

# La Linea 3D

## Neue Wege zur Visualisierung von Biographiedaten

Lunchtime Lecture, 24. Oktober 2017,  
Zentrum für Informationsmodellierung / ACDH, Universität Graz

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- Was gibt es hier zu sehen?

Neue Möglichkeiten die Sehfähigkeit für die biographische Datenanalyse zu nutzen

- "La Linea" ?

Sinnbild für Millionen von ProduzentInnen von biographischen Lebenslinien (Trajektorien)

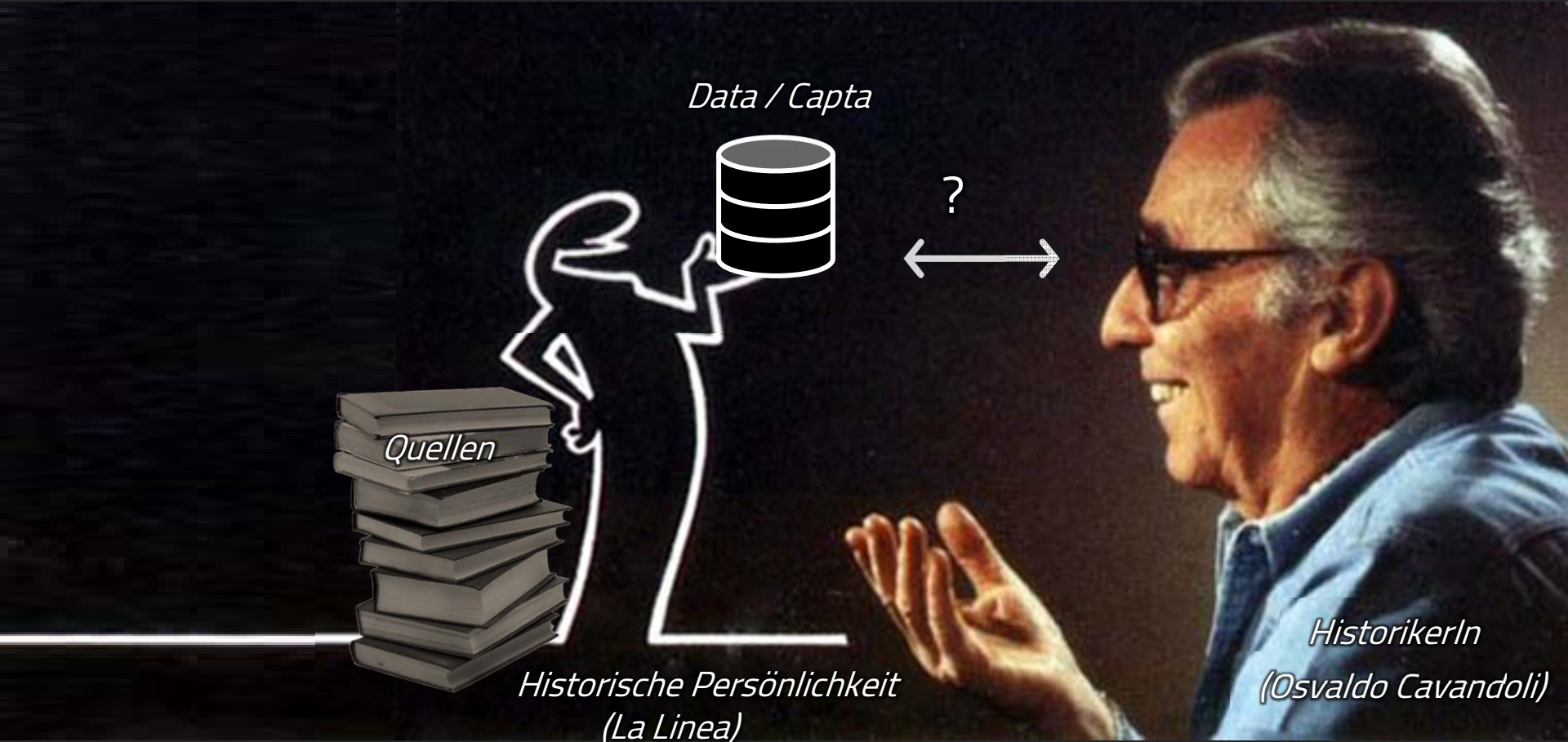


Image source: <http://www.weirdhut.com/wp-content/uploads/2012/08/the-line-cartoon.jpg>

La Linea Interactive: <https://www.youtube.com/watch?v=RZzlezxLu7s>

## Visuelle Analyse von Biographiedaten



i) zum Stand der Kunst

ii) neue Wege

iii) Ausblick

□ Entity extraction:

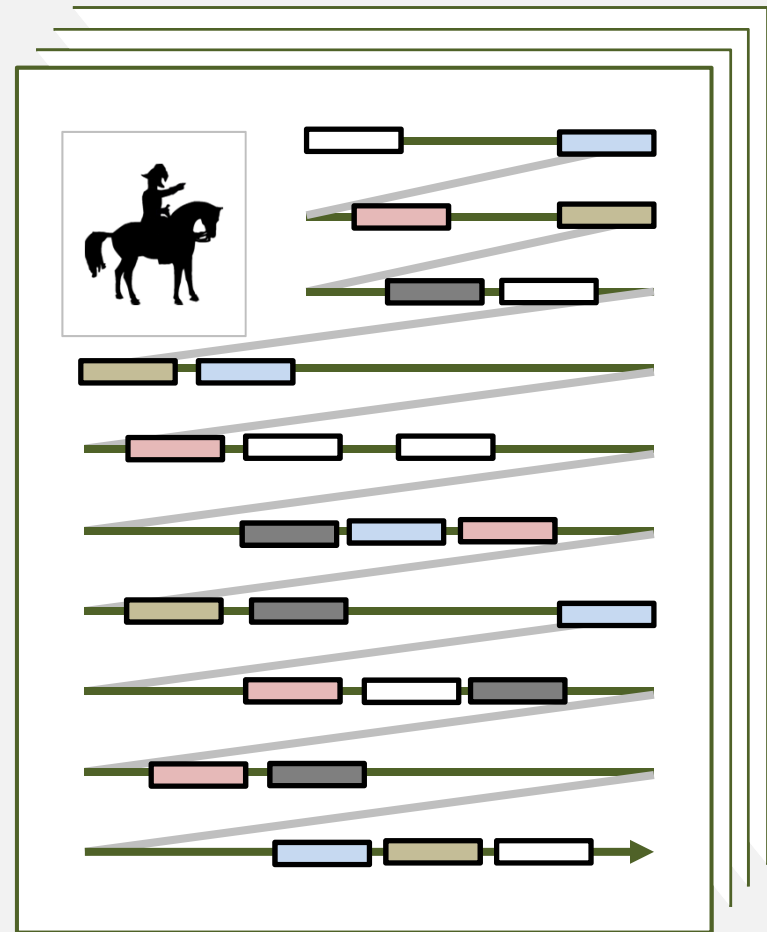
□ AkteurInnen

□ Institutionen

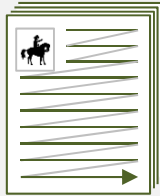
□ Orte

□ Zeitpunkte

□ Aktionen / Relationen



Biographischer Text



***komplexe individuelle Datensätze***  
(multidimensional, zeitorientiert)



**Zielsetzung:** Visuelle Unterstützung  
von „close reading“ auf Individualebene

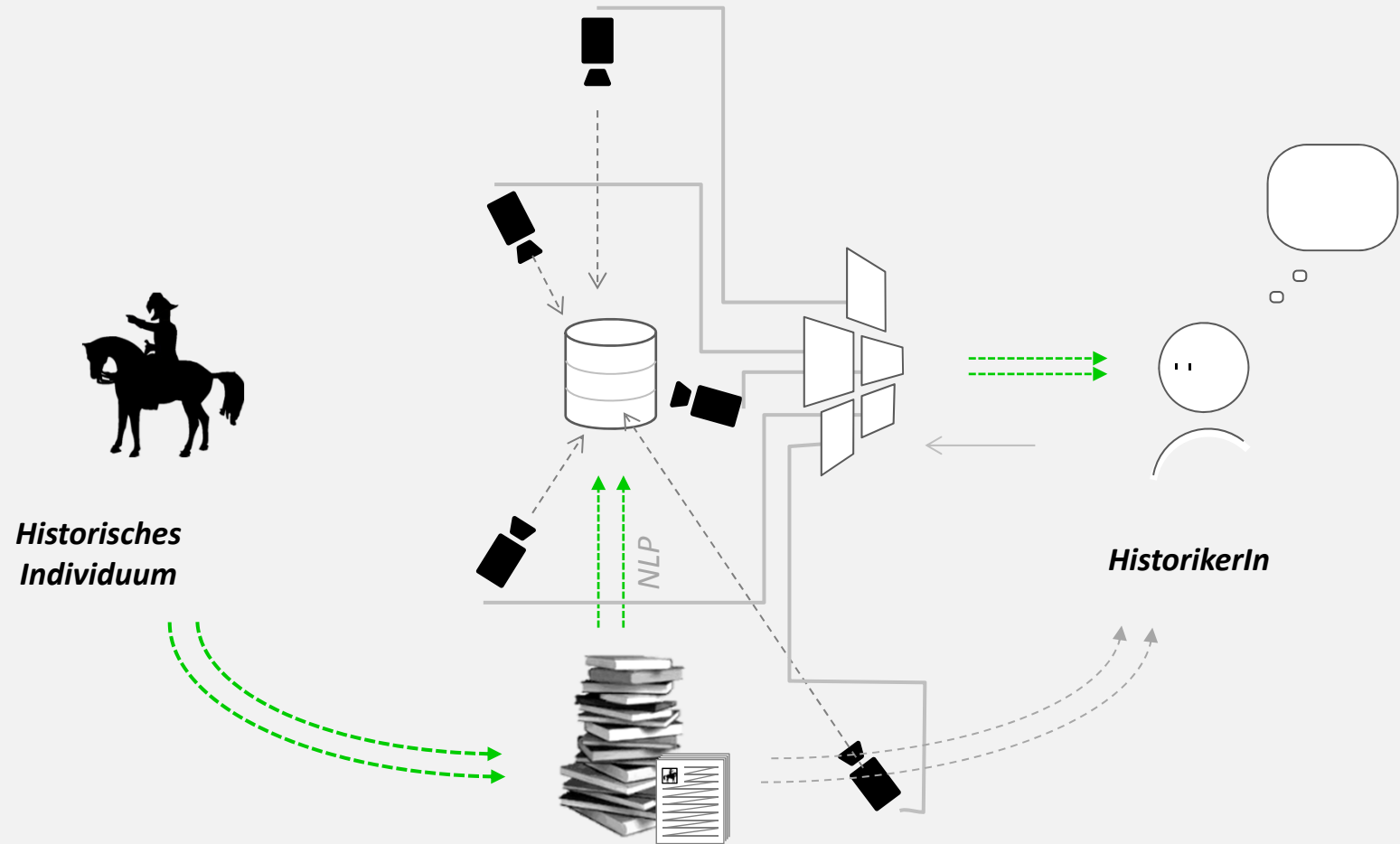


***komplexe aggregierte Korpora***  
(z.B. 20.000 Biographien des ÖBL)



**Zielsetzung:** Visuelle Unterstützung  
von „distant reading“ auf Korpusebene

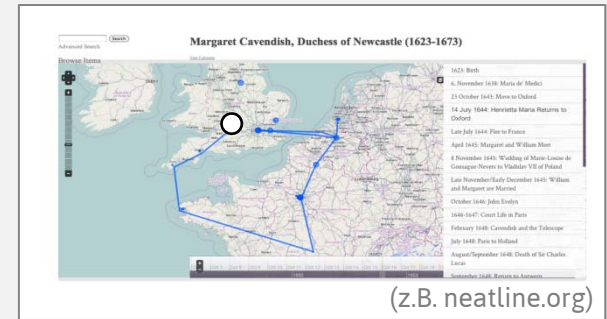
Wie können Methoden der **visuellen Analyse** für die  
**Biographieforschung** erschlossen werden?





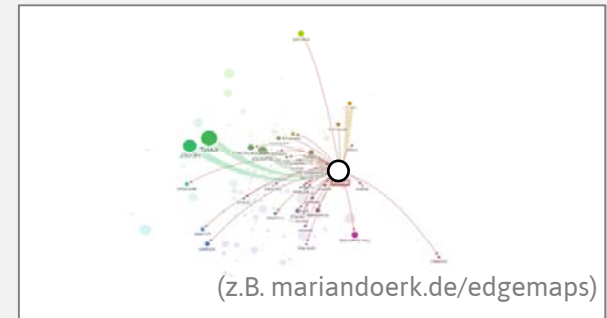
## Temporale Kartierung

(z.B. [timelinestoryteller.com](http://timelinestoryteller.com))



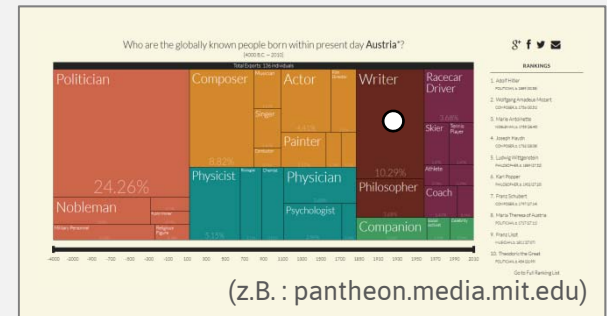
(z.B. [neatline.org](http://neatline.org))

## Geografische Kartierung



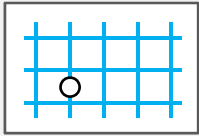
(z.B. [mariandoerk.de/edgemaps](http://mariandoerk.de/edgemaps))

## Relationale Kartierung

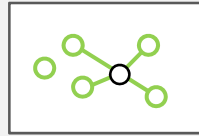


(z.B. : [pantheon.media.mit.edu](http://pantheon.media.mit.edu))

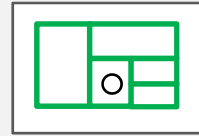
## Kategoriale Kartierung



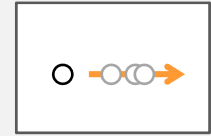
maps



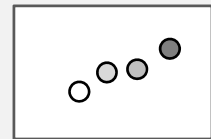
networks



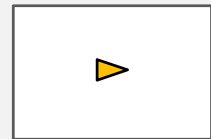
treemaps



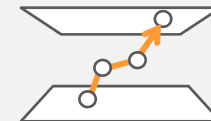
timelines



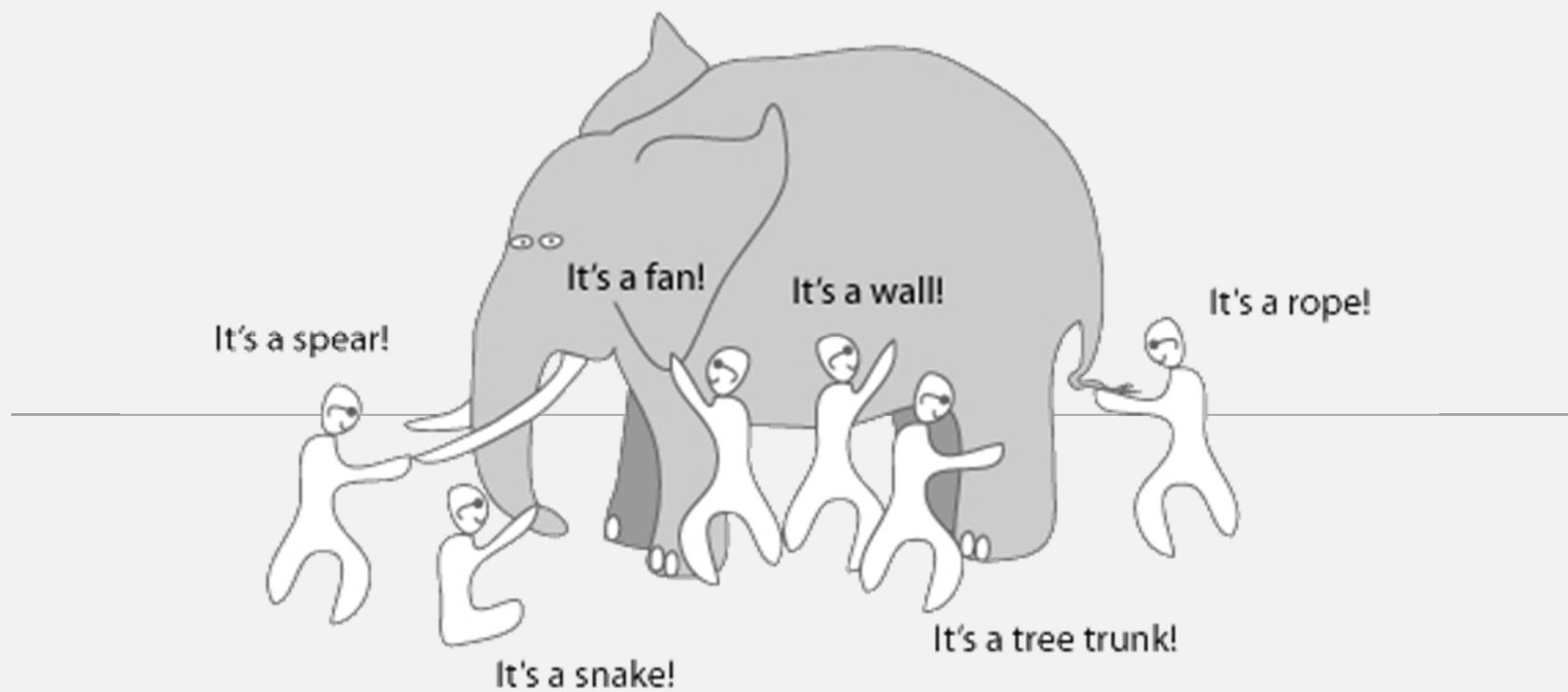
superimposition



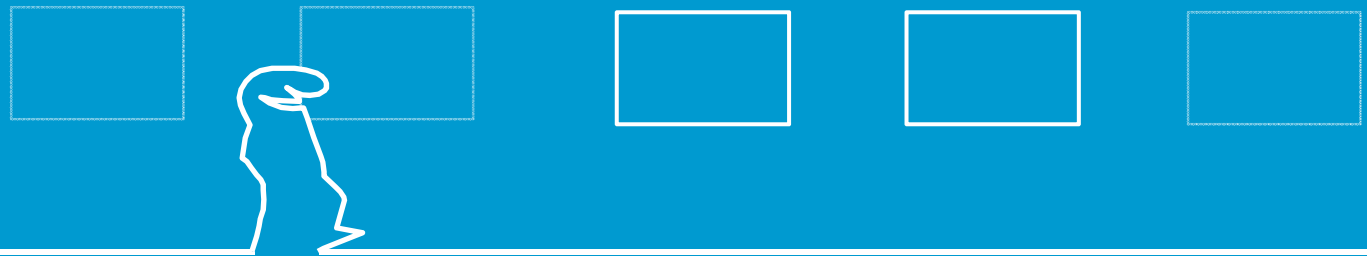
animation



space-time cube



Wie kann die **kognitive Integration** von “multiple views”  
bestmöglich unterstützt werden?



ii) neue Wege der Visualisierung

▶▶ visuelle Analyse kultureller Sammlungen  
<http://www.donau-uni.ac.at/de/polycube>

▶▶ H2020 proposal

▶▶ visuelle Analyse biographischer Daten



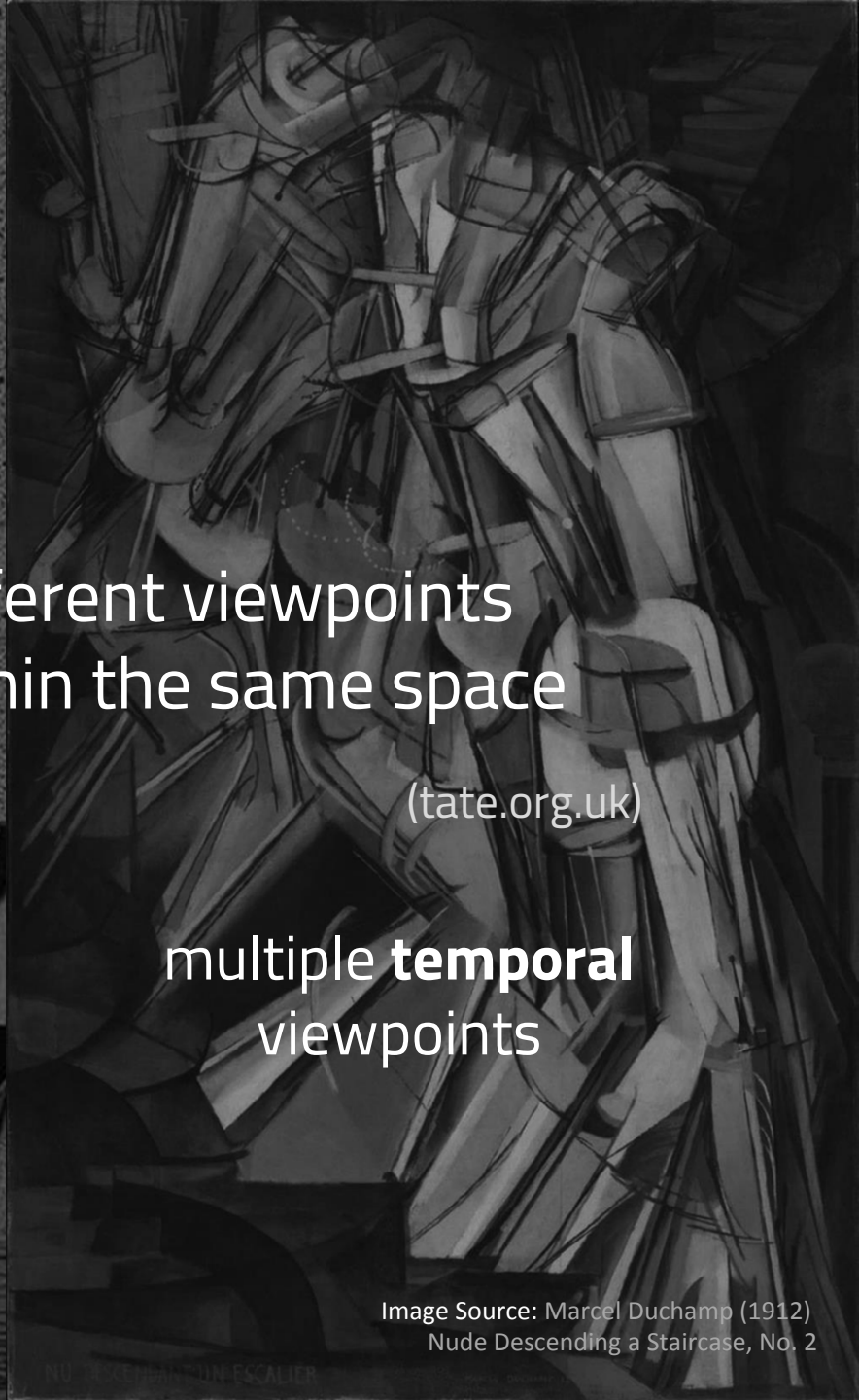
## cubism

artists aimed to show different viewpoints  
at the same time and within the same space

([tate.org.uk](http://tate.org.uk))

multiple **spatial**  
viewpoints

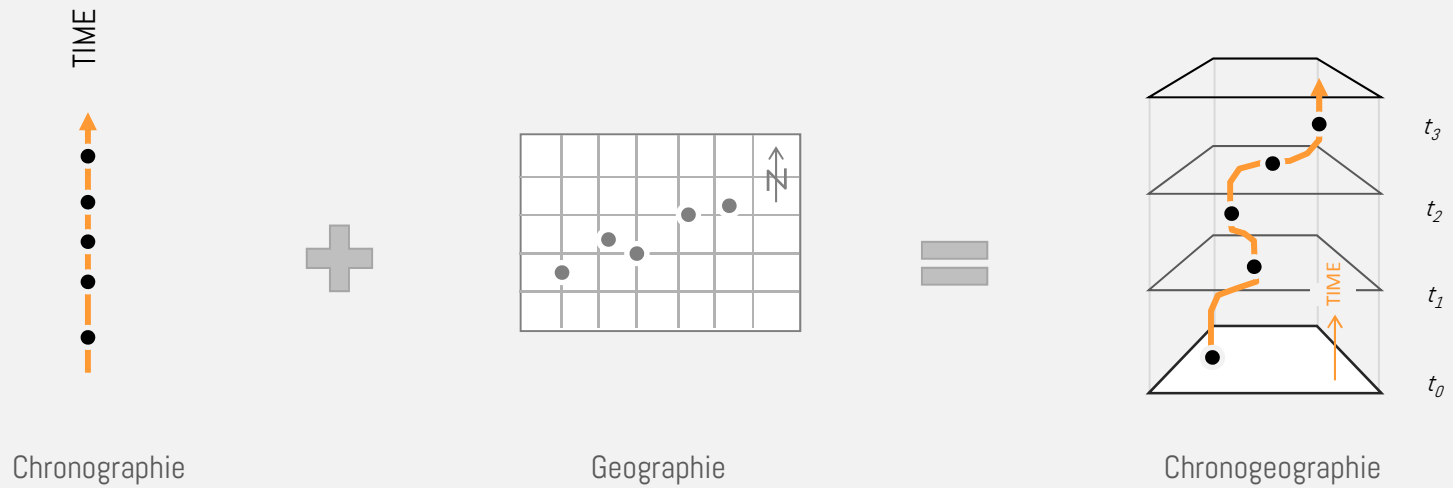
Image Source: Juan Gris (1915).  
Stillleben mit Gitarre



multiple **temporal**  
viewpoints

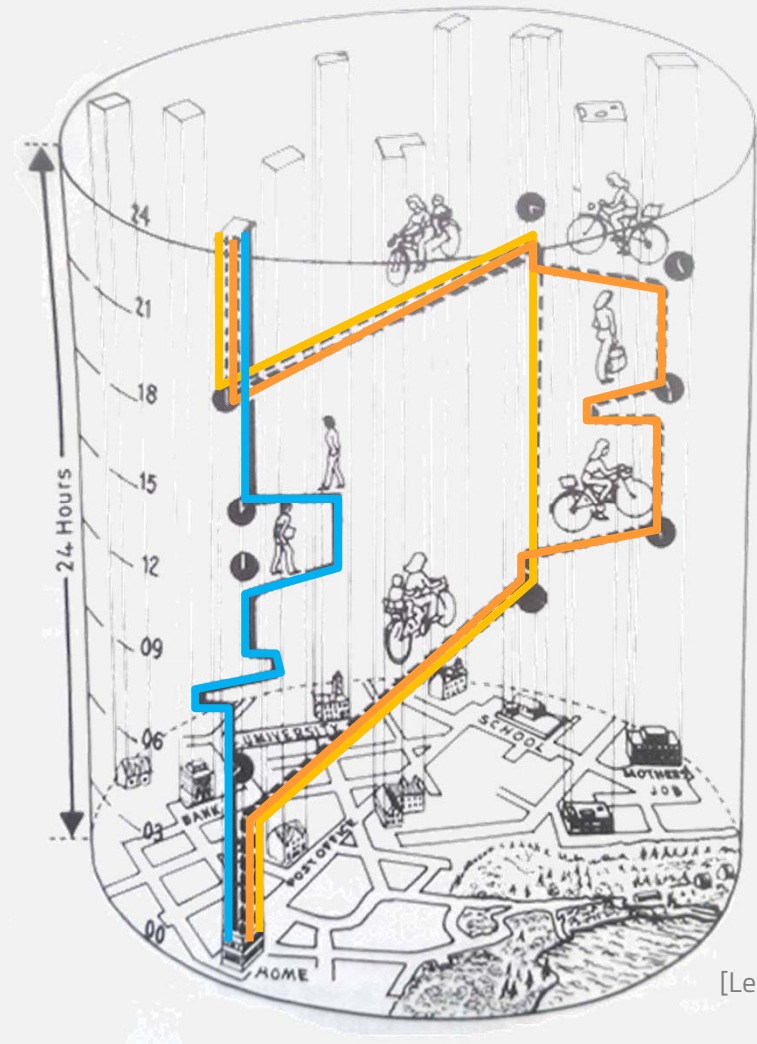
Image Source: Marcel Duchamp (1912)  
Nude Descending a Staircase, No. 2

## ***Space-Time Cubism (Chronogeographie)***



“At one level of analysis time-geography deals with the time-space ‘choreography’ of the individual's existence at daily, yearly, or lifetime (biographical) scales of observation.”

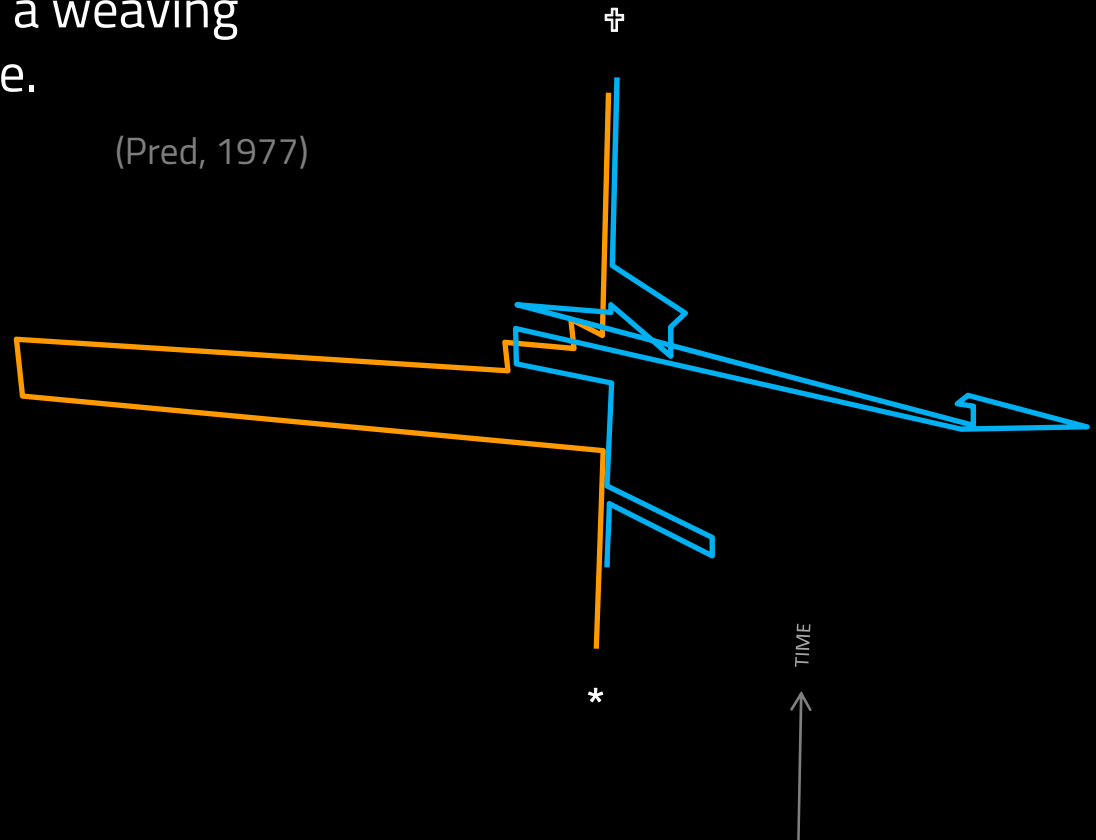
(Pred, 1977)



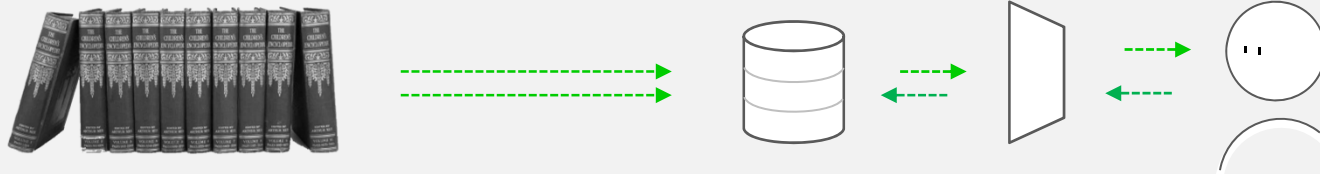
[Lentorp, 1978]

More specifically, an individual's existence can be diagrammatically described as a trajectory, a 'daily-' or 'life-path' of movement - a weaving dance through time-space.

(Pred, 1977)



## *Case Study: APIS Projekt*



Österreichisches  
Biographisches Lexikon (ÖBL)

APIS Projekt  
ÖAW / ACDH

= web-basiertes Interface zur

- Abfrage
- Editierung und
- Visualisierung von 18.000 Biographien

## Auswahl von 9 AkteurInnen

- a) viel geotemporale Bewegung
- b) hohe geographische Diversität
- c) verschiedene Berufsgruppen (Gideon Datenbank)

**Friedrich Piffli** (Bischof)

[http://www.biographien.ac.at/oeb1/oeb1\\_P/Piffli\\_Friedrich\\_1864\\_1932.xml;internal&action=hilite.action&Parameter=piffli%20friedrich](http://www.biographien.ac.at/oeb1/oeb1_P/Piffli_Friedrich_1864_1932.xml;internal&action=hilite.action&Parameter=piffli%20friedrich)

**Ignatius Trebitsch-Lincoln** (Abenteurer)

[http://www.biographien.ac.at/oeb1/oeb1\\_T/Trebitsch-Lincoln\\_Ignatius-Timothy\\_1879\\_1943.xml;internal&action=hilite.action&Parameter=trebitsch](http://www.biographien.ac.at/oeb1/oeb1_T/Trebitsch-Lincoln_Ignatius-Timothy_1879_1943.xml;internal&action=hilite.action&Parameter=trebitsch)

**Wilhelm Thaller** (Schauspieler)

[http://www.biographien.ac.at/oeb1/oeb1\\_T/Thaller\\_Willi\\_1854\\_1941.xml;internal&action=hilite.action&Parameter=thaller%20willi](http://www.biographien.ac.at/oeb1/oeb1_T/Thaller_Willi_1854_1941.xml;internal&action=hilite.action&Parameter=thaller%20willi)

**Wilhelm Thöny** (Maler)

[http://www.biographien.ac.at/oeb1/oeb1\\_T/Thoeny\\_Wilhelm\\_1888\\_1949.xml;internal&action=hilite.action&Parameter=th%F6ny%20wilhelm](http://www.biographien.ac.at/oeb1/oeb1_T/Thoeny_Wilhelm_1888_1949.xml;internal&action=hilite.action&Parameter=th%F6ny%20wilhelm)

**Edvard Rusjan** (Pilot)

[http://www.biographien.ac.at/oeb1/oeb1\\_R/Rusjan\\_Edvard\\_1886\\_1911.xml;internal&action=hilite.action&Parameter=rusjan%20edvard](http://www.biographien.ac.at/oeb1/oeb1_R/Rusjan_Edvard_1886_1911.xml;internal&action=hilite.action&Parameter=rusjan%20edvard)

**Emil Schrutka-Rechtenstamm:** (Jurist)

[http://www.biographien.ac.at/oeb1/oeb1\\_S/Schrutka-Rechtenstamm\\_Emil\\_1852\\_1918.xml;internal&action=hilite.action&Parameter=schrutka](http://www.biographien.ac.at/oeb1/oeb1_S/Schrutka-Rechtenstamm_Emil_1852_1918.xml;internal&action=hilite.action&Parameter=schrutka)

**Rudolf Swoboda** (Maler)

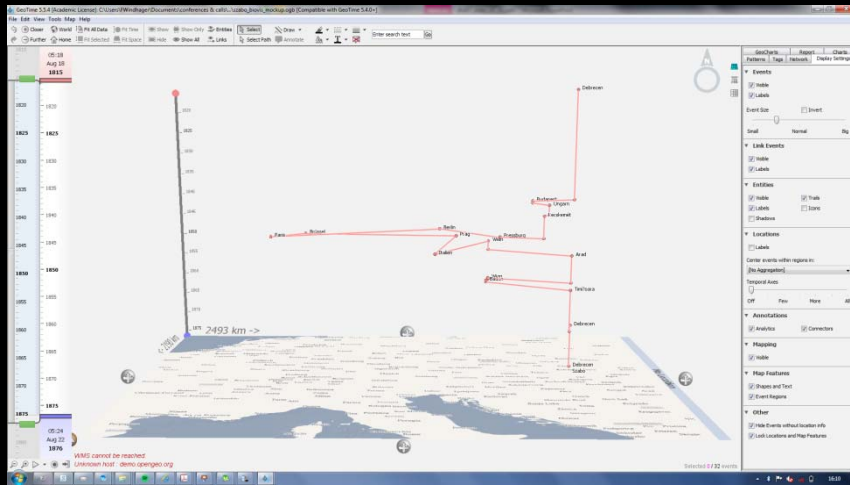
[http://www.biographien.ac.at/oeb1/oeb1\\_S\\_43/Swoboda\\_Rudolf\\_1859\\_1914.xml;internal&action=hilite.action&Parameter=swoboda%20rudolf](http://www.biographien.ac.at/oeb1/oeb1_S_43/Swoboda_Rudolf_1859_1914.xml;internal&action=hilite.action&Parameter=swoboda%20rudolf)

**Josefine Swoboda:** (Malerin)

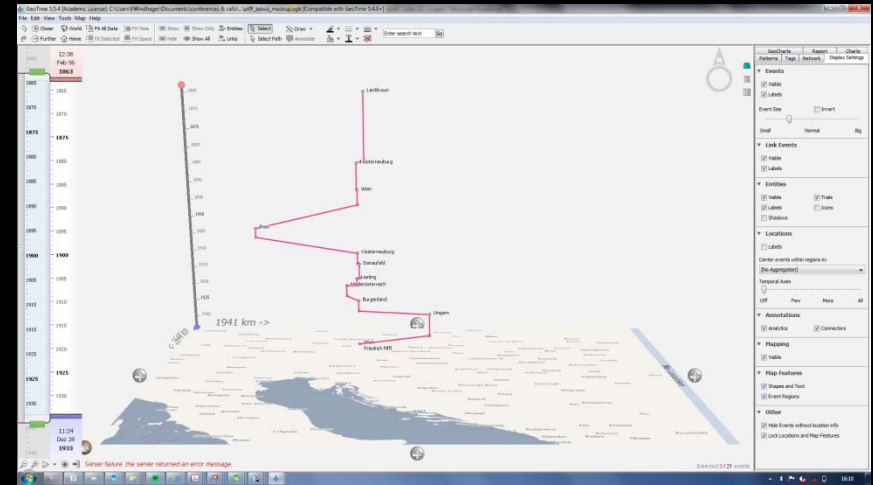
[http://www.biographien.ac.at/oeb1/oeb1\\_S\\_43/Swoboda\\_Josefine\\_1861\\_1924.xml;internal&action=hilite.action&Parameter=swoboda%20josefine](http://www.biographien.ac.at/oeb1/oeb1_S_43/Swoboda_Josefine_1861_1924.xml;internal&action=hilite.action&Parameter=swoboda%20josefine)

**Joszef Szabo** (Theaterdirektor)

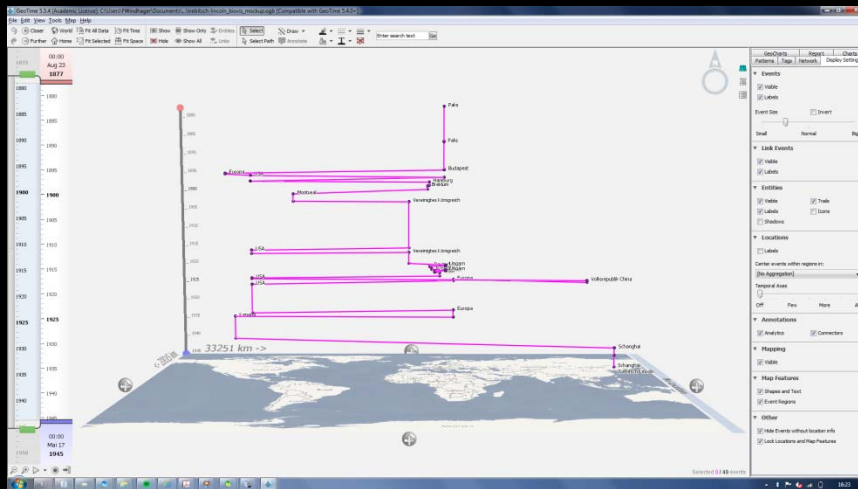
[http://www.biographien.ac.at/oeb1/oeb1\\_S\\_43/Szabo\\_Jozsef\\_1816\\_1875.xml;internal&action=hilite.action&Parameter=szab%F3%20j%F3zsef](http://www.biographien.ac.at/oeb1/oeb1_S_43/Szabo_Jozsef_1816_1875.xml;internal&action=hilite.action&Parameter=szab%F3%20j%F3zsef)



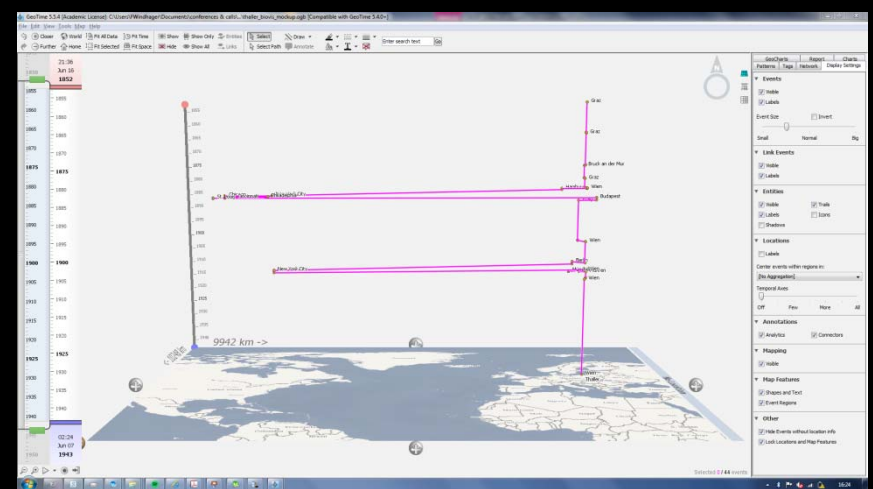
Josef Szabo  
(Sänger, Theaterdirektor)



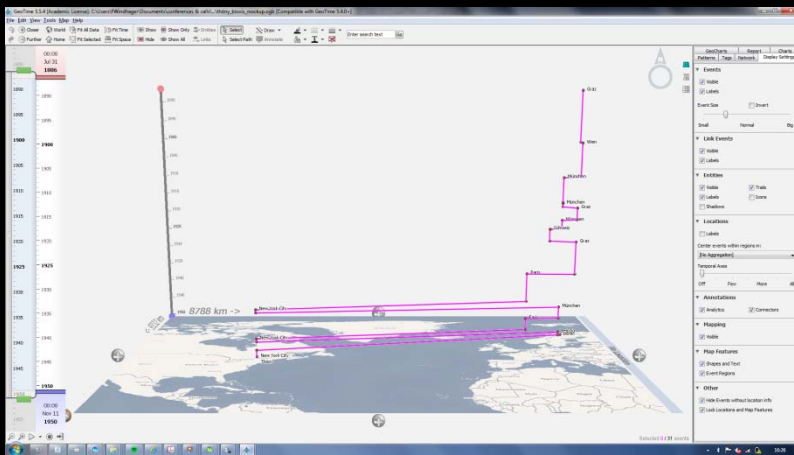
Friedrich Piffel  
(Bischof)



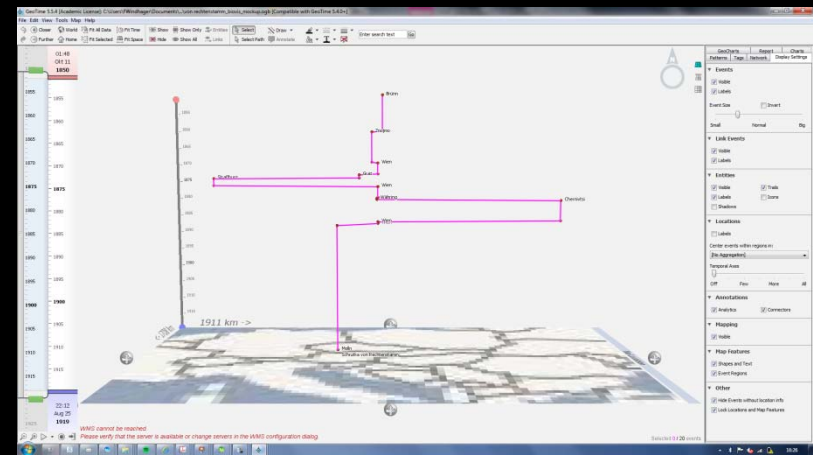
Ignatius Trebitsch-Lincoln  
(Abenteurer)



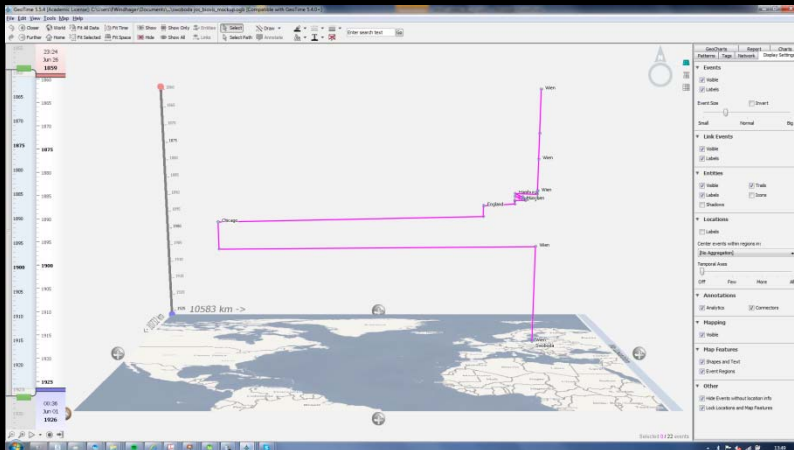
Willi Thaller  
(Schauspieler & Sänger)



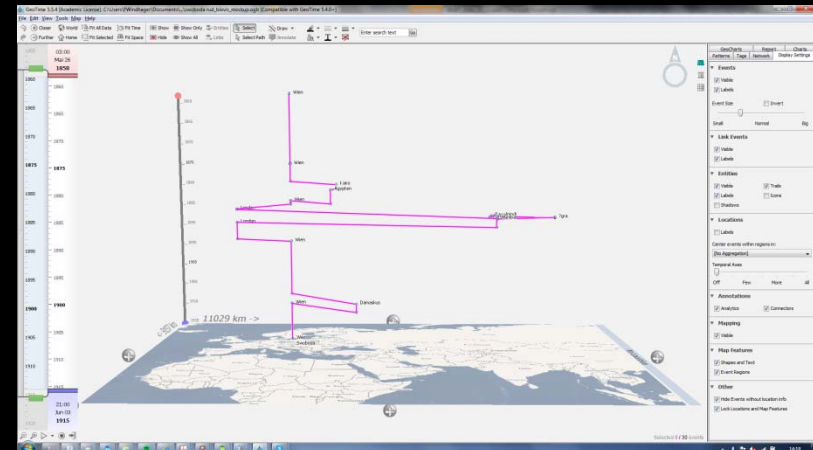
Wilhelm Thöny  
(Maler)



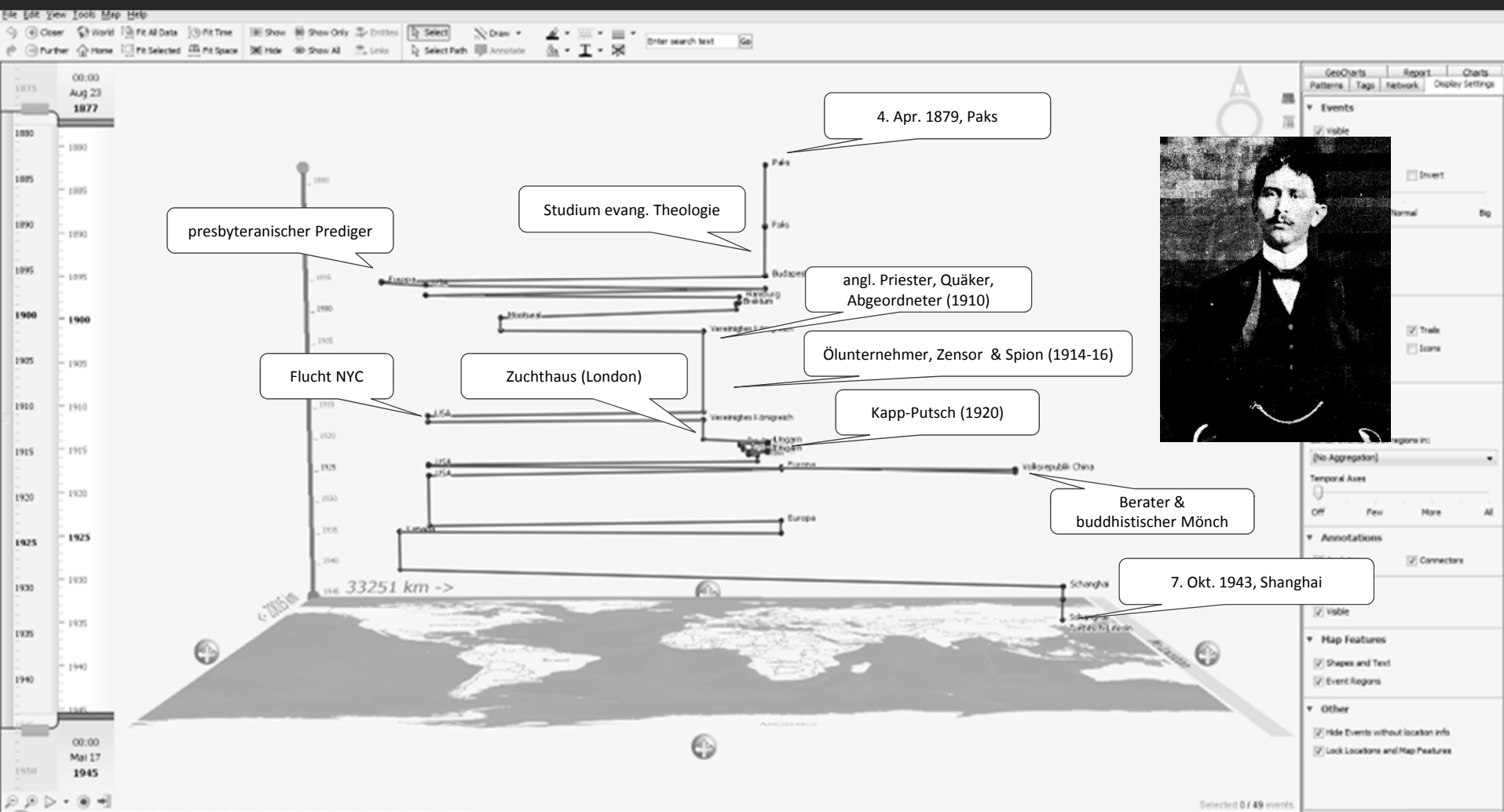
Emil Schrutka von Rechtenstamm  
(Jurist)



Josefine Swoboda  
(Malerin)



Rudolf Swoboda  
(Maler)



*Ignatius Trebitsch-Lincoln (Abenteurer)*

*(Abgeordneter im britischen Unterhaus, Hochstapler, Spion für Deutschland, buddhistischer Mönch u.v.a.m.)*

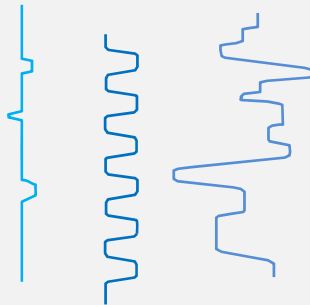
**[Visualizations are also interesting for non-expert users],  
because while they are interacting with them, their 'pattern-mind' is learning,  
even though they don't know the numbers behind that.**

(Valdis Krebs, 2011)

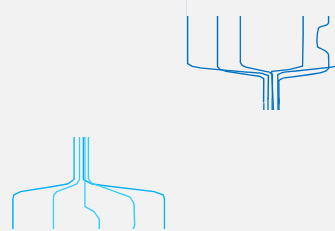
## *i) A New Kind of Pattern Language*



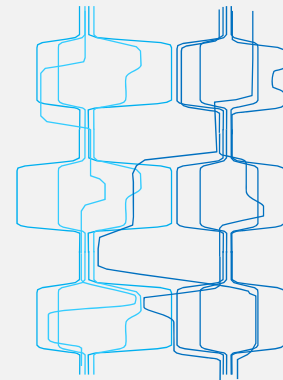
Geburt / Tod



individuelle Bewegung



Konvergenz / Divergenz

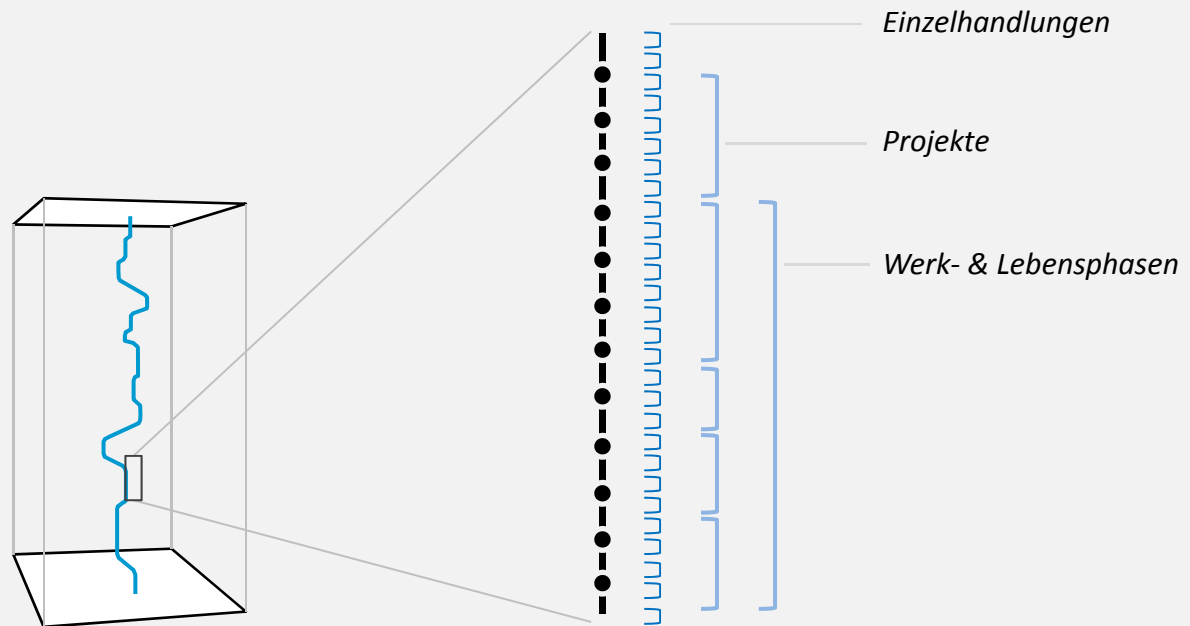


Verbundmuster

↑  
TIME

- geotemporale Position
- Dauer
- Räumliche Ausdehnung
- Zeitliche Rhythmen
- geotemporale Diversität

## *ii) Multiple temporale Granularitäten (cf. Activity Theory)*

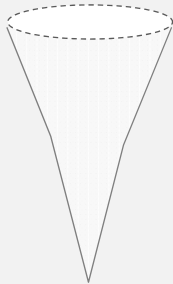


The screenshot displays the GeoChart software interface. The main window shows a map of Europe and Africa with a timeline from 1855 to 1930. A blue trajectory line connects various locations including Wien, London, Paris, and Cairo. An orange line segment is highlighted with a distance of 18232 km. The interface includes a menu bar, a toolbar, and a right-hand panel with settings for Events, Link Events, Entities, Locations, Annotations, Mapping, and Map Features.

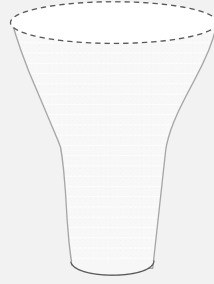
#### *iv) Collective Patterns (set-based)*



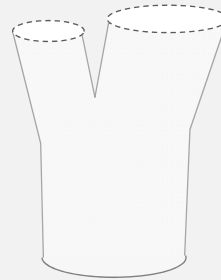
►  $t_2$



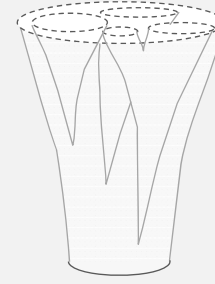
emergence



growth



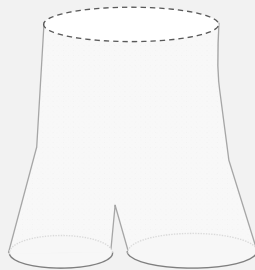
splitting



differentiation

►  $t_1$

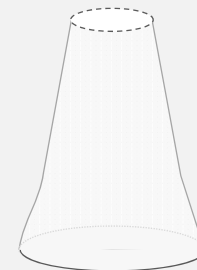
►  $t_2$



merging

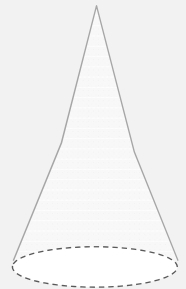


dedifferentiation

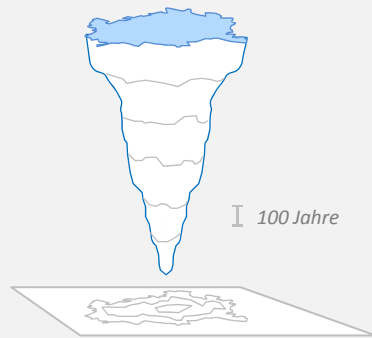


contraction

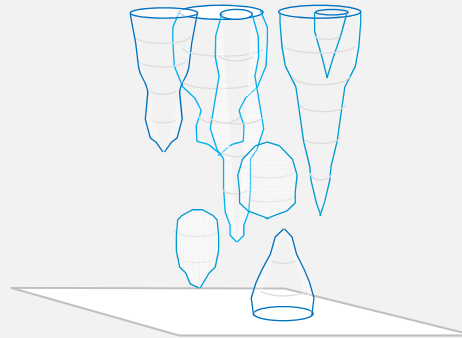
►  $t_1$



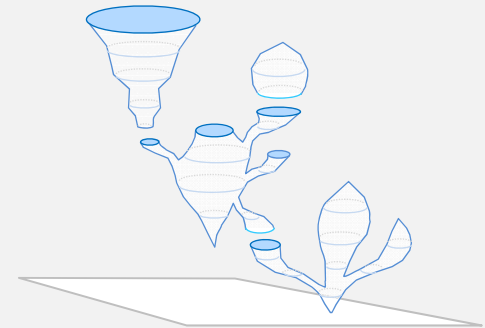
decline



Evolution einer Stadt

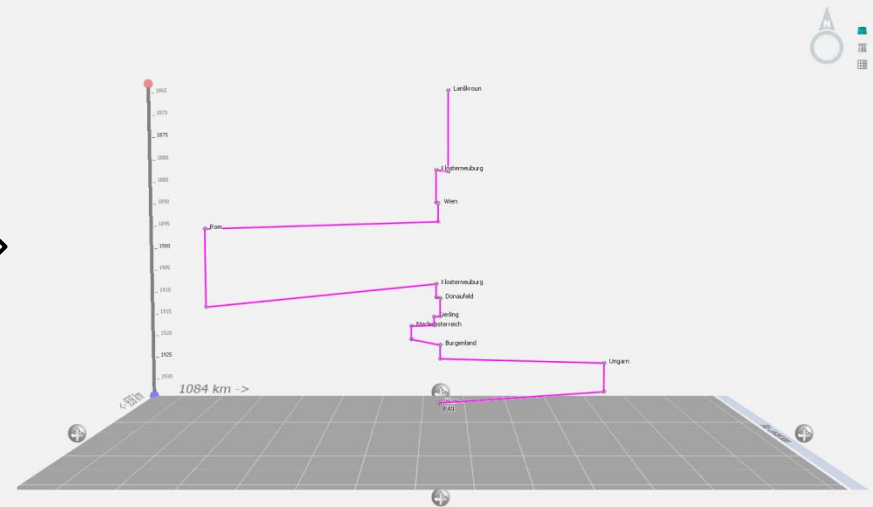
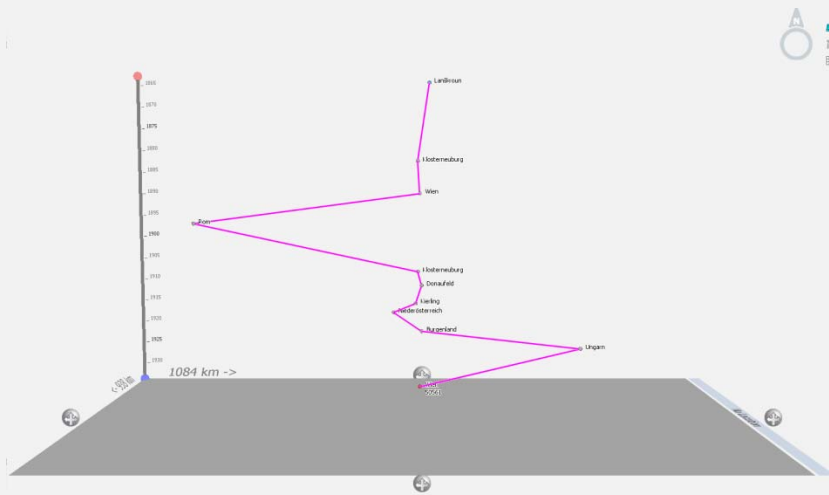


Entwicklung von Kollektiven



Genealogische Entwicklung

## v) InfoVis als Approximation an den "State of Data"



## **Visualising the »Un-seen«: Towards Critical Approaches and Strategies of Inclusion in Digital Cultural Heritage Interfaces**

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### **Abstract**

In recent years, access to cultural heritage has been closely connected to digitisation. We argue the case for recognising this digital shift as an opportunity to create interfaces to cultural heritage that are, first of all, more inviting to the public. Secondly, we want to encourage critical approaches towards the representation of cultural production and



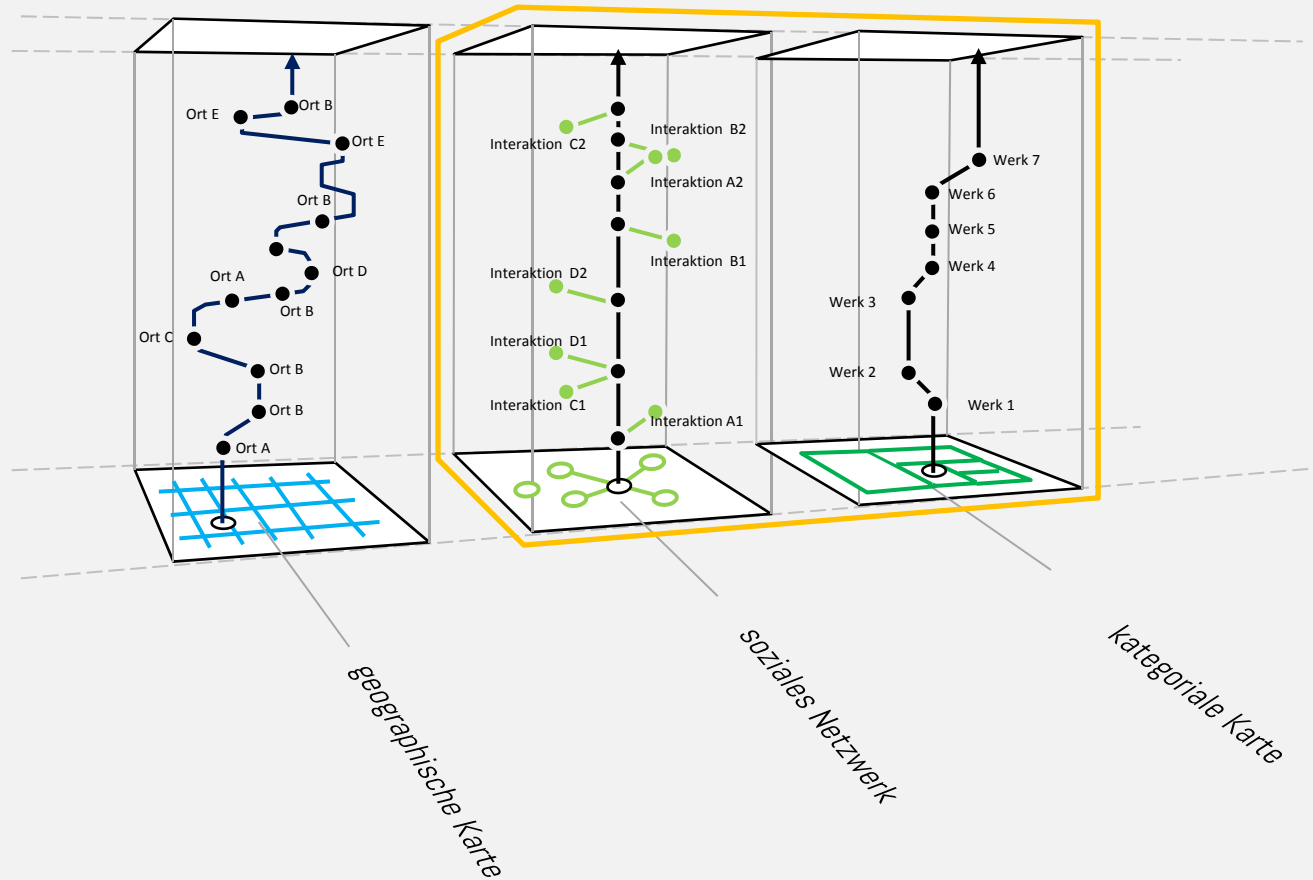
iii) Ausblick

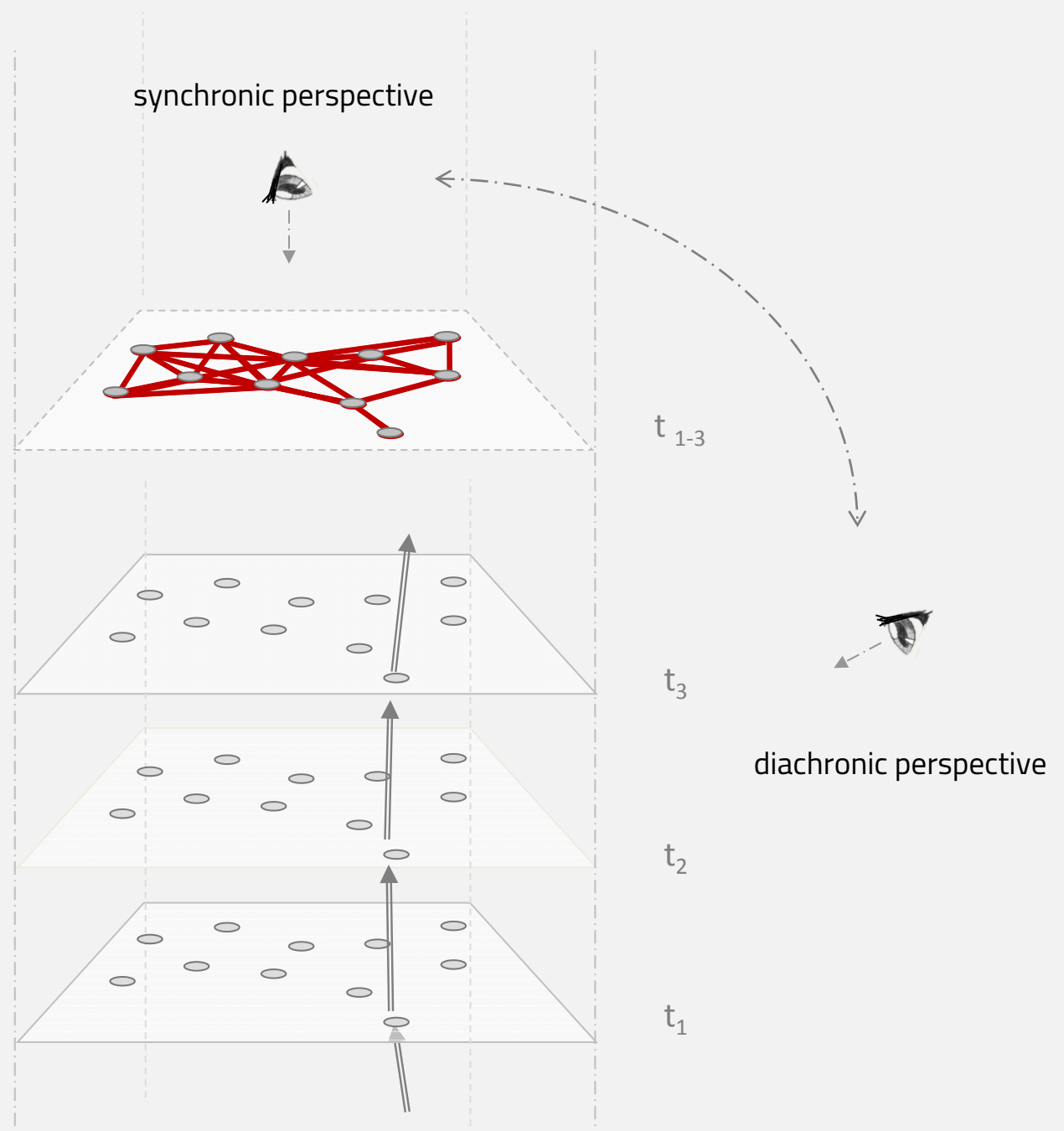
Kann das Verfahren über geo-temporale Daten  
hinaus angewendet werden?

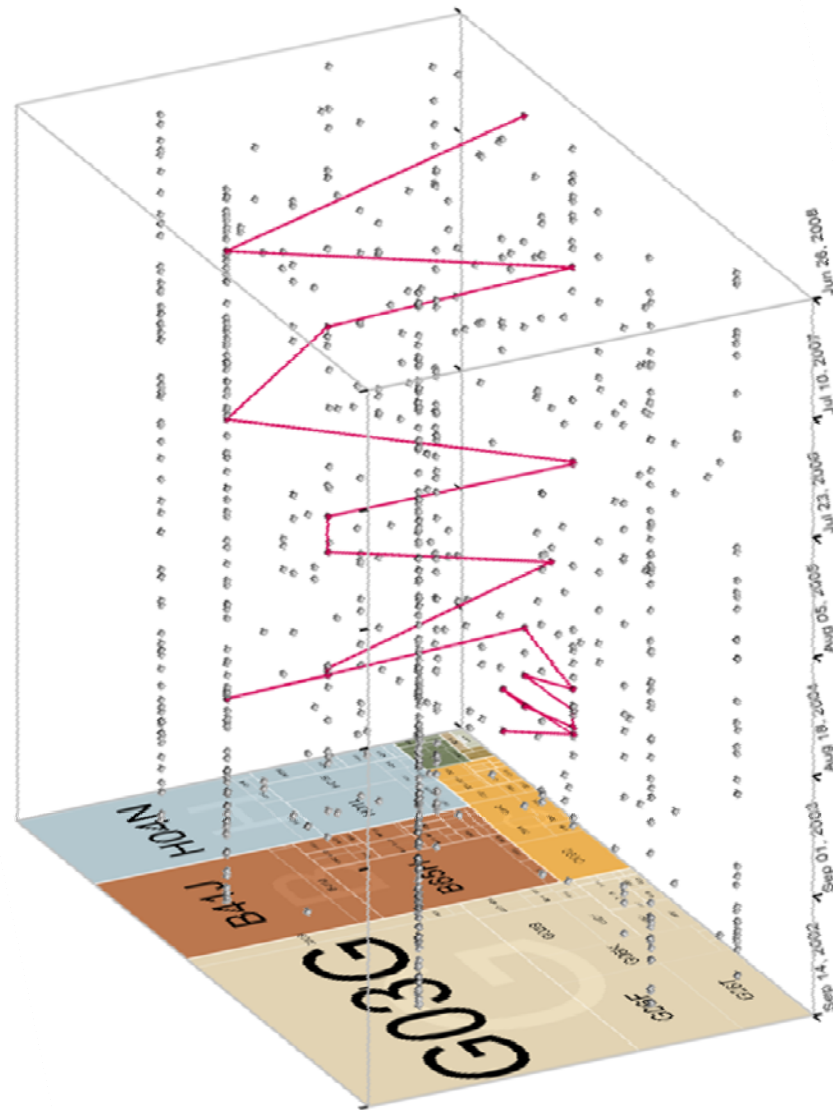


Kann das Verfahren auch die visuelle Analyse von historisch relevanten Persönlichkeiten ohne signifikante geo-temporale Aktivitäten unterstützen?

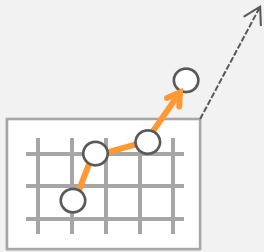
# Visuelle Analyse im Rahmen multipler Raumzeiten



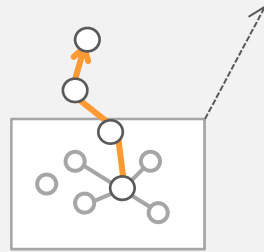




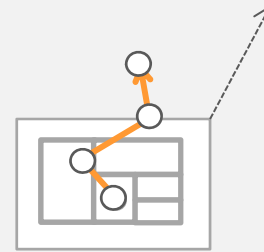
Wie kann die kognitive Integration von  
multiplen Visualisierung von Zeit unterstützt werden?



maps

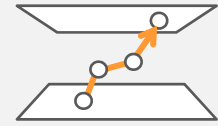


networks

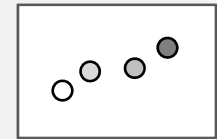


treemaps

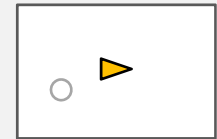
+ Zeit



space-time cube



superimposition



animation



juxtaposition

## A Descriptive Framework for Temporal Data Visualizations Based on Generalized Space-Time Cubes

B. Bach<sup>1</sup>, P. Dragicevic<sup>2</sup>, D. Archambault<sup>3</sup>, C. Hurter<sup>4</sup> and S. Carpendale<sup>5</sup>

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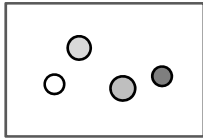
sheelagh@cpsc.ucalgary.ca

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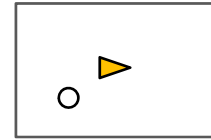
### Abstract

*We present the generalized space-time cube, a descriptive model for visualizations of temporal data. Visualizations are described as operations on the cube, which transform the cube's 3D shape into readable 2D visualizations. Operations include extracting subparts of the cube, flattening it across space or time or transforming the cube's geometry and content. We introduce a taxonomy of elementary space-time cube operations and explain how these operations can be combined and parameterized. The generalized space-time cube has two properties: (1) it is purely conceptual without the need to be implemented, and (2) it applies to all datasets that can be represented in two dimensions plus time (e.g. geo-spatial, videos, networks, multivariate data). The proper choice of space-time cube operations depends on many factors, for example, density or sparsity of a cube. Hence, we propose a characterization of structures within space-time cubes, which allows us to discuss strengths and limitations of operations. We finally review interactive systems that support multiple operations, allowing a user to customize his view on the data. With this framework, we hope to facilitate the description, criticism and comparison of temporal data visualizations, as well as the exploration of new techniques and systems. This paper is an extension of Bach et al.'s (2014) work.*

**Keywords:** space-time Cubes, temporal data, information visualization, video visualization, network visualization



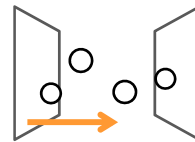
superimposition  
+ color coding



animation

„colored time flattening“

„time traversing“



stc

„multiple time cutting“

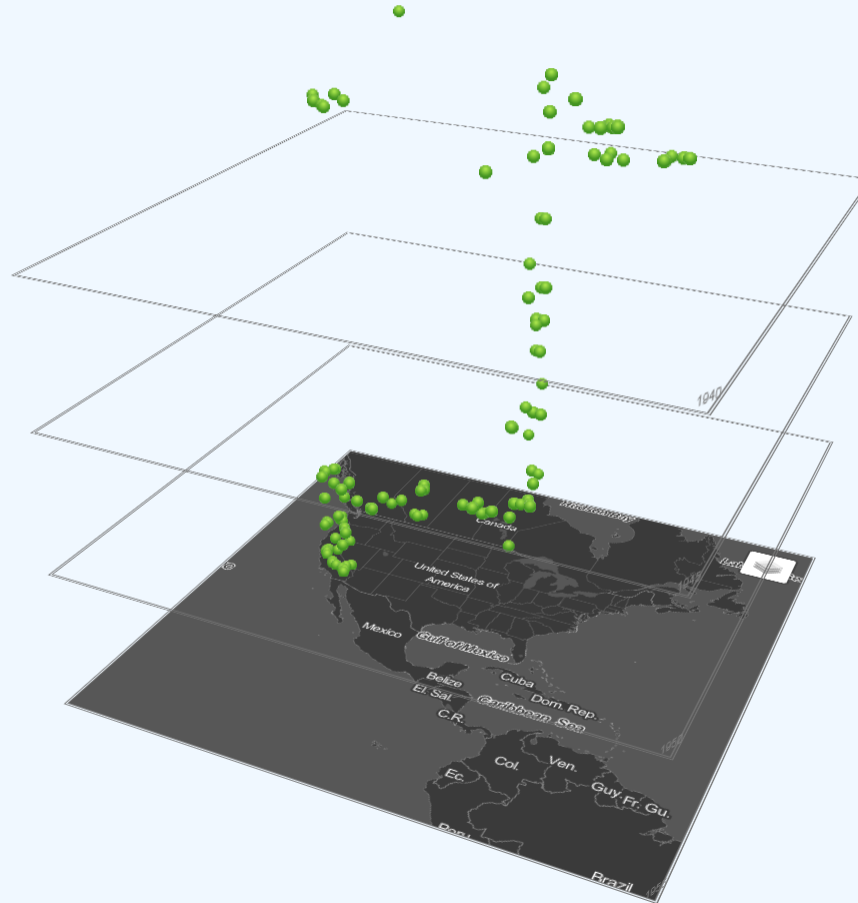


juxtaposition

space-time cube    juxtaposition    superimposition

Cupola, Maryland's capitol

Date : Sep. 25, 1940  
Location : Annapolis, Maryland



PolyCube © Cushman Data

Morphing

Show PC Data ☒

Show Nodes ☐

nodeSize

Close Controls

## **Ausblick** auf neue Möglichkeiten des

- multimodalen “cognition support” in Seminar & Klassenräumen
- visuellen Analyse & Synthese (*“theoria”*)
- kognitiv kohärenten close & distant readings / viewings

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