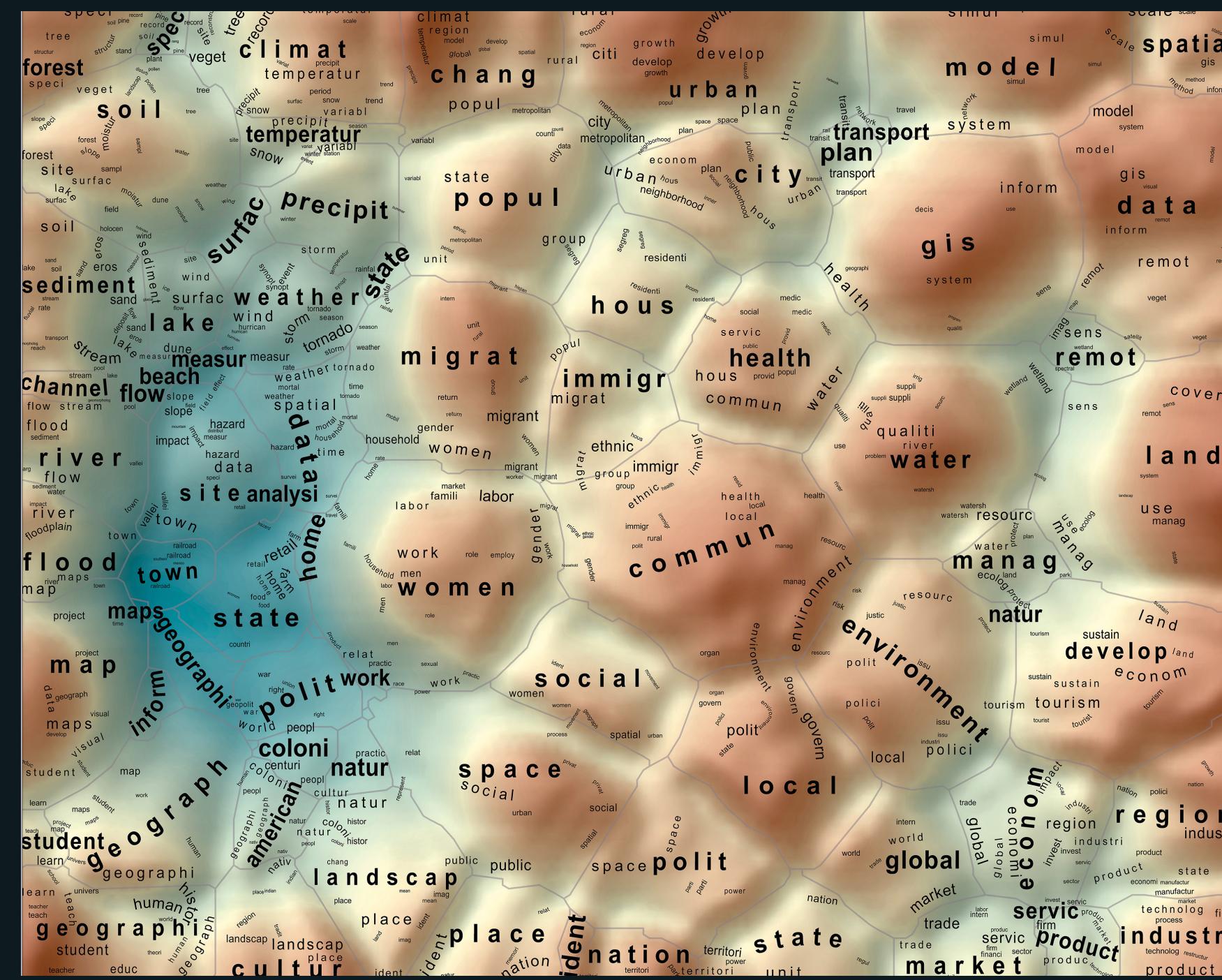




Phase I: Science Maps

Science maps serve as visual interfaces to immense amounts of data, allowing us to effectively discern outliers, clusters, and trends. The *Places & Spaces: Mapping Science* exhibit aims to introduce science mapping techniques to the general public and to experts across diverse disciplines for educational, scientific, and practical purposes.



I.9 In Terms of Geography, by André Skupin



Katy Börner speaks with exhibit-goers at Northwestern University in Chicago

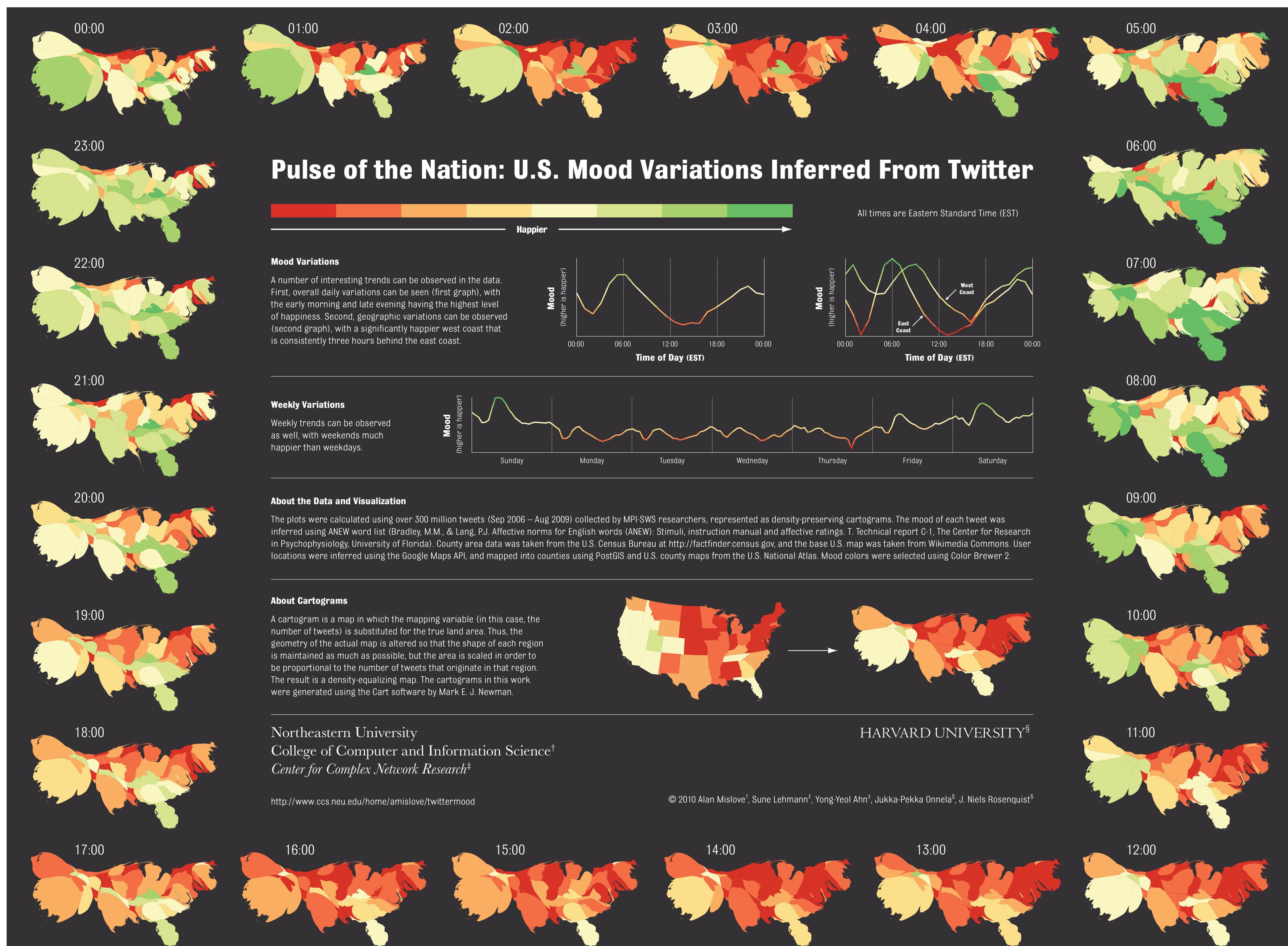


Visitors to the University of Miami exhibition discuss *The Oil Age* map.

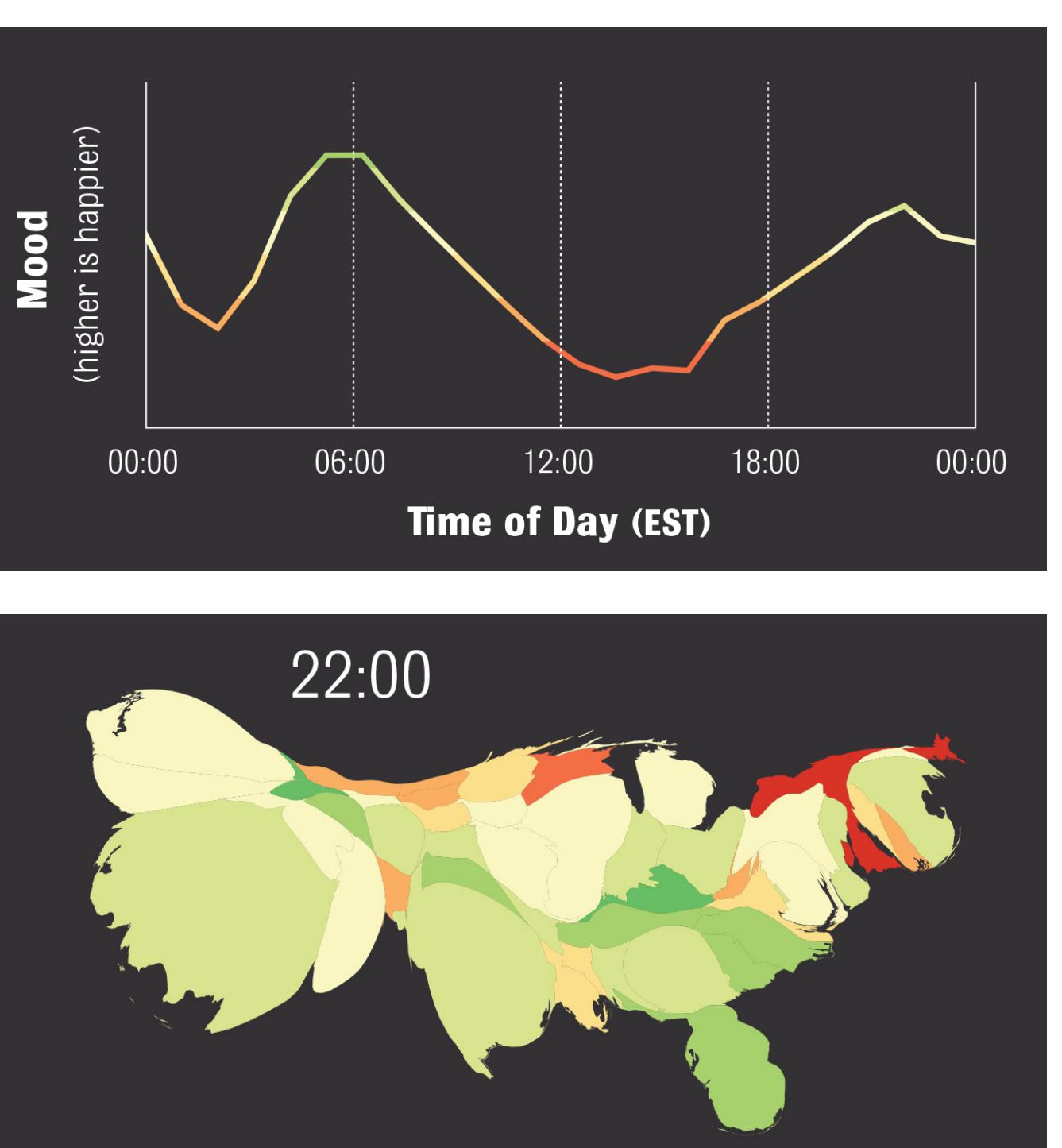
How do we communicate complex ideas with limited time and space?

Data Visualization

Could you convey the collective “mood” of Twitter users with just text? Maybe—but it would take pages and pages to convey the same insights this map does in seconds.



Conceived and created by computer scientists Alan Mislove and Sune Lehmann, network scientists Yong-Yeol Ahn and Jukka-Pekka Onnela, and psychiatrist and economist James Niels Rosenquist, this map makes a persuasive case for Twitter as a repository for our collective state of mind. Every second, up to tens of thousands of tweets are composed. Individually, each tweet is mostly interesting to friends or fans of the tweeter. But taken together, they add up to something more. Analogous to individual neurons firing together to add up to the human consciousness, these billions of tweets may constitute meaningful macro-states containing information about the system as a whole, rather than merely



information about individual tweeters. This map studies the mood of over 300 million public tweets in the U.S. sent between September 2006 and August 2009. The sheer number of tweets is represented by a density-preserving cartogram—the true land area of states sized by the number of tweets. The mood of each tweet was inferred using ANEW (Affective Norms for English Words), an affective word list where individual words are rated for their emotional valence. Each state was then color-coded by its mood per hour, averaged over the three years. To witness the national mood rise and fall before your very eyes, view the time-lapse video of *Pulse of the Nation* at <http://www.ccs.neu.edu/home/amislove/twittermood>.

Phase II: Macroscope Tools

While Phase I of *Places & Spaces* introduced the power and utility of science mapping to many, it has also raised new questions:

- How can we demonstrate the power of data analysis and visualization techniques to monitor and support science over time?
 - How can we improve data visualization literacy globally and for all ages?
 - How can we empower individuals to make their very own maps?

Phase II of the exhibit aims to address these questions by shifting the focus of the exhibit from maps to “macroscope tools.”



Stephen Mautner from the National Academy of Sciences interacts with *AcademyScope*, an interactive visualization of National Academies Press publications created by the CNS Center.

The term “macroscope” was first coined in 1979 by Joël de Rosnay in a book entitled *The Macroscope: A New World Scientific System*. To meet the challenges posed by the abundance, diversity and complexity of information, de Rosnay proposes the macroscope, a tool “not used to make things larger or smaller but to observe what is at once too great, too slow, and too complex for our eyes.”

The Call for Macroscope Tools went out in May and the first iteration of macroscopes will debut this fall.



Hidalgo, César A., Bailey Klinger, Albert-László Barabási, and Ricardo Hausmann. 2007. See also *The Product Space* map from Phase I of *Places & Spaces*.

Places & Spaces is curated by Dr. Katy Börner and managed by Lisel Record. Learn more about the *Places & Spaces* exhibit at scimaps.org.

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