



Cartography

Spatial Computing – University of Minnesota



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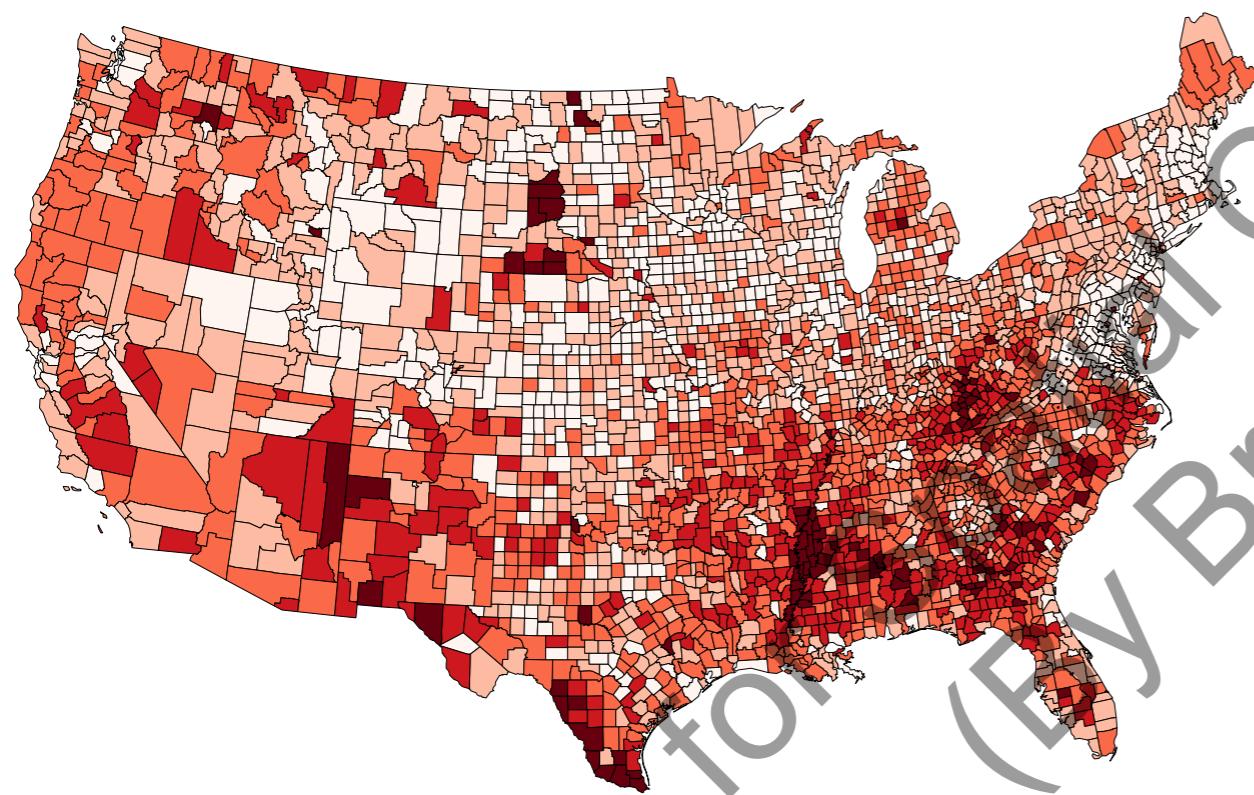
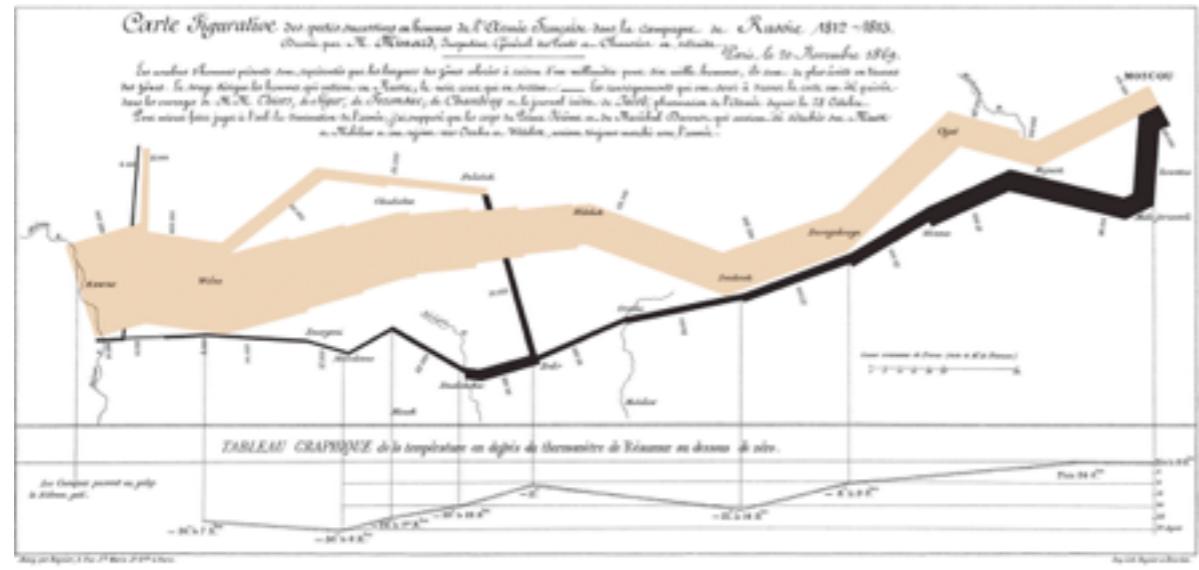
Learning Objectives

1. Understand the drastically **changed** (and changing) **professional context** of modern cartography.
2. Be able to distinguish between and understand the purpose of the two major types of maps: **reference** and **thematic**.
3. Know the **limitations** of popular online and mobile reference maps. (**Technical track:** Know how to get around them)
4. Be able to distinguish between types of **thematic maps** and choose the correct type for a given **geocommunication** need.
5. Have an understanding of some of the **computing-oriented innovation** going on in cartography (i.e. **spatialization**)

Spatialization

Hydrogen															Helium	
	Beryllium															
		Sodium														
Potassium	Calcium	Scandium	Titanium		Chromium	Tin	Cobalt	Nickel	Copper	Zinc	Gallium	Germanium	Arsenic	Selenium	Bromine	Krypton
	Strontium		Zirconium		Technetium		Rhodium		Silver	Cadmium	Indium	Tin	Antimony		Iodine	Xenon
Caesium	Barium		Hafnium	Tungsten	Rhenium	Osmium	Iridium	Platinum	Gold	Mercury element)		Lead		Polonium		Radon
				Dubrium	Seaborgium	Bismuth		Darmstadtium		Copernicium		Ununquadium		Ununhexium		Ununoctium

Cerium	Praseodymium		Promethium		Gadolinium	Dysprosium	Erbium	Thulium	Ytterbium	Lutetium
Thorium	Uranium	Plutonium	Curium	Californium	Fermium				Lawrencium	



Income Ladder, ... ×

com/2013/07/22/business/in-climbing-income-ladder-location-matters/

The New York Times

U.S.

Advertisement

B
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To



"Help us achieve a future where no child dies from a parent's gun."

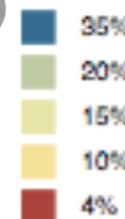
-Ann Marie Crowell, Mother

HERE'S HOW *

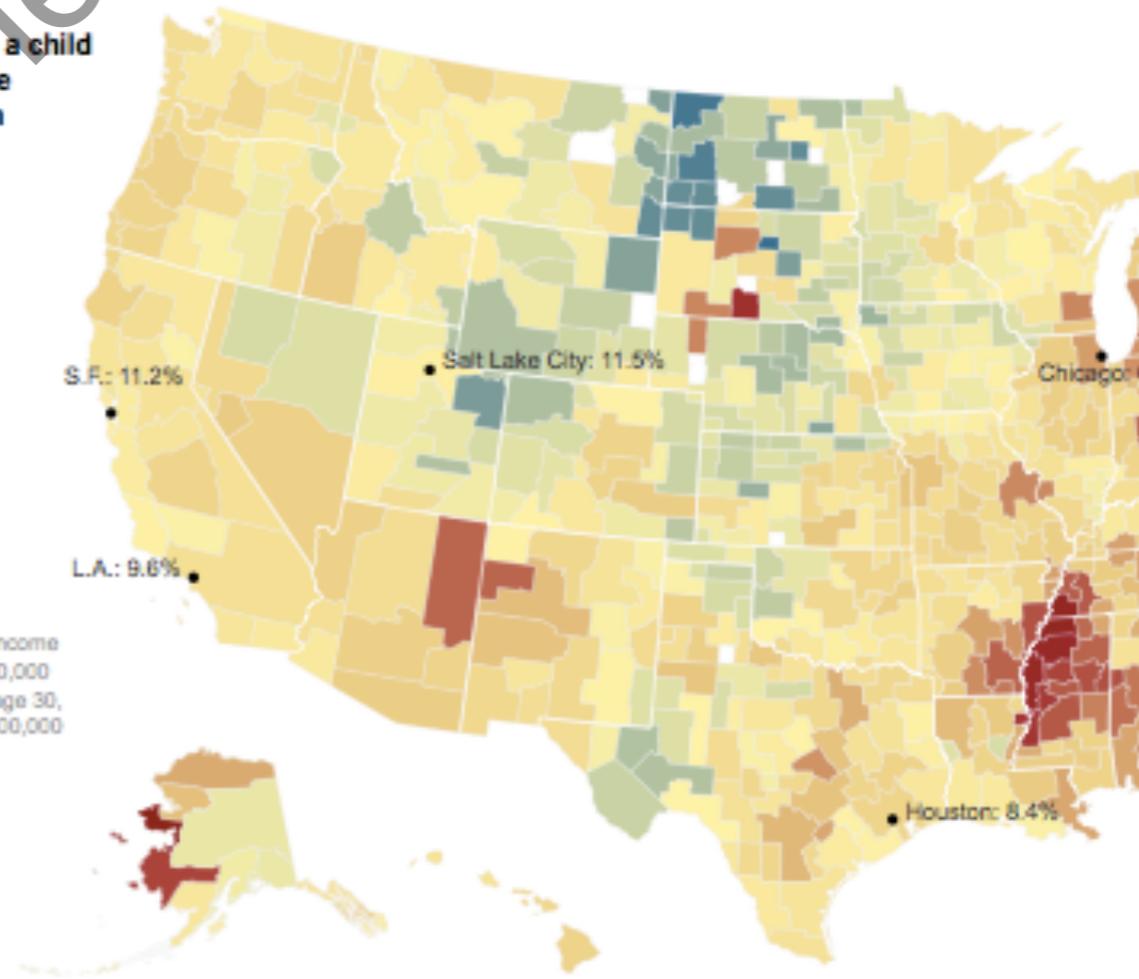
In Climbing Income Ladder, Location Matters

A study finds the odds of rising to another income level are notably low in certain cities, like Atlanta and Charlotte, and much higher in New York and Boston.

The chance a child raised in the bottom fifth rose to the top fifth



The top fifth is equal to family income of more than \$70,000 for the child by age 30, or more than \$100,000 by age 45.





Slides_Party

ited in one
important

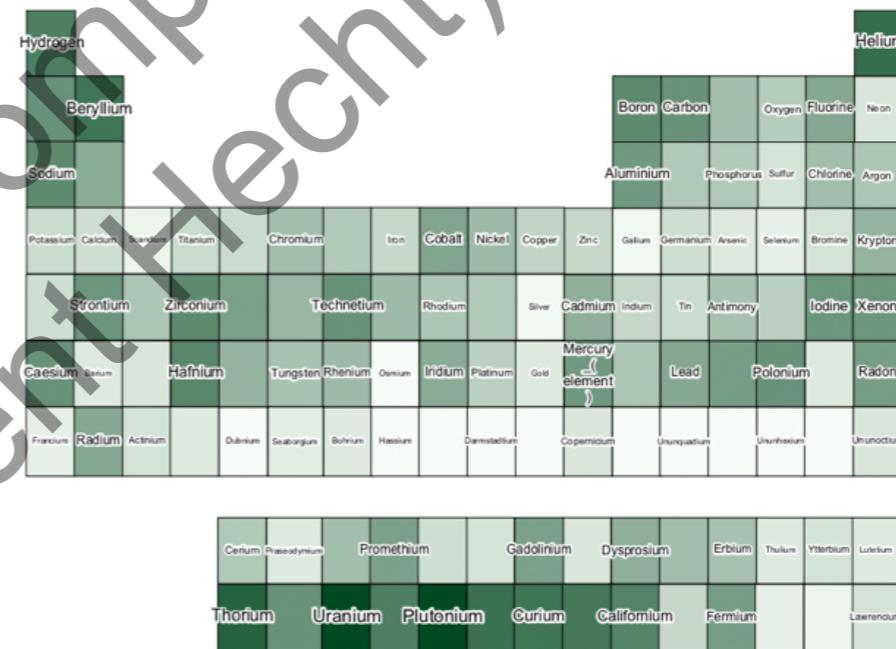
Computing
...
(By BremerHecht)

ited in one
important

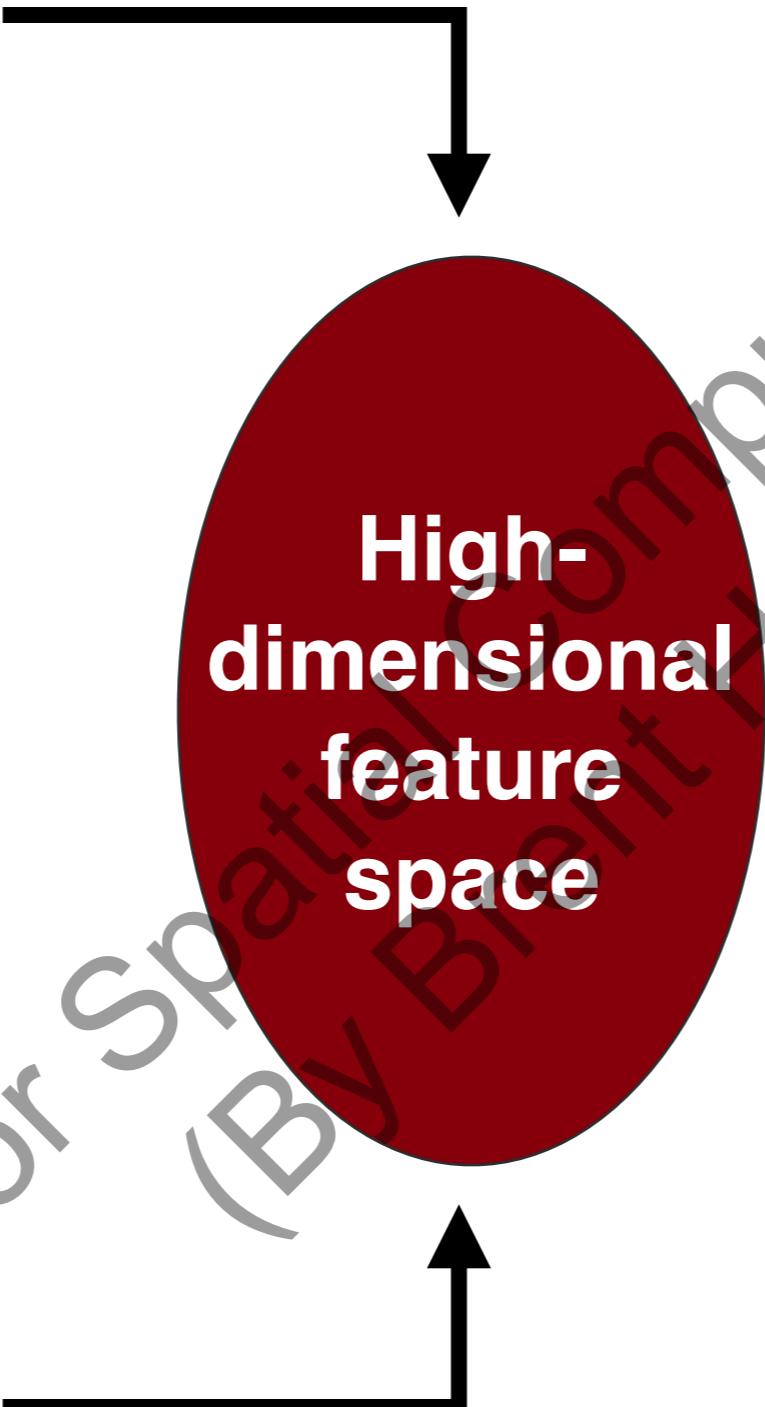
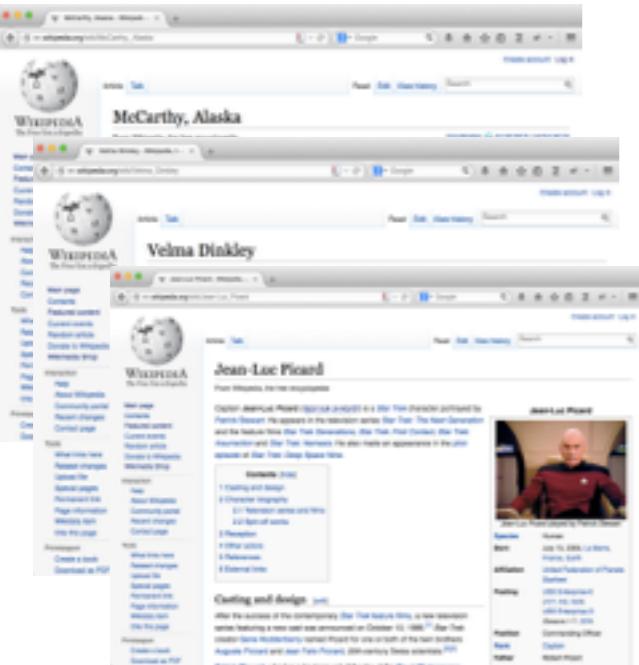
There are **two types** of spatialization...



Implicit Spatialization
(e.g. Skupin and Fabrikant 2003)



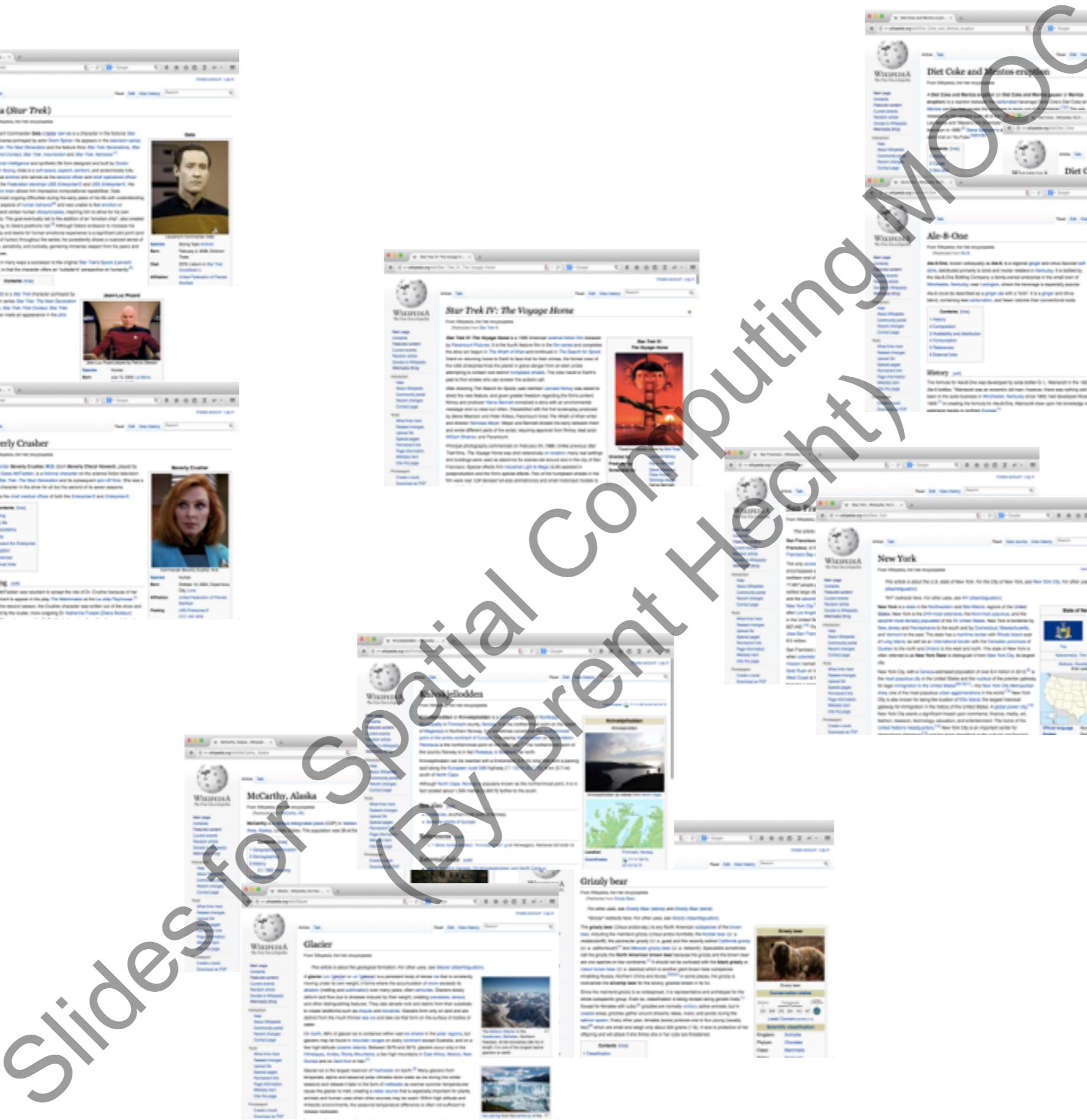
Explicit Spatialization
(Hecht et al. 2012)

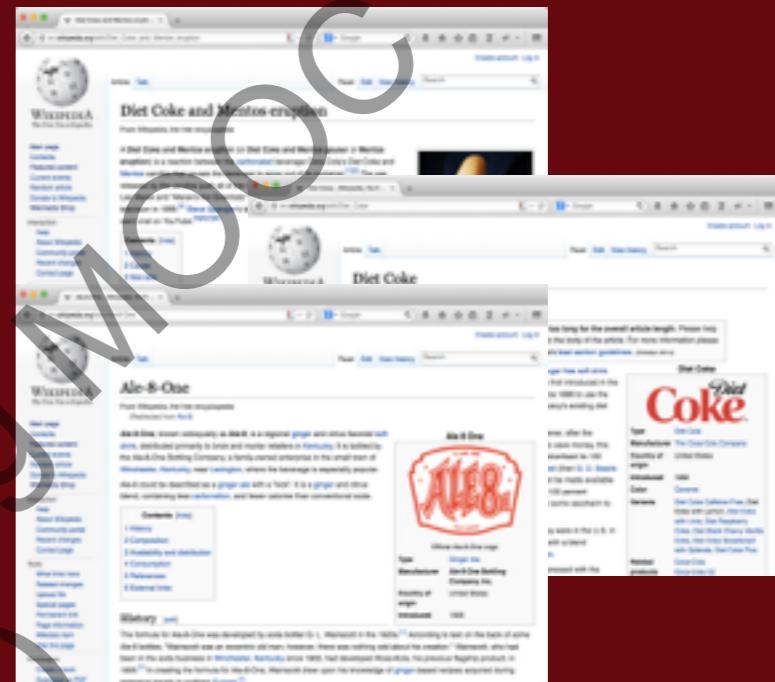
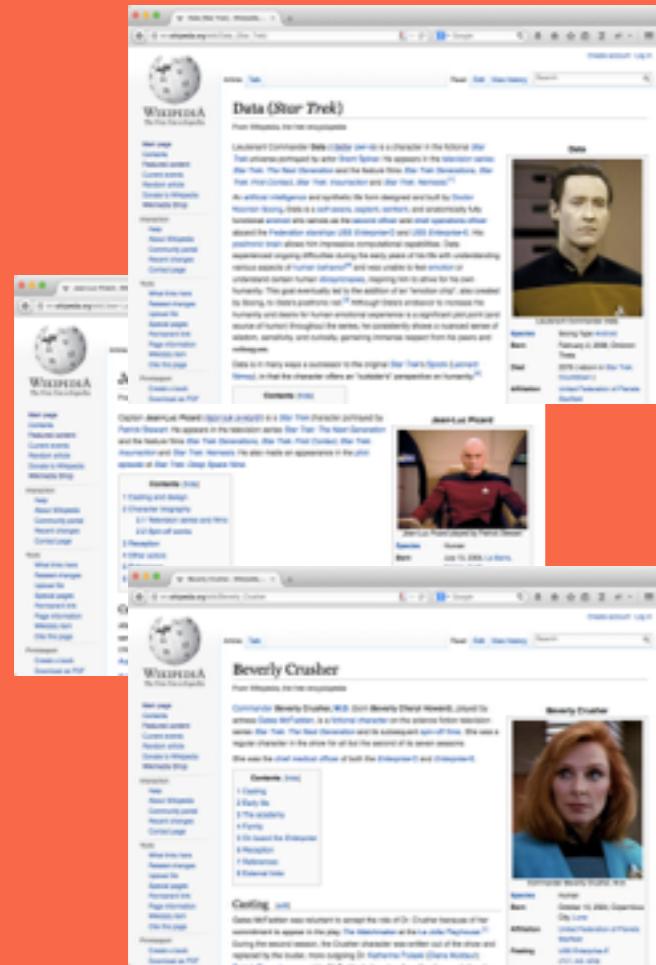


**Multi-dimensional
Scaling (MDS)**

**Kohonen
Self-
organizing
Maps**

Slides for Spatial Computing
(BY-BNC) Tech





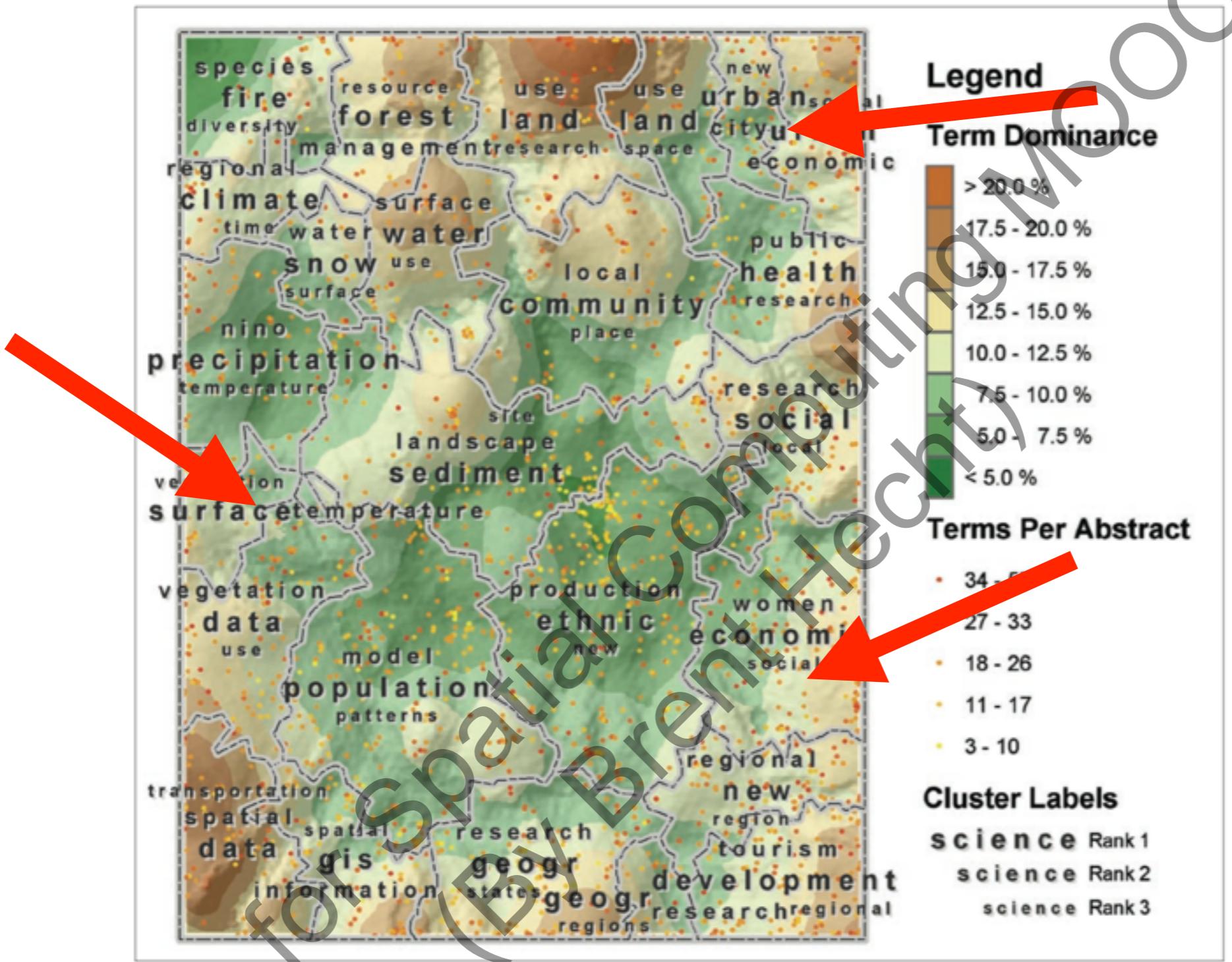
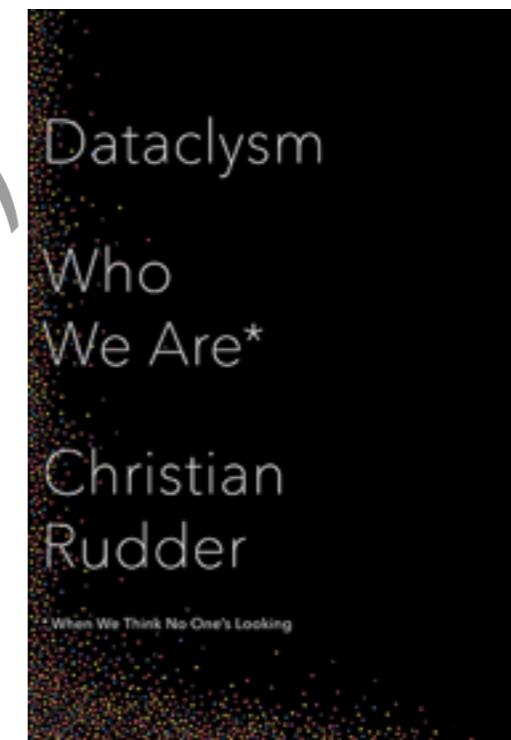
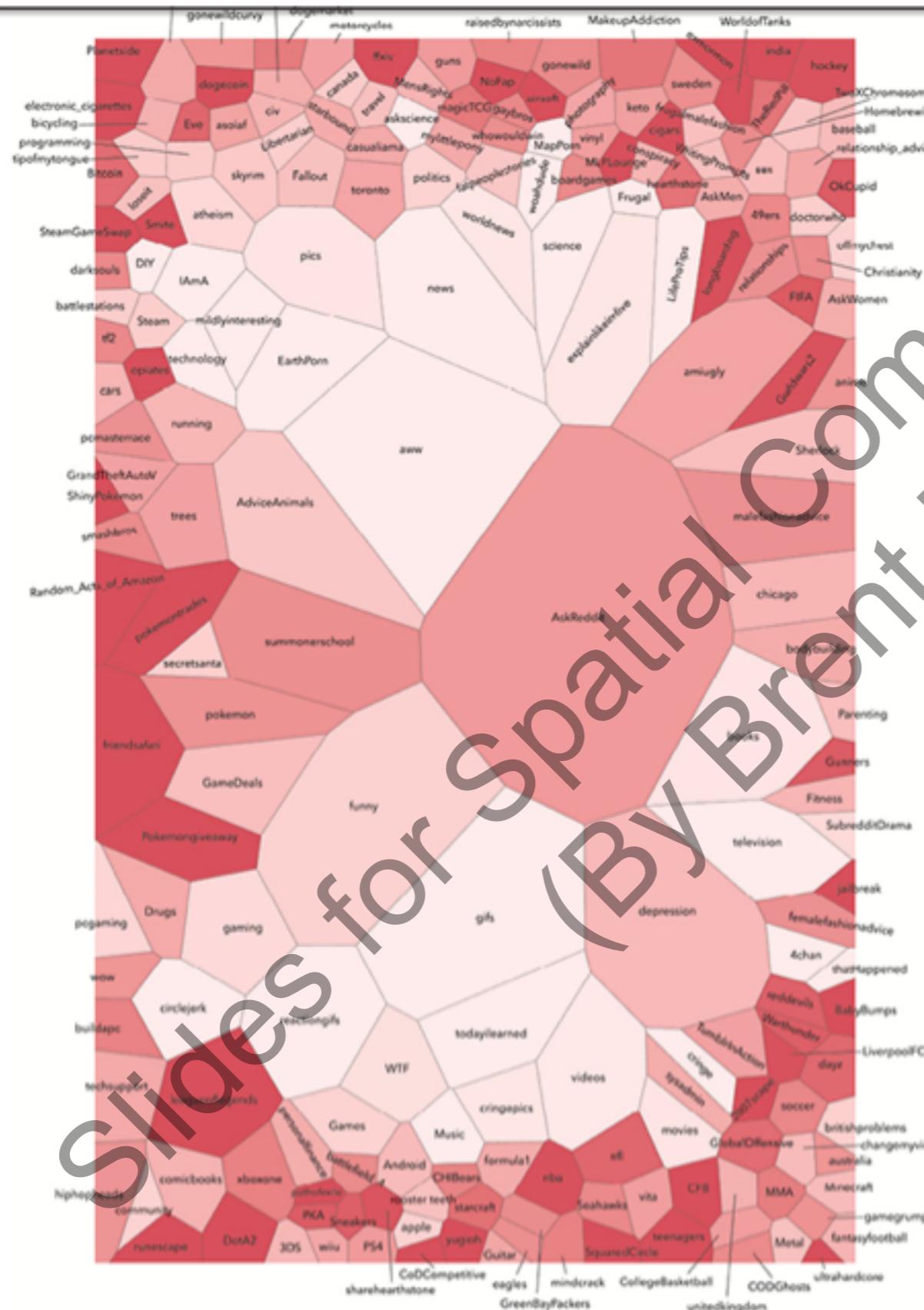


Figure 16. Visual support for evaluating cluster validity. The visualization is based on a 60-by-80 neuron SOM. It shows individual point locations for several thousand AAG conference abstracts, the 25-cluster level of a hierarchical cluster solution, ranked cluster labels, and an indication of how much the highest-ranked terms dominate particular regions. Low term dominance may indicate a lack of sharply defined themes and therefore the existence of relatively heterogeneous clusters.

(Skupin and Fabrikant 2003)

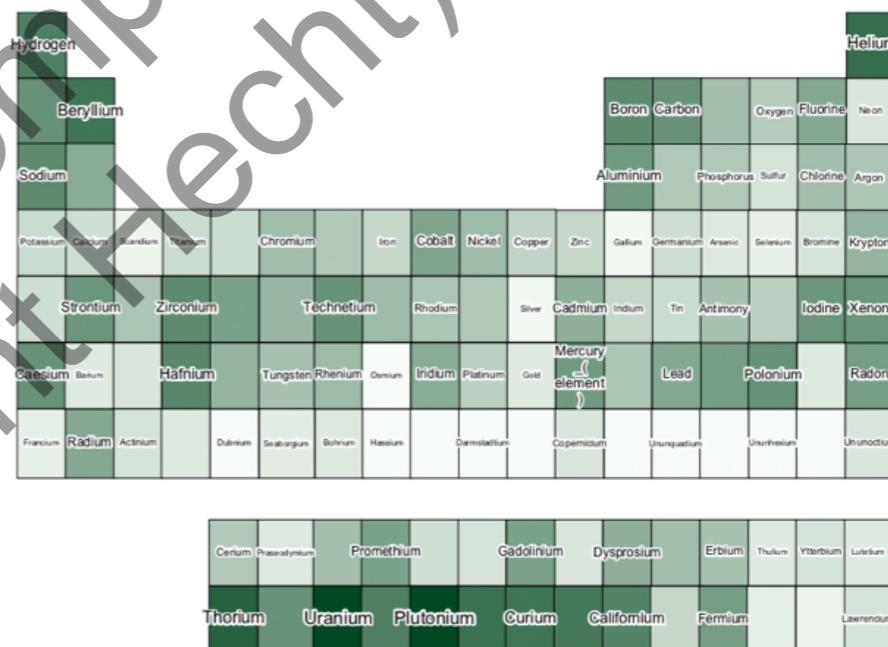


Map courtesy
*Dataclysm: Who
We Are When No
One's Looking*
by Christian
Rudder

There are **two types** of spatialization...



Implicit Spatialization
(e.g. Skupin and Fabrikant 2003)



Explicit Spatialization
(e.g. Hecht et al. 2012)



Implicit Spatialization

(e.g. Skupin and Fabrikant 2003)

Data-driven, implicit
reference systems

Hydrogen															Helium
Beryllium															
Sodium															
Potassium	Calcium	Scandium	Titanium		Chromium	Irons	Cobalt	Nickel	Copper	Zinc	Gallium	Germanium	Arsenic	Selenium	Bromine
Strontium	Zirconium			Technetium	Rhodium	Silver	Cadmium	Indium	Tin	Antimony	Iodine	Xenon			
Caesium	Barium	Hafnium	Tungsten	Rhenium	Osmium	Iridium	Platinum	Gold	Merkury element	Lead	Polonium				Radon
Francium	Radium	Actinium	Dubnium	Seaborgium	Bethunium	Hassium	Darmstadtium	Copernicium		Ununquadium	Ununhexium				Ununoctium
Cerium	Praseodymium		Promethium		Gadolinium	Dysprosium	Erbium	Thulium	Ytterbium						Lutetium
Thorium	Uranium	Plutonium	Curium	Californium	Fermium										

Explicit Spatialization

(e.g. Hecht et al. 2012)

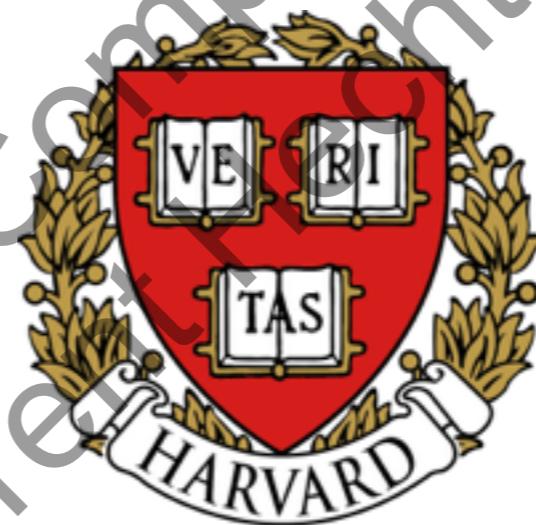
Real-life reference
systems



Dr. Kirk Goldsberry



Geography
Professor
@ Michigan State



Visiting
Professor
@ Harvard

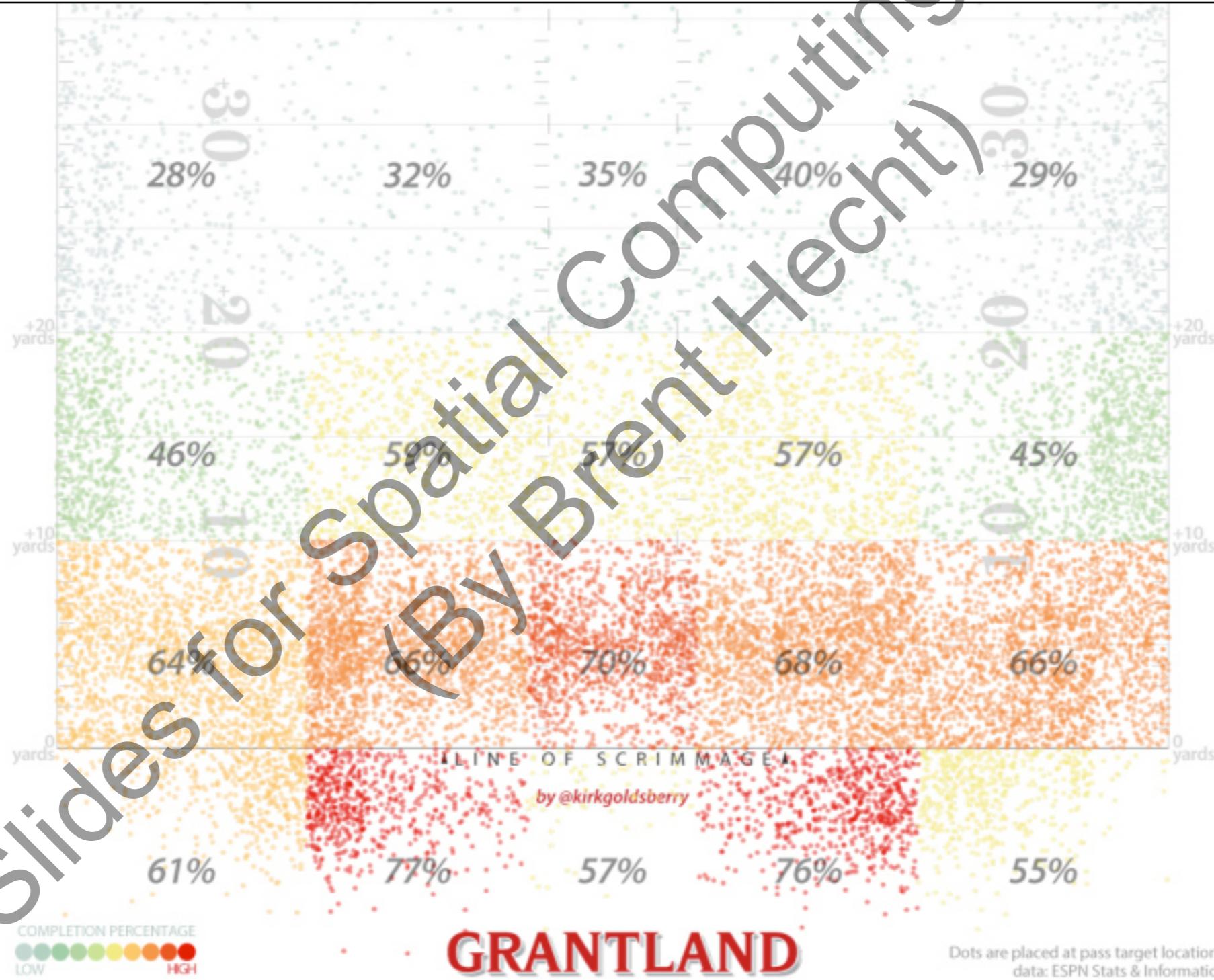


Contributor

Slides for Spatial Computing MOOC
(BY Breitlow)

<http://grantland.com/the-triangle/pass-atlas-peyton-manning-vs-the-seahawks-pass-defense/>

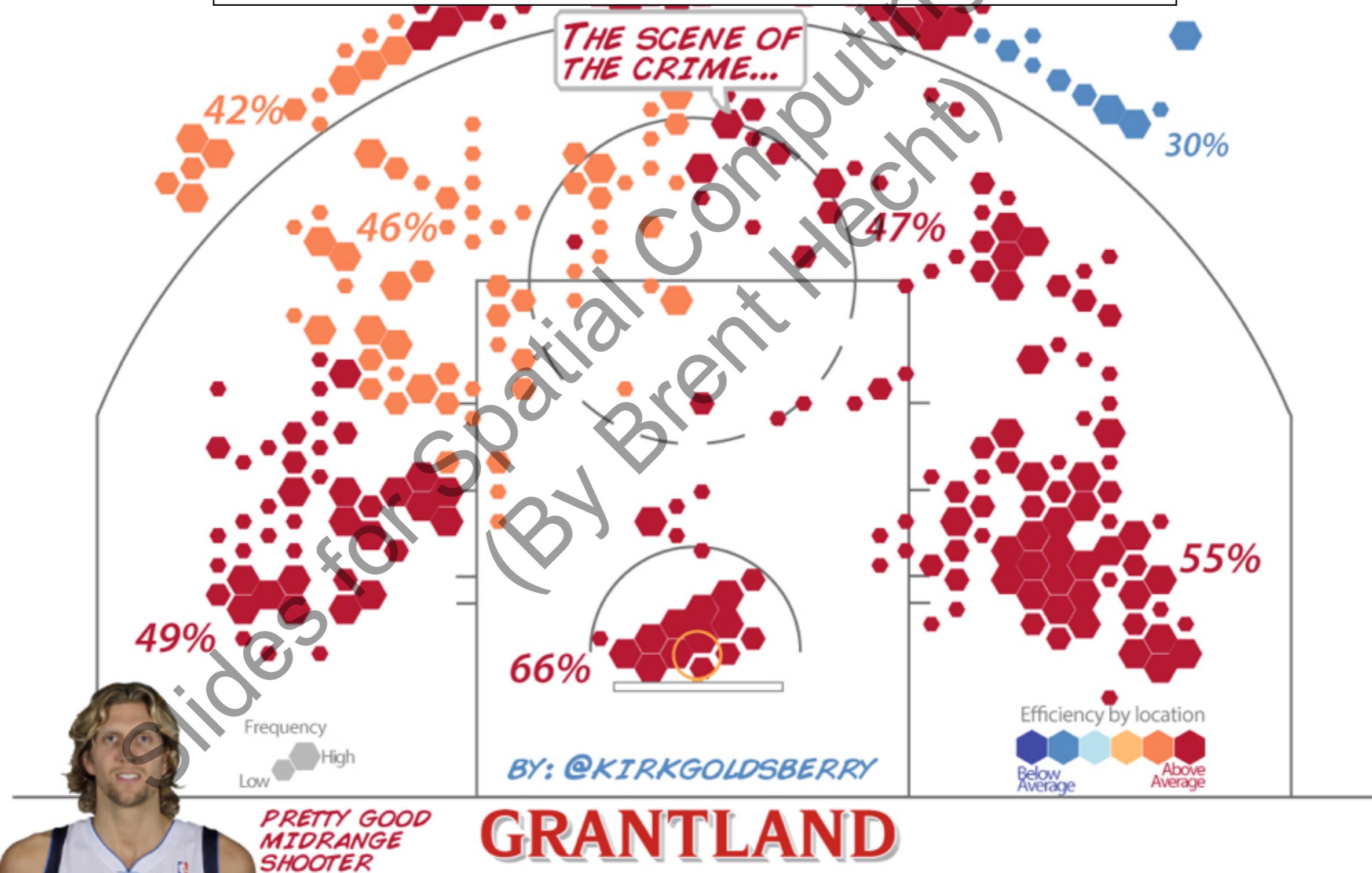
Reference System – Football Field



DIRK NOWITZKI BUZZER BEATER IN NEW YORK!

<http://grantland.com/the-triangle/nba-overnight-dirk-is-out-here-playing-h-o-r-s-e-with-peoples-lives/>

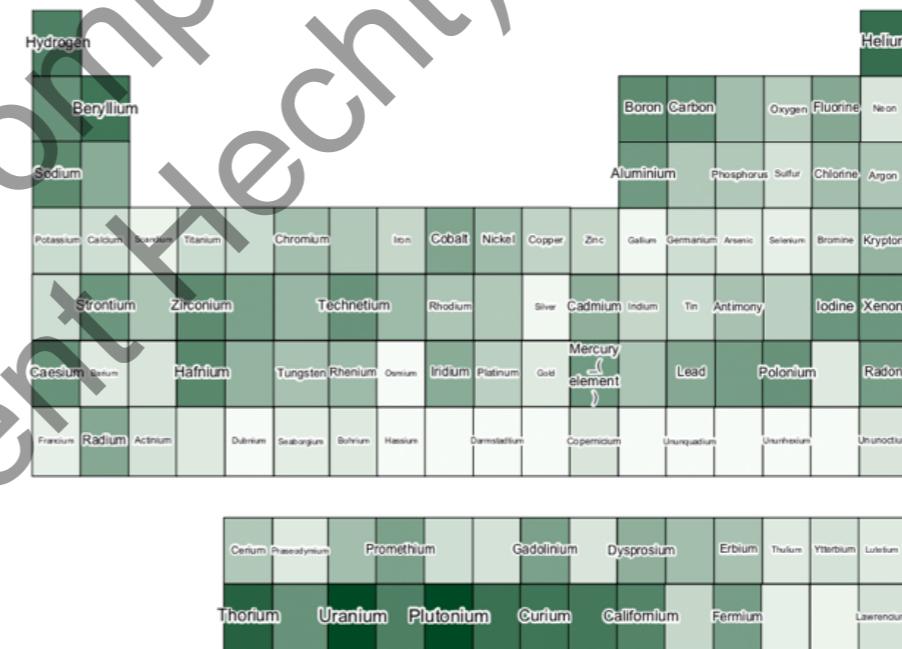
Reference System = Basketball Court



There are **two types** of spatialization...



Implicit Spatialization
(e.g. Skupin and Fabrikant 2003)



Explicit Spatialization
(Hecht et al. 2012)

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Attributions

“Globe” symbol by Bart Laugs of The Noun Project

Slides for Spatial Computing MOOC
(By Brent Hecht)