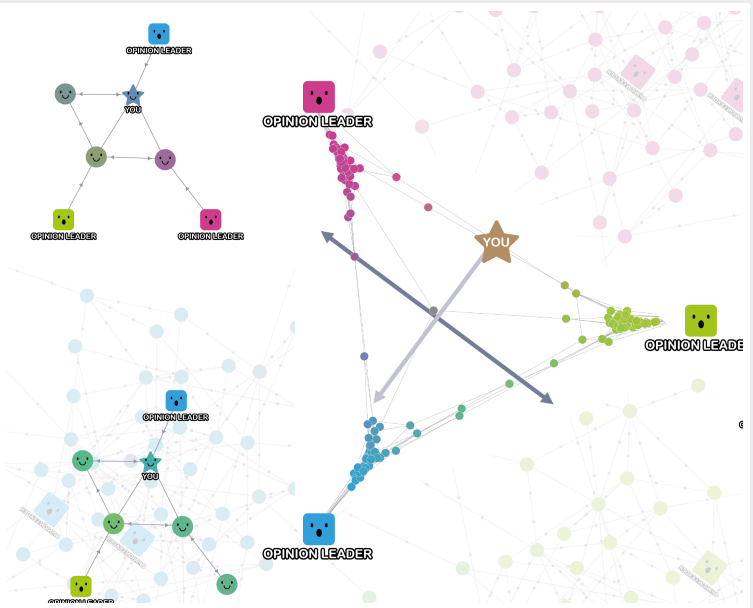
Explaining complex knowledge









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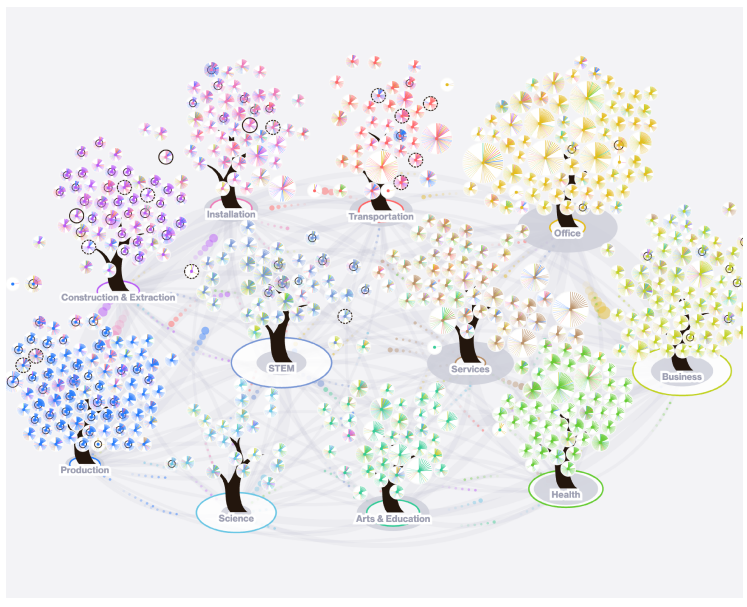
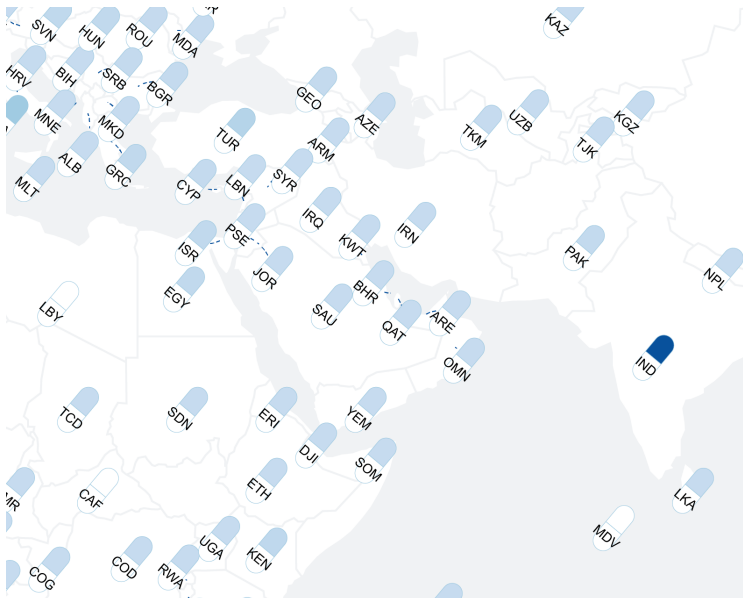
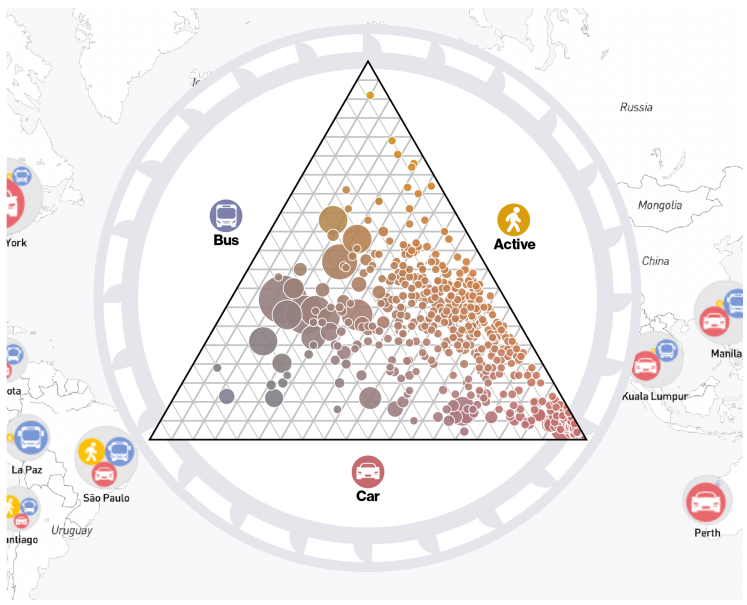
Visualizing model outputs







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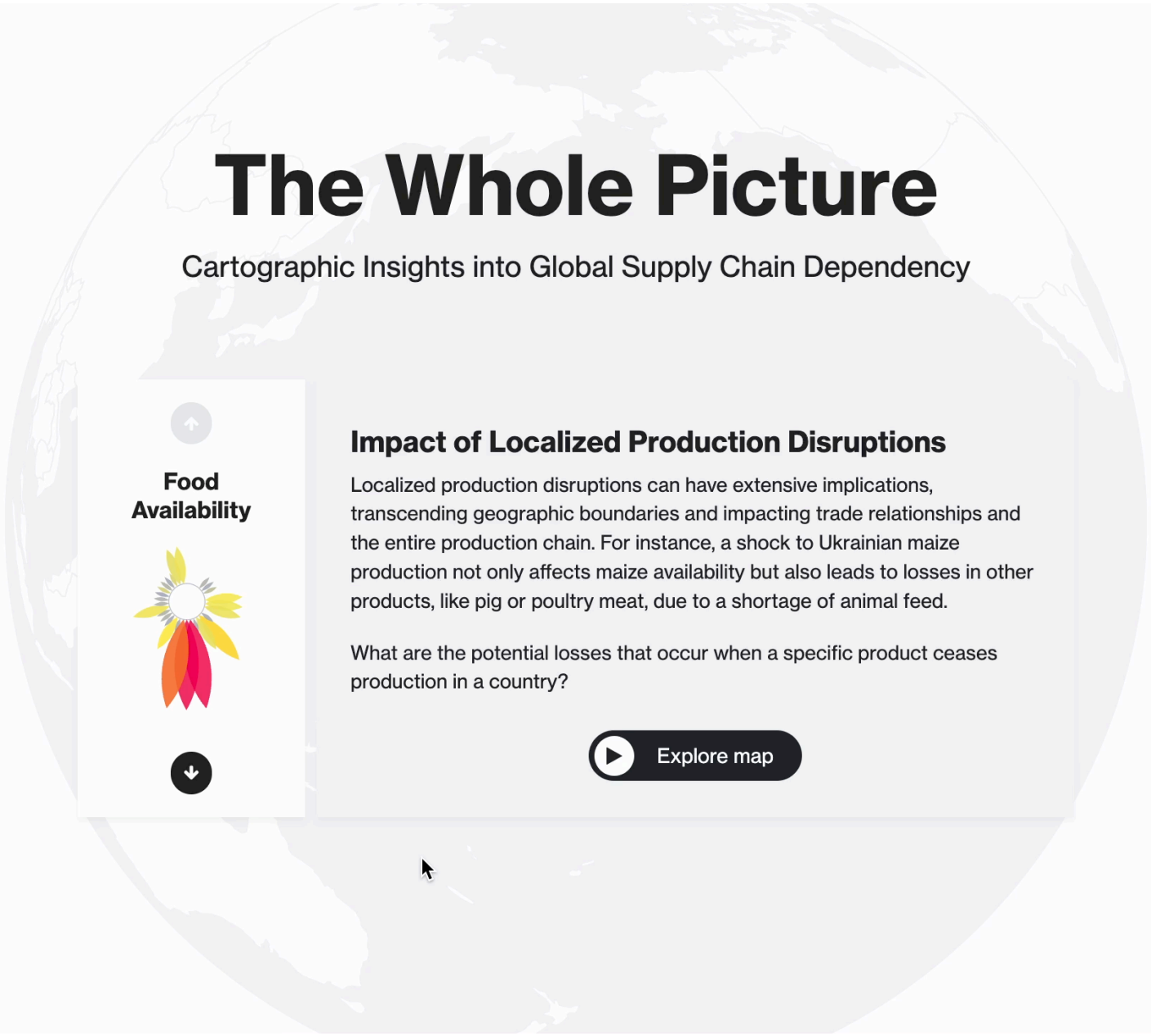
The Whole Picture
Cartographic Insights into Global Supply Chain Dependency

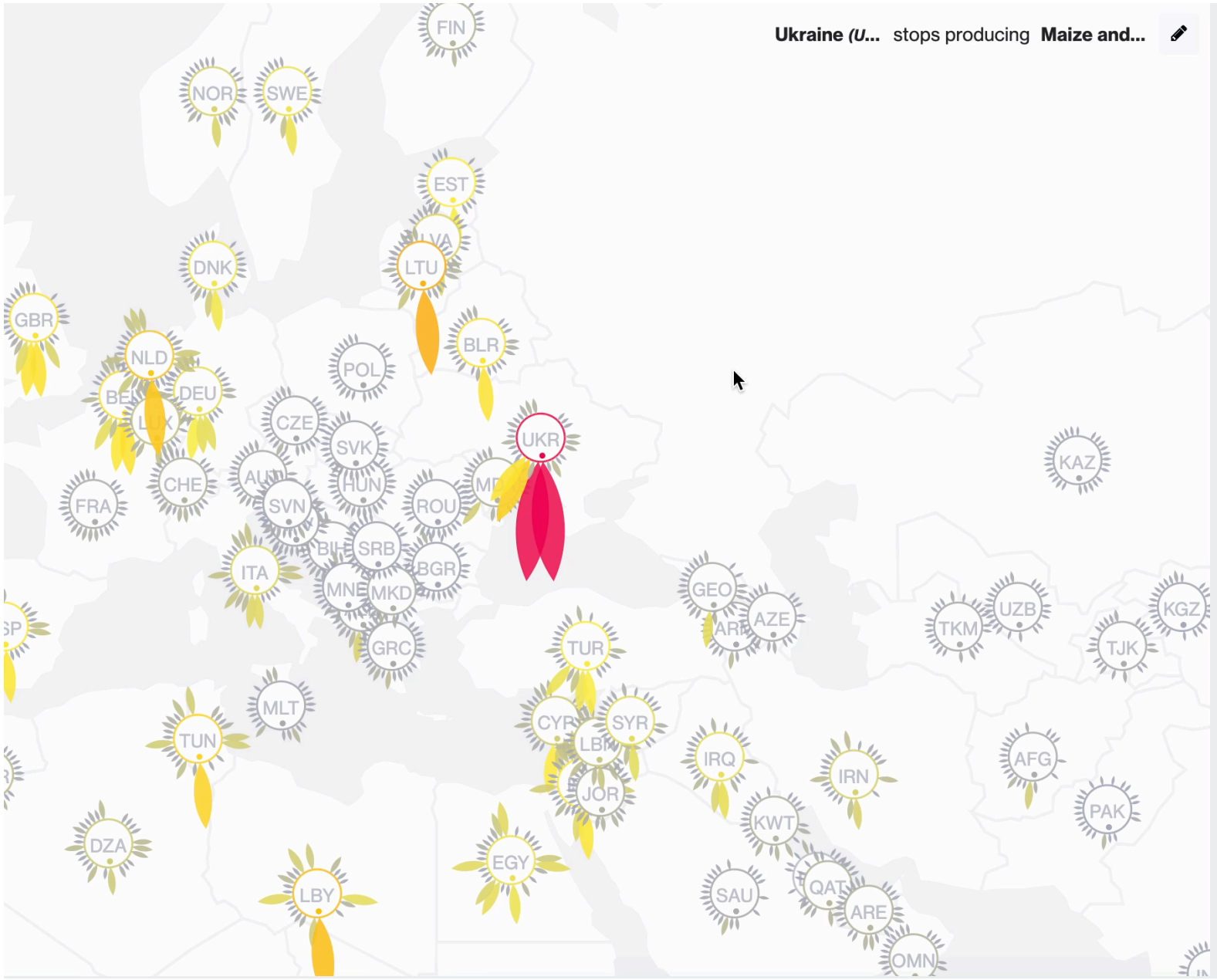


Places & Spaces: Mapping Science

Complexity Science★Hub

The Whole Picture

Food supply shocks

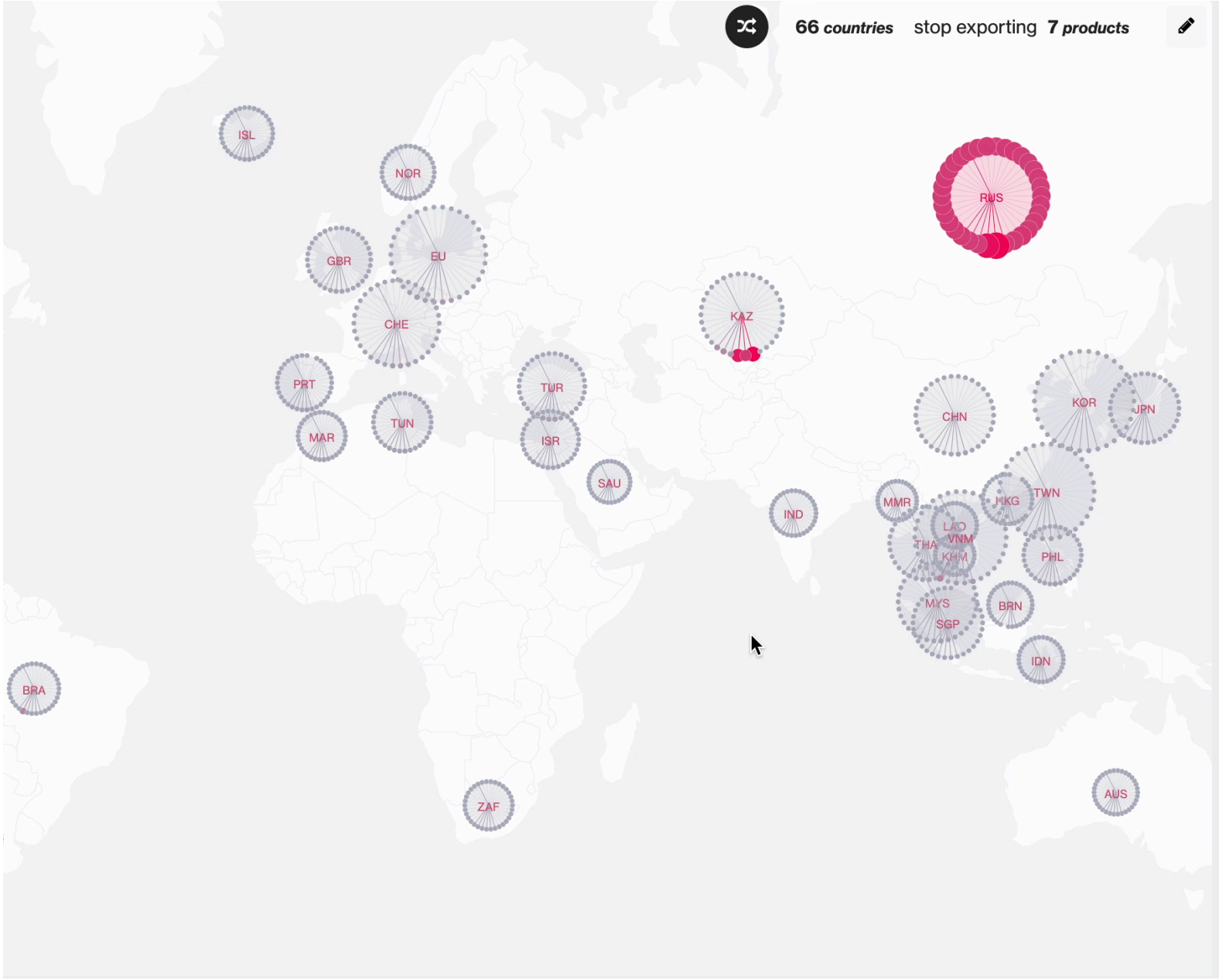


Places & Spaces: Mapping Science

Complexity Science★Hub

The Whole Picture

Sanctions on Russia



PLACES & SPACES
MAPPING SCIENCE

CSH Policy Brief

Policy Brief 04.03.2022

How the war in Ukraine might affect global food supply

M. Laber, P. Klimek, T. Reisch, L. Yang, S. Thurner

Supply Chain Science

Policy Brief 15.03.2022

Shocking Russia | How will economic sanctions affect the Russian economy, how will an oil and gas embargo play out, and how are sanction-imposing countries affected on the various industry sectors?

T. Reisch, L. Yang, J. Hurt, S. Thurner

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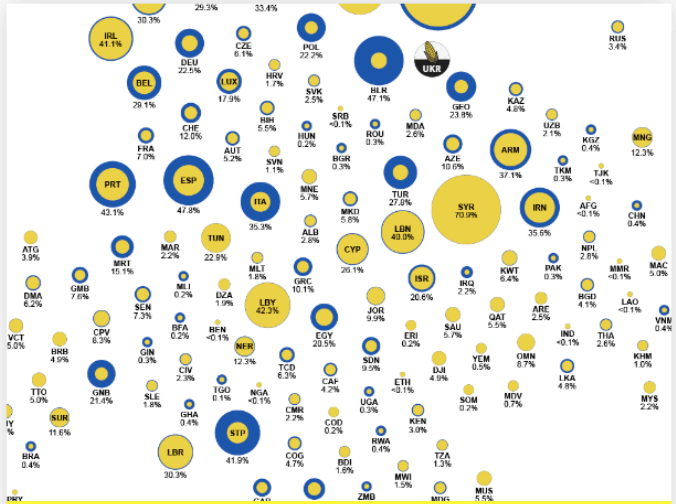


Visual

Supply Shocks in Ukraine

Show direct and indirect effects of a 100% supply shock of maize and sunflower seed oil on a stylized world map.

Supply Chain Science

Paper 12.10.2023

Shock propagation from the Russia–Ukraine conflict on international multilayer food production network determines global food availability

M. Laber, P. Klimek, M. Bruckner, L. Yang, S. Thurner

Nature Food

Supply Chain Science

Visual

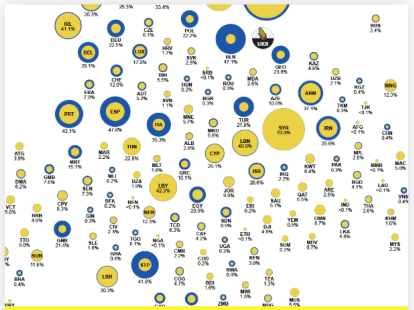
Food Supply Shock Explorer

Explore which food products are lost and which countries are affected most severely when a specific supplier stops to produce a single food product.

Supply Chain Science

Food supply shocks

2022 March
Policy brief version



Visual

Supply Shocks in Ukraine

Show direct and indirect effects of a 100% supply shock of maize and sunflower seed oil on a stylized world map.

Supply Chain Science

2022 September
Paper version

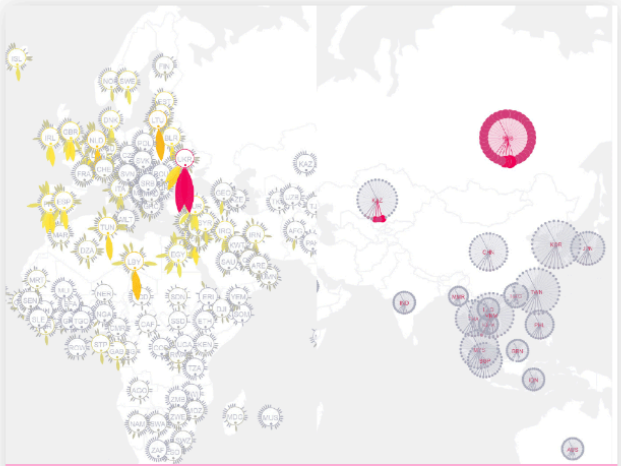
Visual

Food Supply Shock Explorer

Explore which food products are lost and which countries are affected most severely when a specific supplier stops to produce a single food product.

Supply Chain Science

2023 August
Whole picture version



Visual

The Whole Picture: Cartographic Insights into Global Supply Chain Dependency

Explore effects of global supply disruptions via interactive visualizations and maps.

Supply Chain Science

Policy Brief 15.03.2022

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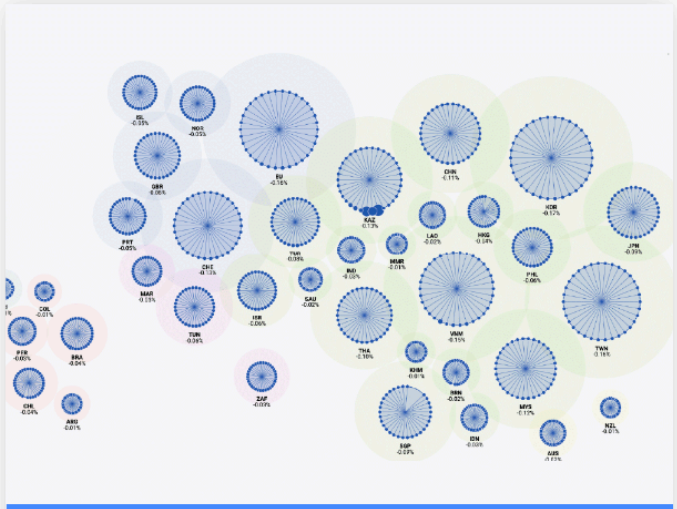
Supply Chain Science



Visual

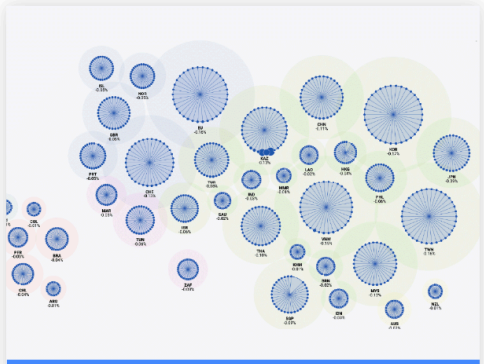
Sanctions on Russia

Explore the effects of international sanctions against Russia in response to the invasion of Ukraine.

Supply Chain Science

The whole picture

Sanctions on Russia



Visual

Sanctions on Russia

Explore the effects of international sanctions against Russia in response to the invasion of Ukraine.

Supply Chain Science

Food supply shock

Visual

Food Supply Shock Explorer

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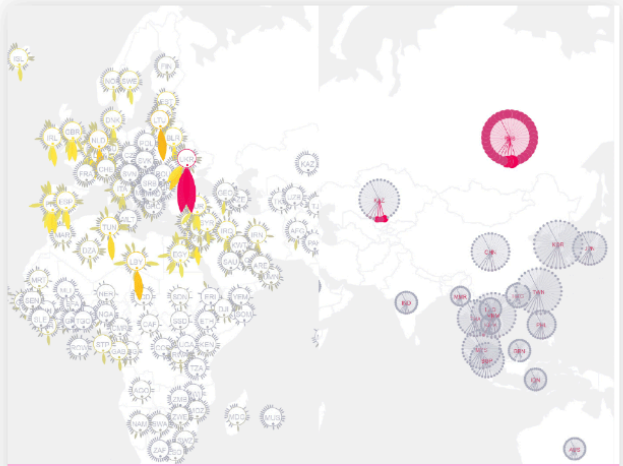
Supply Chain Science



Visual

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Explore effects of global supply disruptions via interactive visualizations and maps.

Supply Chain Science

Global Supply Chain Dependency

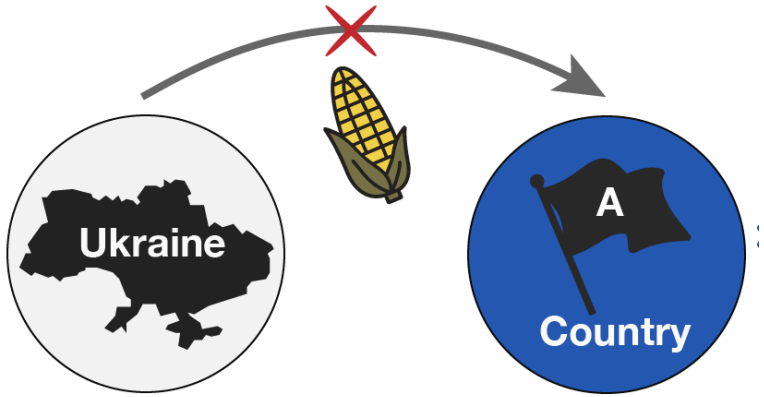
Forecast direct and indirect effects

The Whole Picture

Global Supply Chain Dependency

Forecast direct and indirect effects

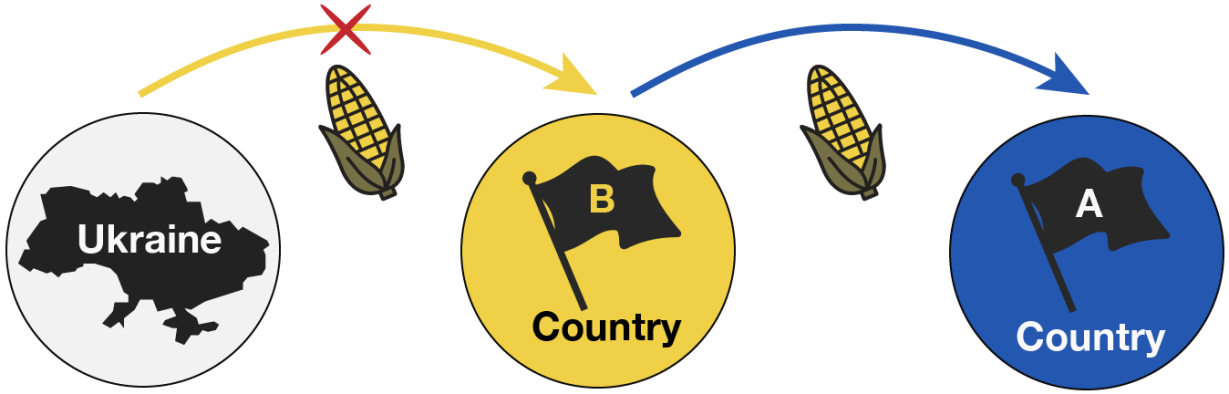
Direct effect: direct exports



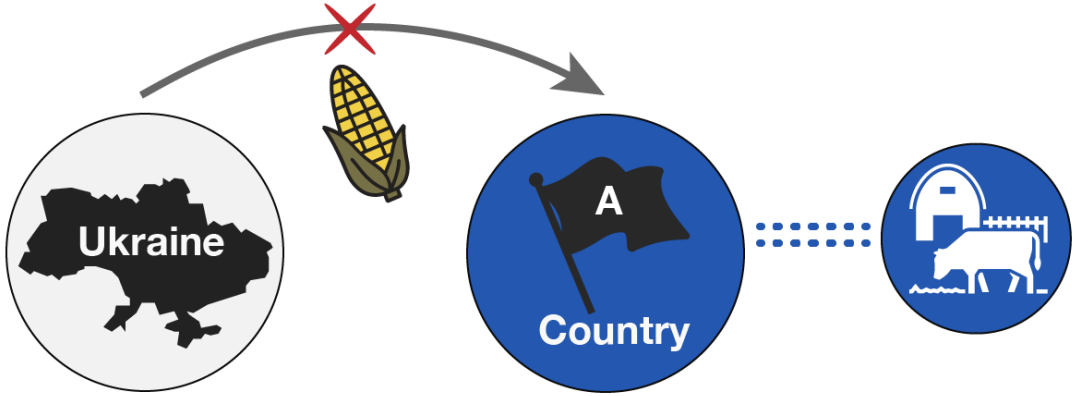
Global Supply Chain Dependency

Forecast direct and indirect effects

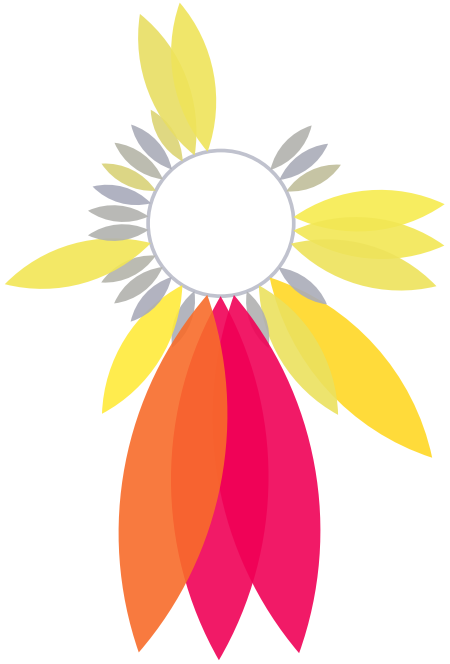
Indirect effect 1: trade network

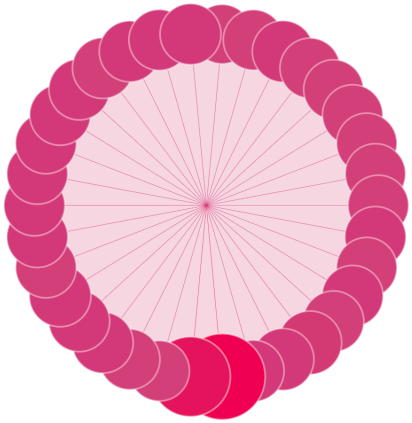


Indirect effect 2: production processes

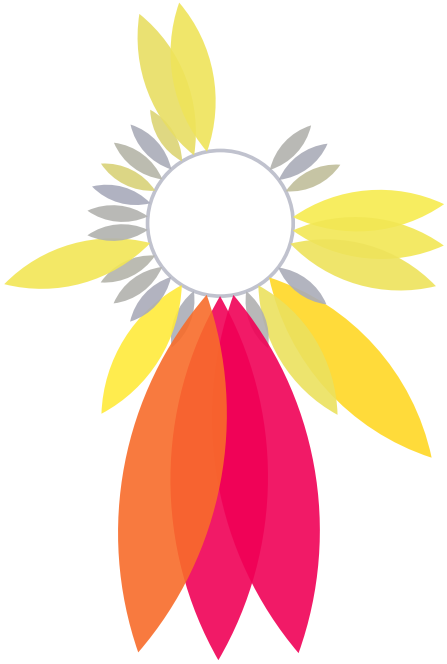


Design

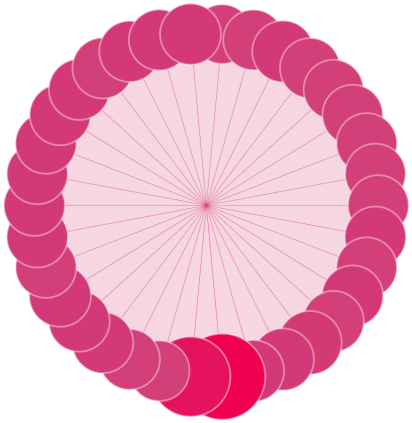


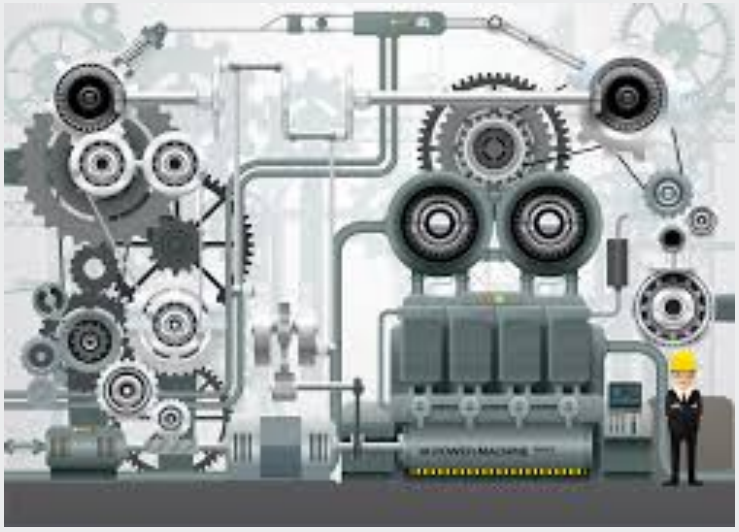


Visual inspiration
Sunflowers

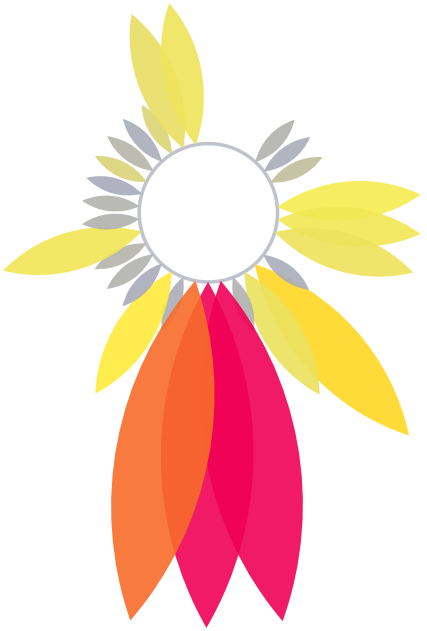


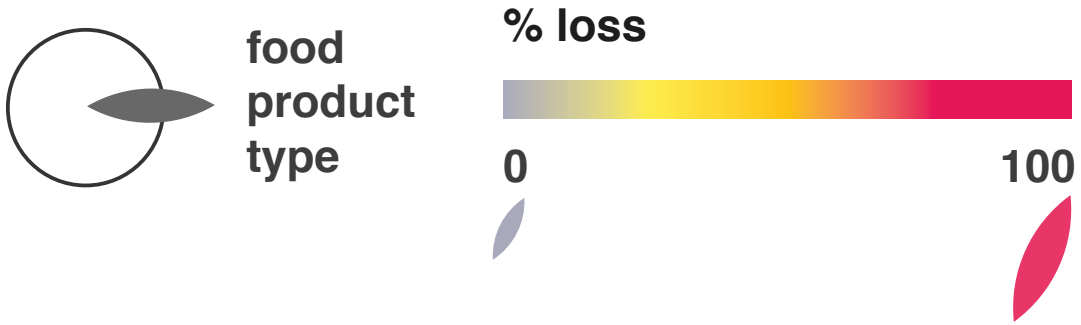
Visual inspiration
Industry wheel





Data Design





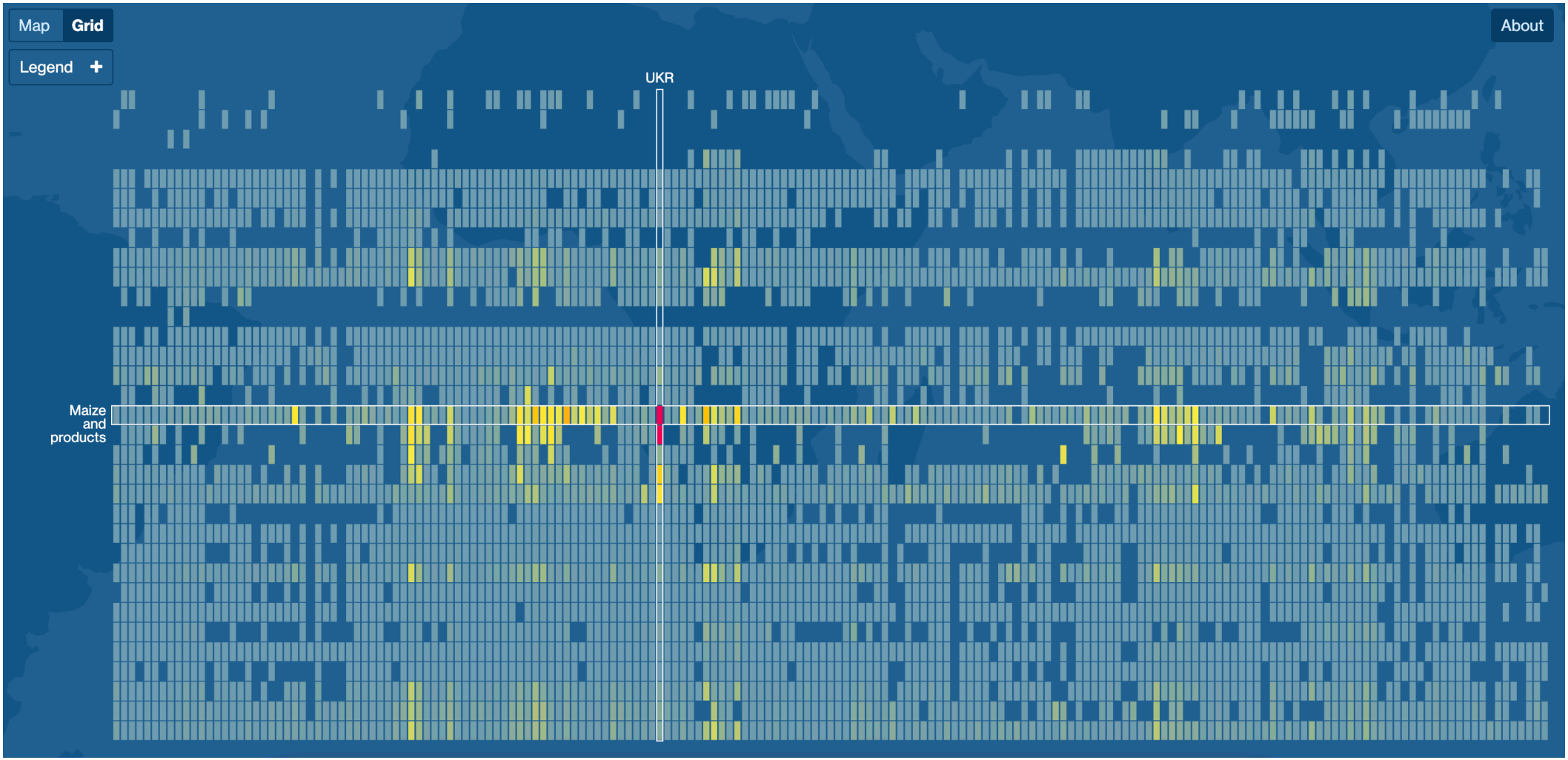
Shock values across countries and products

192 countries

123 food products

	Country A	Country B	Country C	Country D	…
Product 1					
Product 2					
Product 3					
Product 4					
Product 5					
…					

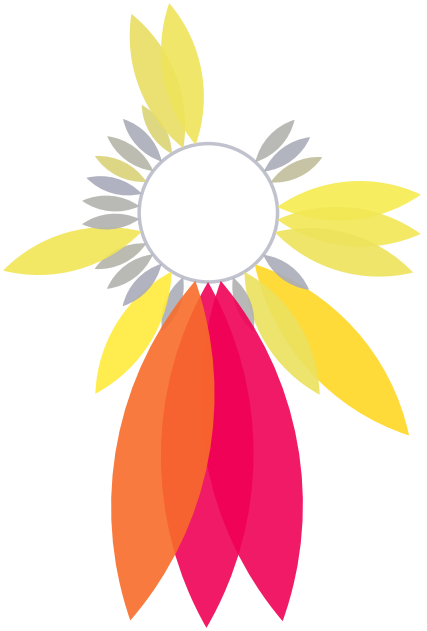
Grid view for food supply shocks

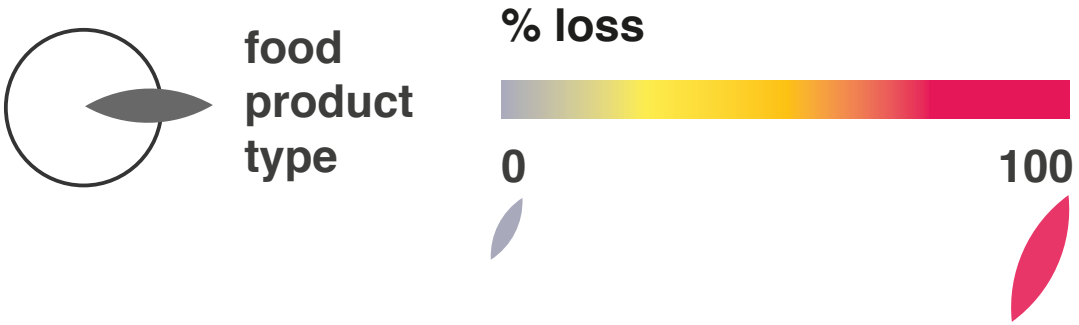


Grid view for sanctions on Russia

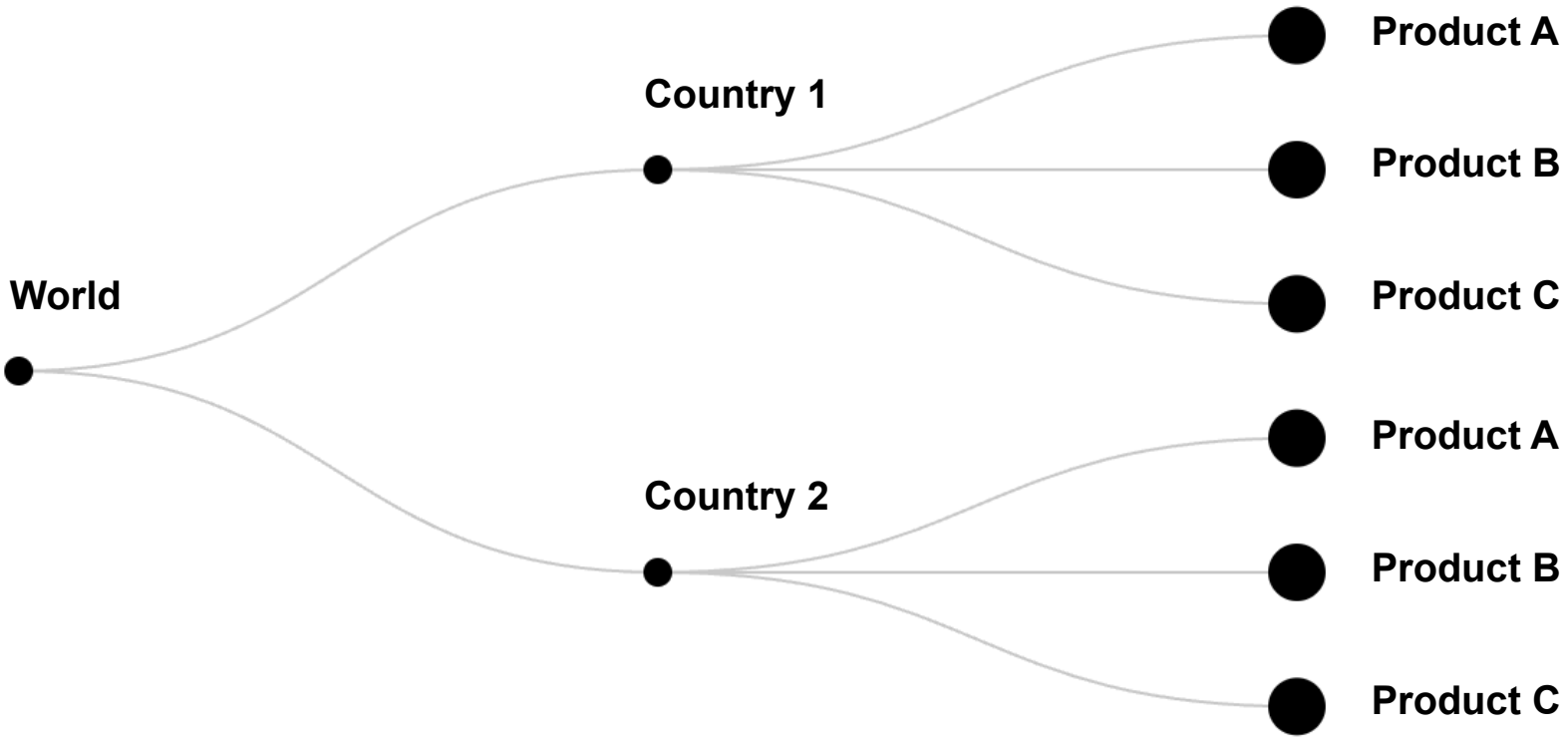
	ARG	AUS	BRA	BRN	CAN	CHE	CHL	CHN	COL	CRI	EU	GBR	HKG	IDN	IND	ISL	ISR	JPN	KAZ	KHM	KOR	LAO	MAR	MEX
Agriculture	-0.21%	-0.06%	-0.21%	-0.03%	-0.05%	-0.18%	-0.30%	-0.11%	-0.09%	-0.34%	-0.23%	-0.07%	-0.04%	-0.10%	-0.05%	-0.09%	-0.77%	-0.03%	-0.78%	-0.03%	-0.10%	-0.03%	-0.60%	-0.02%
Mining, energy products	-0.08%	-0.24%	-0.17%	-0.20%	-0.10%	-0.42%	-0.15%	-0.28%	-0.28%	-0.05%	-0.56%	-0.40%	0%	-0.16%	-0.16%	-0.49%	-0.25%	-0.18%	-1.48%	0%	-0.38%	-0.08%	-0.20%	-0.14%
Mining, non-energy products	-0.20%	-0.30%	-0.33%	-0.09%	-0.25%	-0.46%	-0.39%	-0.29%	-0.12%	-0.02%	-0.68%	-0.21%	0%	-0.15%	-0.19%	-0.38%	-0.41%	-0.12%	-6.80%	-0.04%	-0.36%	-0.21%	-0.22%	-0.29%
Mining support activities	-0.07%	-0.21%	-0.19%	-0.04%	-0.12%	-0.44%	-0.20%	-0.33%	-0.10%	-0.03%	-4.59%	-0.84%	-0.20%	-0.13%	-0.15%	-0.25%	-5.74%	-0.50%	-2.88%	-0.03%	-3.42%	-0.00%	-0.15%	-0.02%
Food products	-0.11%	-0.02%	-0.08%	-0.03%	-0.02%	-0.28%	-0.38%	-0.09%	-0.11%	-0.04%	-0.16%	-0.10%	-0.04%	-0.12%	-0.07%	-0.16%	-0.03%	-0.02%	-0.50%	-0.04%	-0.11%	-0.02%	-0.10%	-0.01%
Textiles	-0.03%	-0.08%	-0.02%	-0.03%	-0.06%	-0.24%	-0.04%	-0.27%	-0.01%	-0.02%	-0.34%	-0.12%	-0.04%	-0.12%	-0.13%	-0.49%	-0.64%	-0.11%	-3.30%	-0.18%	-0.26%	-0.08%	-0.35%	-0.03%
Wood and products of wood	-0.06%	-0.04%	-0.10%	-0.05%	-0.05%	-0.45%	-0.07%	-0.19%	-0.03%	-0.08%	-0.50%	-0.15%	-0.05%	-0.05%	-0.10%	-0.08%	-0.19%	-0.08%	-0.38%	-0.08%	-0.18%	-0.05%	-0.16%	-0.05%
Paper products and printing	-0.04%	-0.05%	-0.13%	-0.02%	-0.08%	-0.62%	-0.18%	-0.19%	-0.03%	-0.07%	-0.96%	-0.31%	-0.08%	-0.13%	-0.15%	-0.16%	-0.33%	-0.18%	-1.61%	-0.15%	-0.38%	-0.10%	-0.12%	-0.04%
Coke and refined petroleum products	-0.07%	-0.09%	-0.10%	-0.10%	-0.10%	-0.43%	-0.11%	-0.29%	-0.13%	-0.10%	-0.67%	-0.40%	-0.18%	-0.06%	-0.18%	-1.61%	-0.29%	-0.23%	-5.47%	-0.03%	-0.50%	-0.06%	-0.13%	-0.04%
Chemical and chemical products	-0.14%	-0.86%	-0.23%	-0.31%	-0.20%	-1.32%	-0.54%	-0.47%	-0.07%	-0.11%	-1.63%	-0.84%	-0.18%	-0.39%	-0.36%	-0.35%	-1.02%	-0.33%	-13.15%	-0.06%	-0.77%	-0.30%	-0.25%	-0.14%
Pharmaceuticals	-0.10%	-0.05%	-0.04%	-0.07%	-0.29%	-0.58%	-0.09%	-0.12%	-0.02%	-0.05%	-0.81%	-0.54%	-0.07%	-0.03%	-0.44%	-0.12%	-0.27%	-0.09%	-2.09%	-0.03%	-0.19%	-0.04%	-0.08%	-0.04%
Rubber and plastics products	-0.11%	-0.12%	-0.15%	-0.03%	-0.13%	-1.05%	-0.13%	-0.52%	-0.05%	-0.12%	-1.32%	-0.69%	0%	-0.22%	-0.27%	-1.23%	-0.83%	-0.49%	-5.24%	-0.11%	-0.80%	-0.07%	-0.42%	-0.14%
Other non-metallic mineral products	-0.04%	-0.05%	-0.09%	-0.02%	-0.05%	-0.44%	-0.06%	-0.19%	-0.01%	-0.10%	-0.73%	-0.26%	-0.16%	-0.05%	-0.08%	-0.05%	-0.15%	-0.18%	-3.34%	-0.03%	-0.28%	-0.03%	-0.09%	-0.04%
Basic metals	-0.12%	-0.28%	-0.49%	-0.09%	-0.31%	-0.67%	-0.40%	-0.38%	-0.19%	-0.14%	-1.15%	-0.43%	-0.29%	-0.25%	-0.21%	-0.91%	-0.37%	-0.35%	-5.87%	-0.09%	-0.67%	-0.25%	-0.38%	-0.40%

Visualization Design

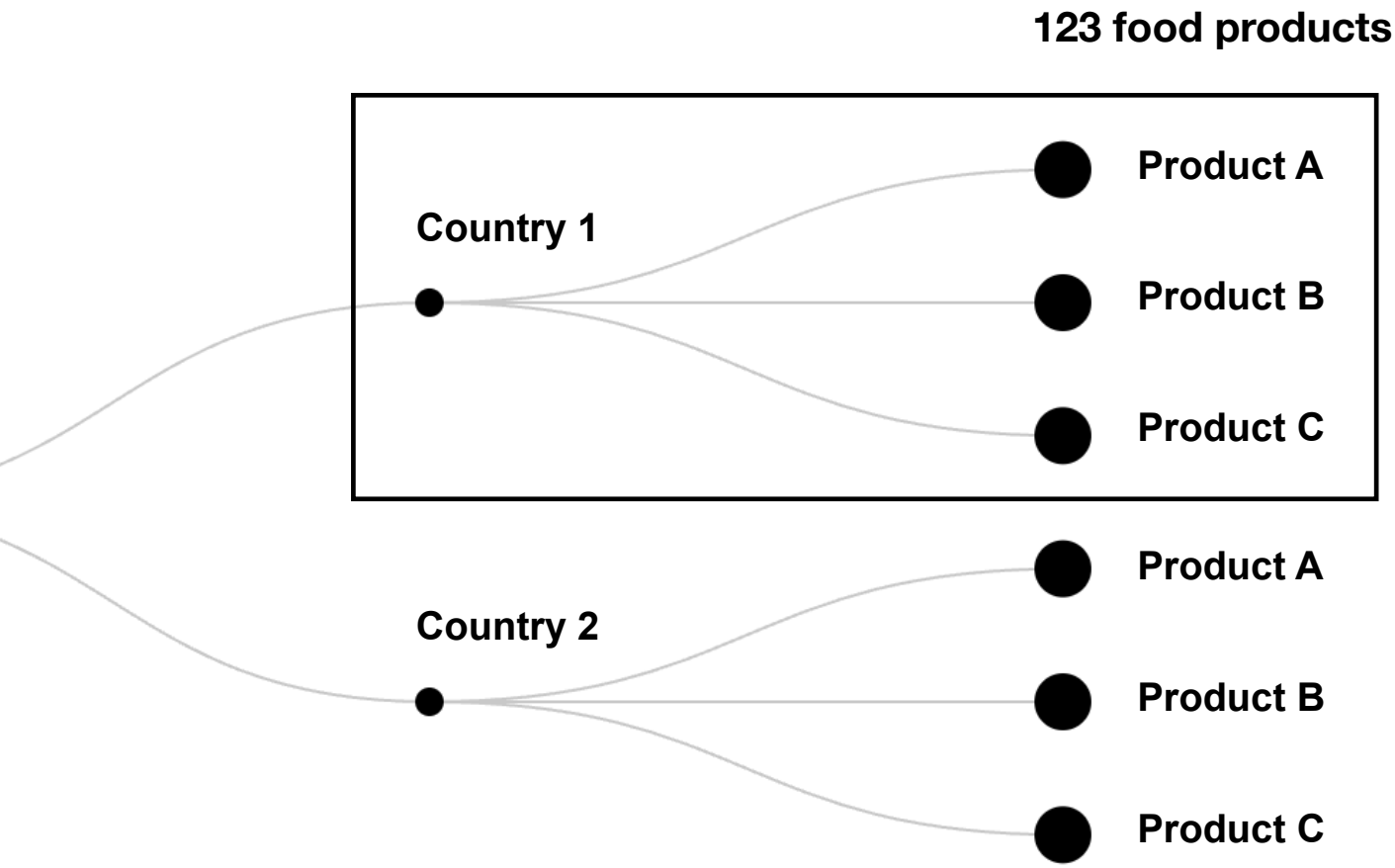


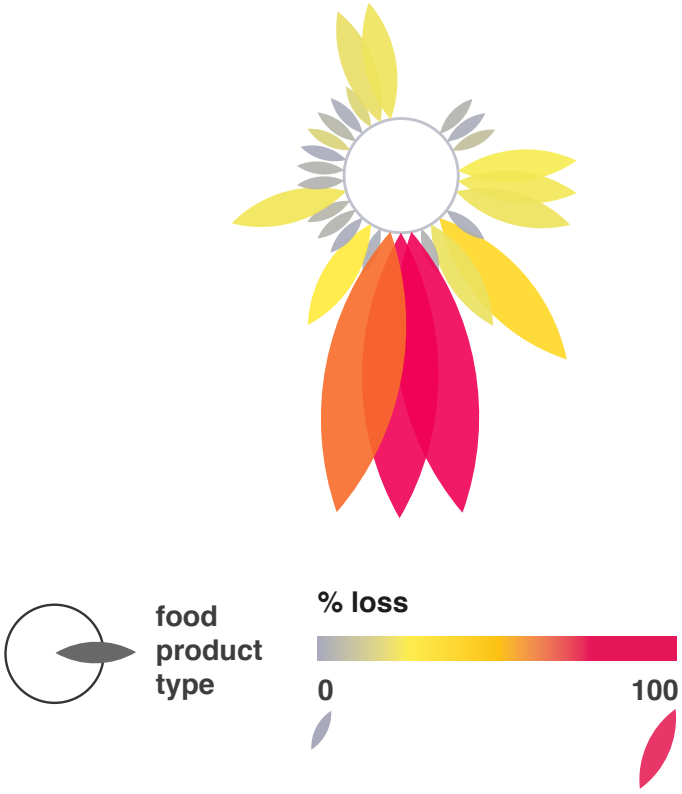


Hierarchy


World
Country 1
Country 2
Product A
Product B
Product C
Product A
Product B
Product C

Hierarchy


123 food products
Country 1
Product A
Product B
Product C
Country 2
Product A
Product B
Product C

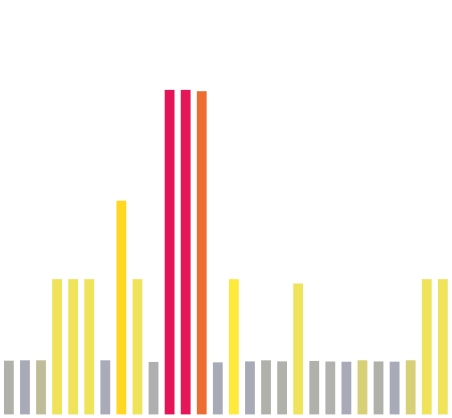

food
product
type
% loss
0
100

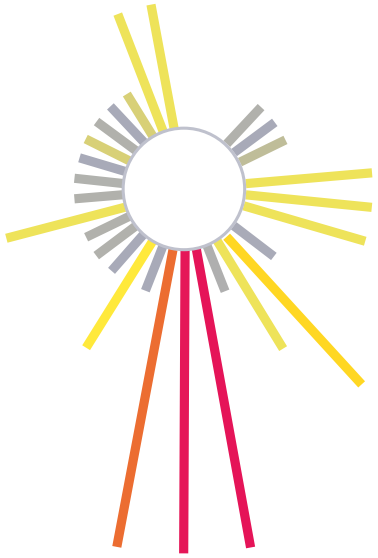
Start from bar chart

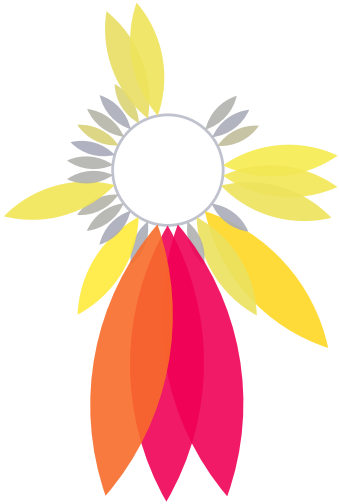
Bar chart

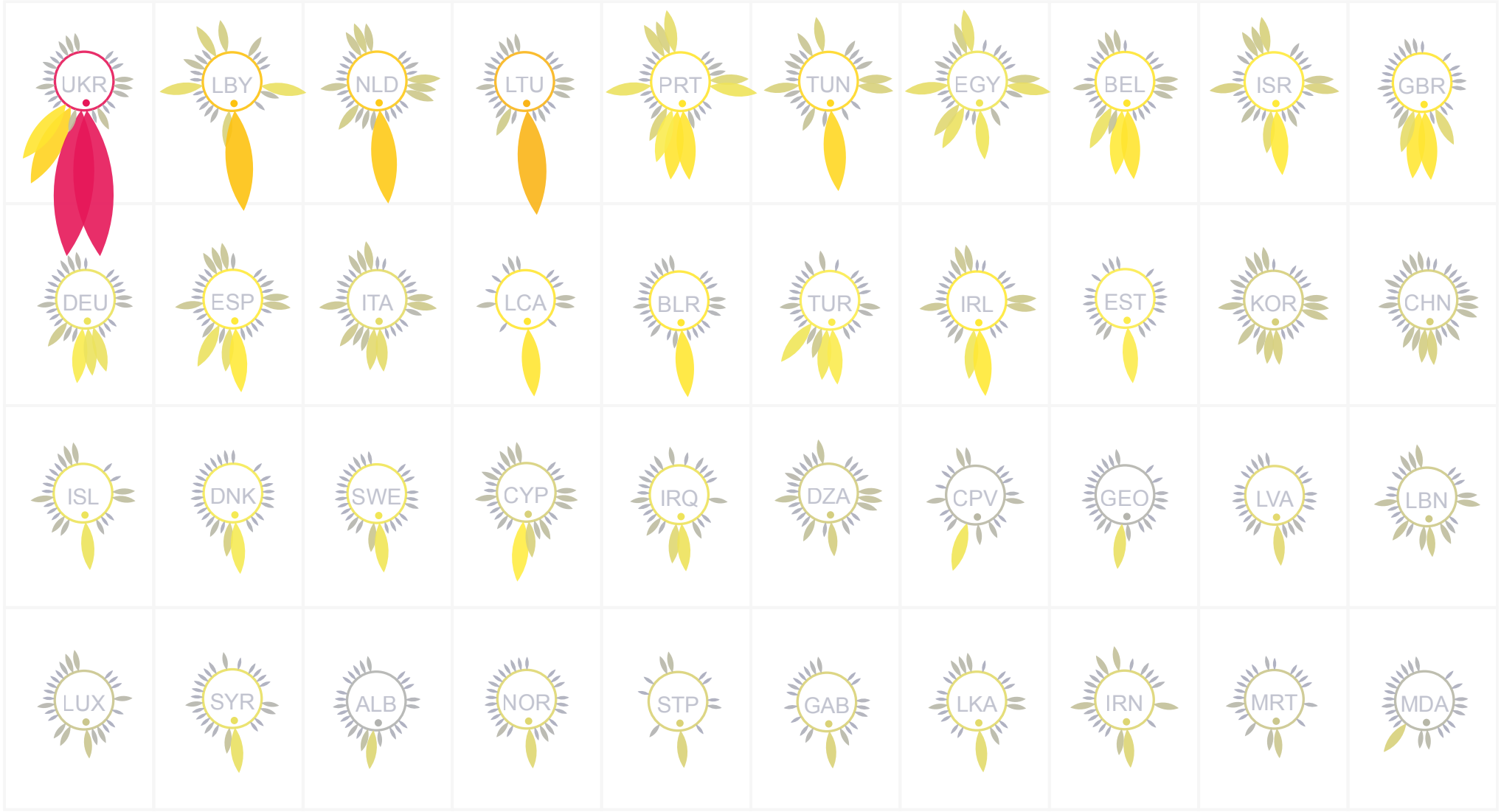
Radial bar chart

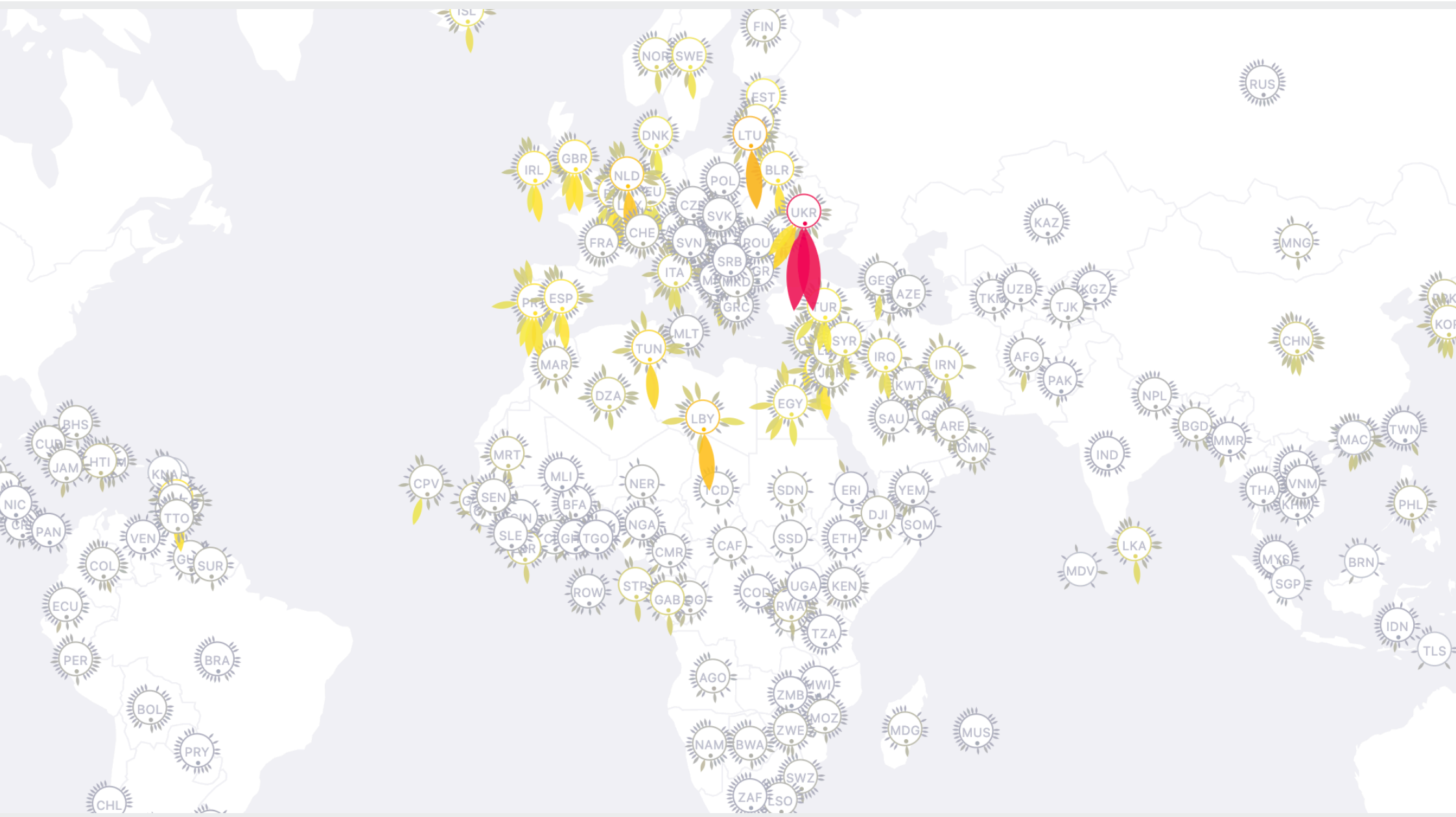
Flower glyph





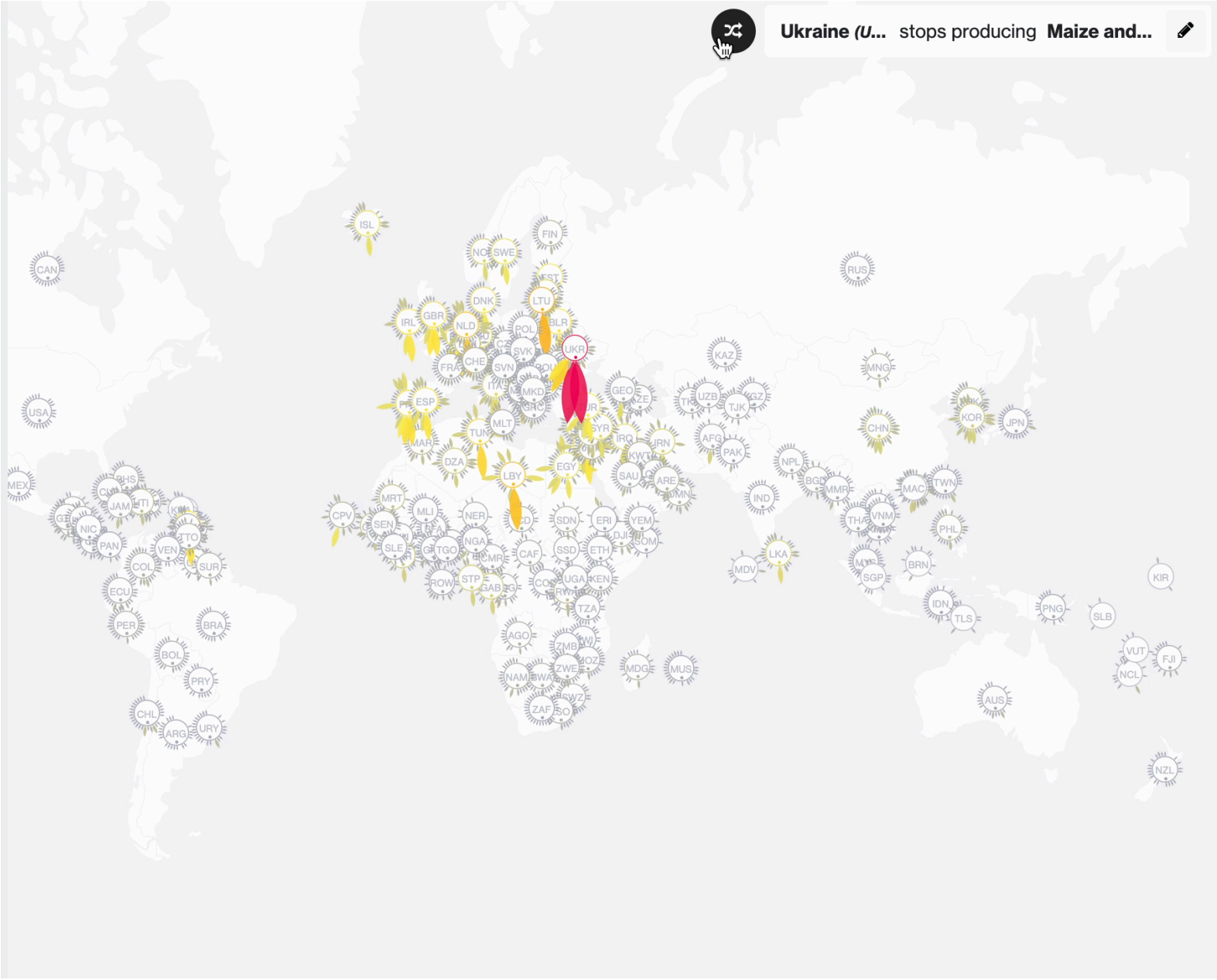



UKR
LBY
NLD
LTU
PRT
TUN
EGY
BEL
ISR
GBR
DEU
ESP
ITA
LCA
BLR
TUR
IRL
EST
KOR
CHN
ISL
DNK
SWE
CYP
IRQ
DZA
CPV
GEO
LVA
LBN
LUX
SYR
ALB
NOR
STP
GAB
LKA
IRN
MRT
MDA


FIN
NOR
SWE
EST
LTU
DNK
IRL
GBR
NLD
POL
BLR
UKR
CZE
SVK
FRA
CHE
SVN
ROU
SRB
ITA
GRC
ESP
TUR
MLT
TUN
MAR
DZA
SYR
IRQ
IRN
KWT
SAU
ARE
OMN
EGY
LBY
RUS
KAZ
MNG
CHN
AFG
PAK
NPL
BGD
MMR
IND
LKA
MDV
THA
VNM
KHM
SGP
MYS
BRN
PHL
IDN
TLS
MAC
TWN
GEO
AZE
TKM
UZB
TJK
KGZ
MRT
MLI
NER
TCD
SDN
ERI
YEM
DJI
SOM
ETH
SSD
CAF
CMR
NGA
BFA
SEN
GIN
SLE
LBR
TGO
CPV
STP
GAB
COG
COD
RWA
UGA
KEN
TZA
ROW
AGO
ZMB
MWI
MOZ
ZWE
NAM
BWA
SWZ
ZAF
LSO
MDG
MUS
BHS
CUB
JAM
HTI
PAN
CRI
NIC
VEN
COL
ECU
PER
BRA
BOL
PRY
CHL
TTO
GUY
SUR

Country details

Shuffle the cases



What have you found?

Tag us:

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@Complexity Science Hub Vienna

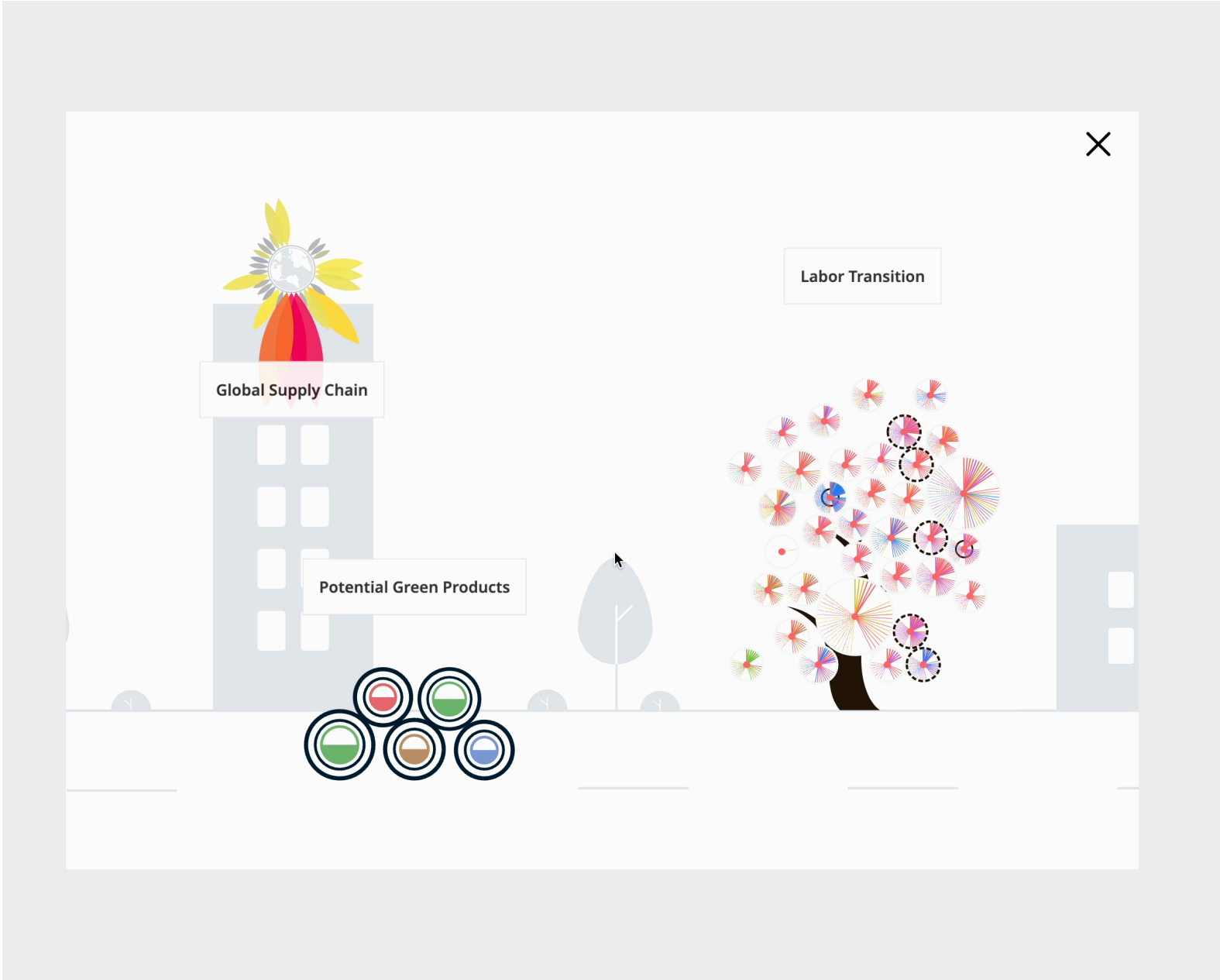
Links:

CSH website: csh.ac.at
CSH Visuals: csh.ac.at/visuals

Complexity
Science★Hub

More examples in my portfolio

spark.go4trees.com

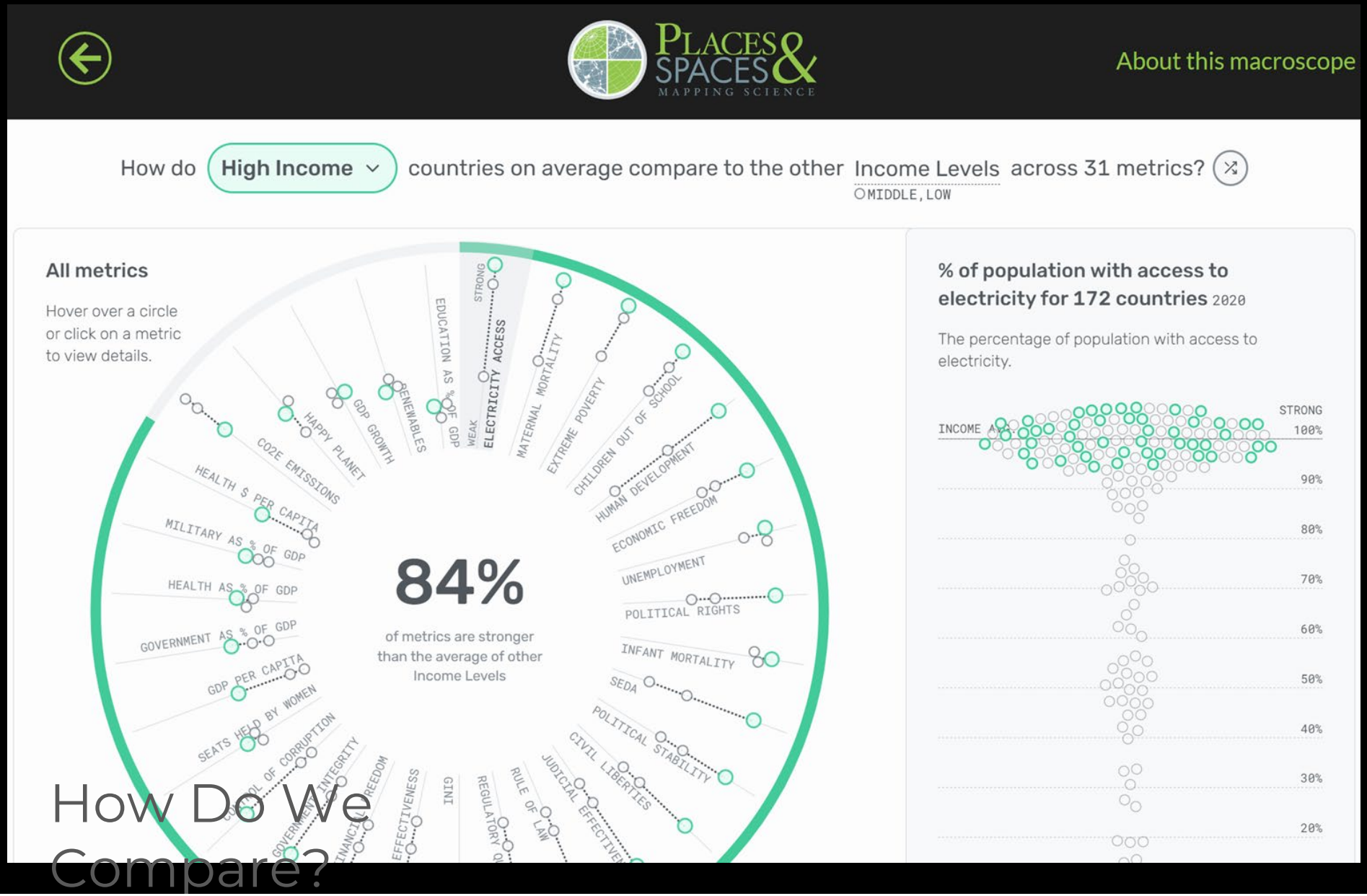


Complexity Science Hub

Places & Spaces: Mapping Science

Thank you

Liuhuaying Yang
Data visualization practitioner



How Do We Compare?

How do **High Income** countries on average compare to the other Income Levels across 31 metrics?

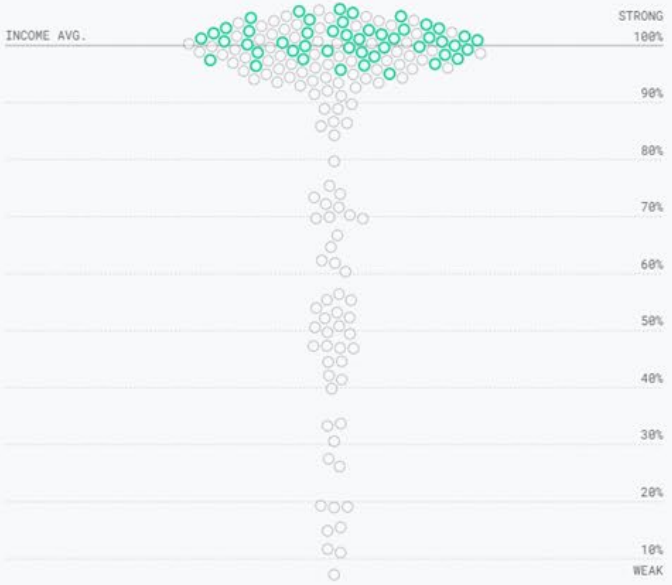
MIDDLE, LOW

All metrics

Hover over a circle or click on a metric to view details.

% of population with access to electricity for 172 countries 2020

The percentage of population with access to electricity.



Source: World Bank

How does the **United States** compare to the Americas and High Income countries across 29 metrics?
REGION · INCOME LEVEL

How do **High Income** countries on average compare to the other Income Levels across 31 metrics?
MIDDLE, LOW

How does **South Asia** on average compare to the other Regions across 31 metrics?
5 OTHER

PLACES & SPACES
MAPPING SCIENCE

How does **Poland** compare to Europe & Central Asia and High Income countries across 30 metrics?
REGION · INCOME LEVEL

CO2e emissions per capita for 171

Measures carbon dioxide emissions are those s
fuels and the manufacture of cement on a per

Lateral Thinking Gone VR: Enabling Geospatial and Topical Insights in Virtual Reality

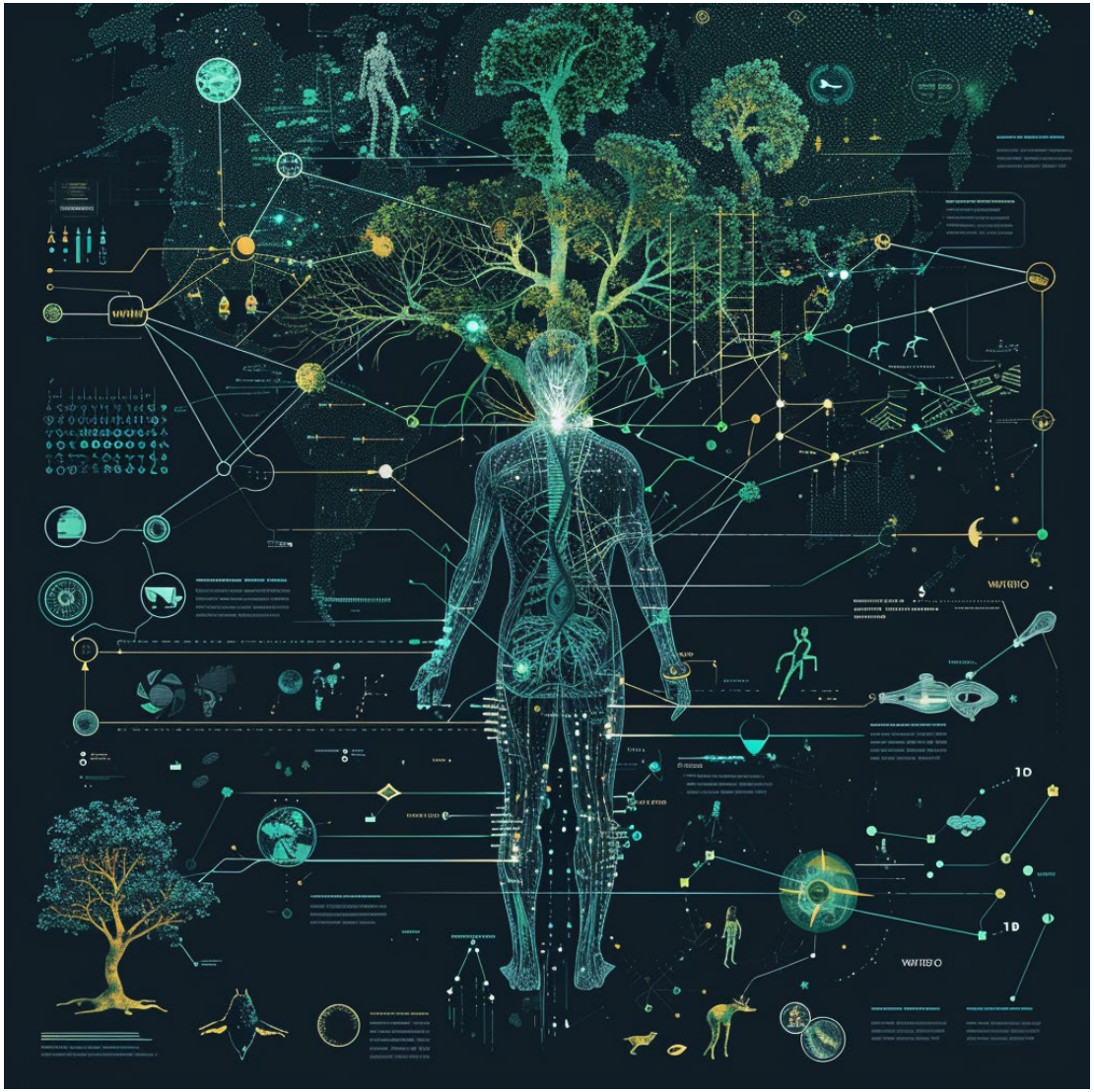
Andreas Bueckle[1], Mudrika Alla[1], Juhi Khare[1], Kilian Buehling[2,3]

[1] Department of Intelligent Systems Engineering, Luddy School of Informatics, Computing, and Engineering, Indiana University, Bloomington, IN 47408, USA

[2] Institute for Media and Communication Studies, Freie Universität Berlin, Berlin, Germany

[3] Weizenbaum Institute for the Networked Society, Berlin, Germany

3rd Decade of *Places & Spaces*: Envisioning Intelligences (2025-2034)



https://scimaps.org

wermind using https://www.midjourney.com

Envisioning Intelligences

Including

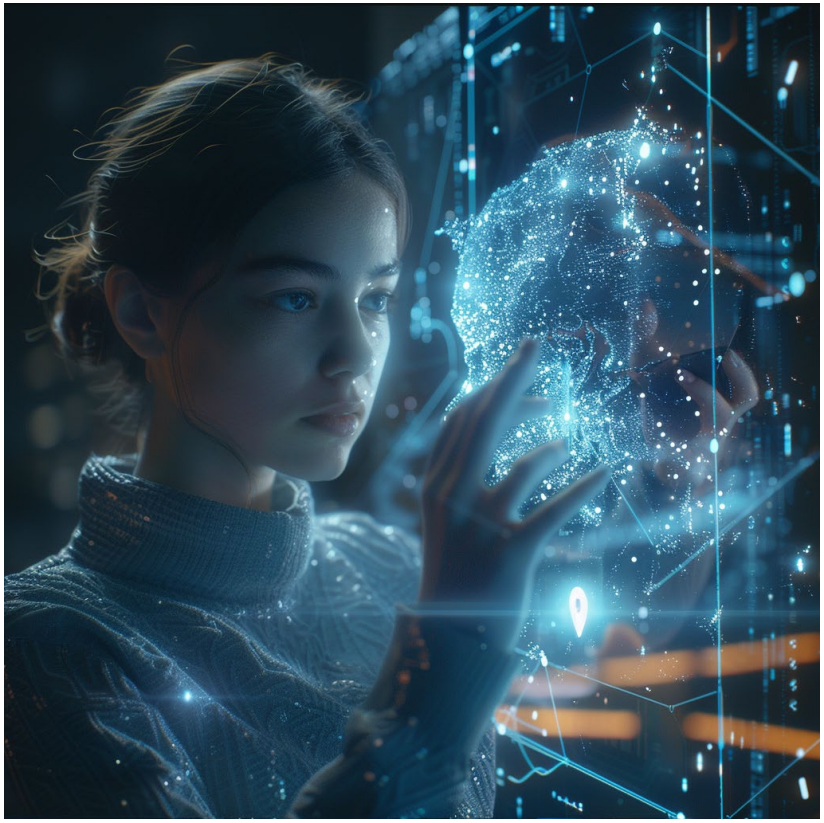
- linguistic, kinesthetic, communication, musical, emotional, and other intelligences by biological and technological life forms

with a focus on

- collaboration & coordination across life forms and intelligence types

to inspire discussion about

- existing and future sensors & actuators, memory & reasoning, exploration & communication, plus shared goals & desirable futures.



.master_of_code_global using
https://www.midjourney.com

We would like to thank

The fantastic team at University Collections, including especially Brian Woodman, Alisha Beard, Jake Goode, and Bill Bass.

The amazing Carrie Longley and Ingo Günther for sharing original artworks.

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The creative Melanie B. Goldstone for website design.

The eloquent Pete DiPrimio for composing the IU News Story.

The visionary Andreas Bueckle and Kyah Hiers-Vavrek for taking event photos.

The technical expertise of Haley Scruggs, Nicole Johnson, and the Luddy IT Team for online event support.