

Tutorial

1

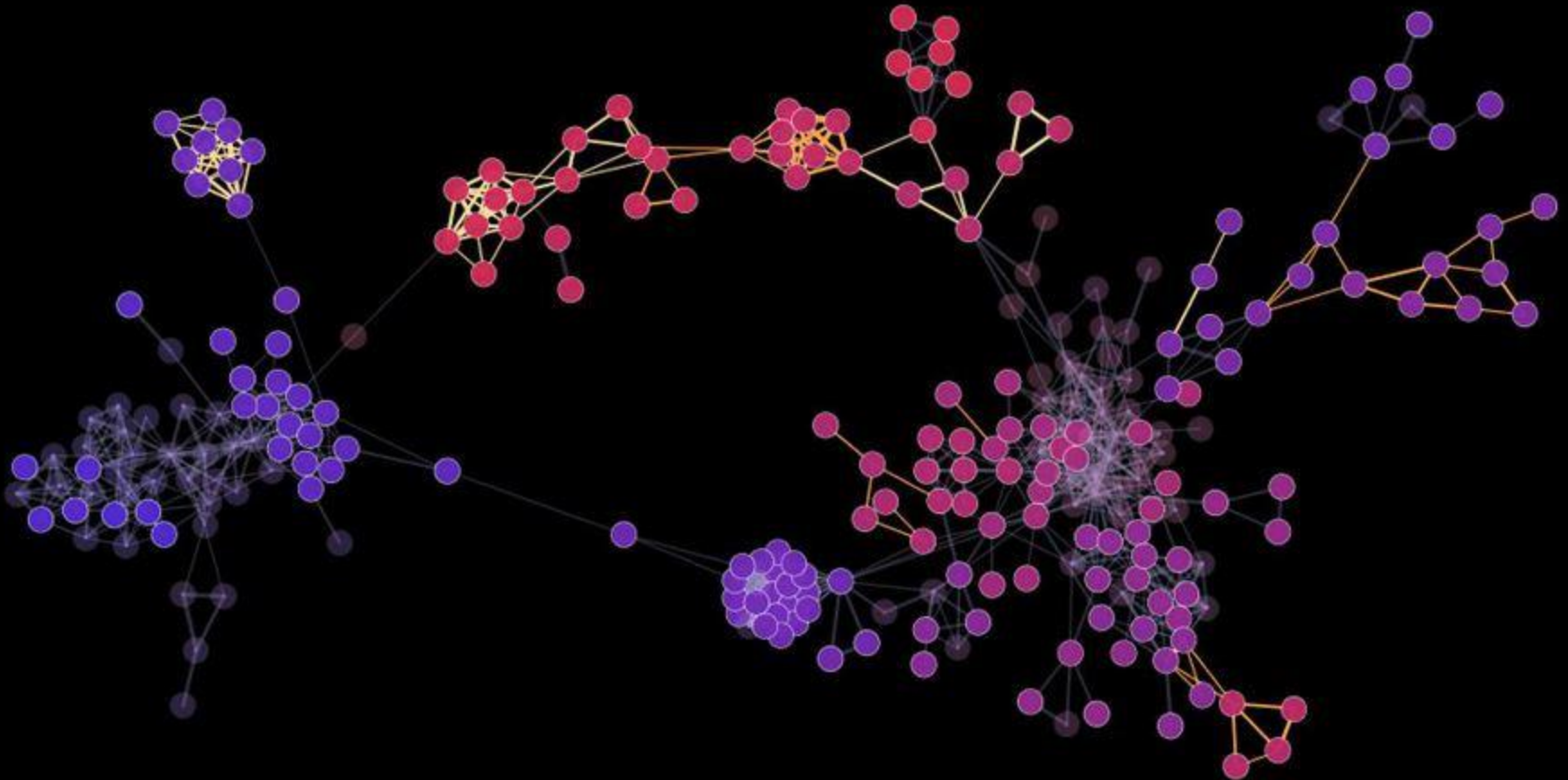
CiteSpace: Visualizing and Analyzing the Structure and Dynamics of Scientific Fields

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Learning Objectives

- What is the design rationale of CiteSpace?
- What are the primary tasks supported by CiteSpace?
- How can I perform these tasks with CiteSpace?
- What is next?

	Outline
Introduction	
Design Rationale	Basic Ideas
	A: Chen (2004) PNAS
	B: Chen (2006) JASIST
	C: Chen et al. (2010) JASIST
	Questions and Discussions
Functionality	Data Collection and Expansion
	Example 4: A Hands-on Test Project
	Example 5: Two-step citers to the set of {A, B, C}
	Questions and Discussions
What's Next	D: Chen (2012) JASIST – Predictive Effects
	E: Chen et al. (2013) JASIST – The study of retraction
	E: Chen and Leydesdorff (In Press) JASIST – Dual-map Overlays
	Questions and Discussions

About Me



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Citation indices

	All	Since 2008
Citations	6977	3901
h-index	38	29
i10-index	72	54

Citations to my articles



Select: [All](#), [None](#) [Actions](#)

Show: [1-20](#) [Next >](#)

Title / Author	Cited by	Year
CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature ☐ C Chen Journal of the American Society for Information Science and Technology 57 (3 ...	604	2006
Visualizing knowledge domains ☐ K Börner, C Chen, KW Boyack Annual review of information science and technology 37 (1), 179-255	603	2003
Interacting with hypertext: A meta-analysis of experimental studies ☐ C Chen, R Rada Human-computer interaction 11 (2), 125-156	395	1996
Information visualization: Beyond the horizon ☐ C Chen Springer	359	2004
Information visualisation and virtual environments ☐ C Chen Springer	342	1999
Searching for intellectual turning points: Progressive knowledge domain visualization ☐ C Chen Proceedings of the National academy of Sciences of the United States of ...	320	2004



Chaomei Chen

Chen



Turning Points

Turning Points

The Nature of Creativity



Chaomei Chen

Mapping Scientific Frontiers

The Quest for Knowledge Visualization

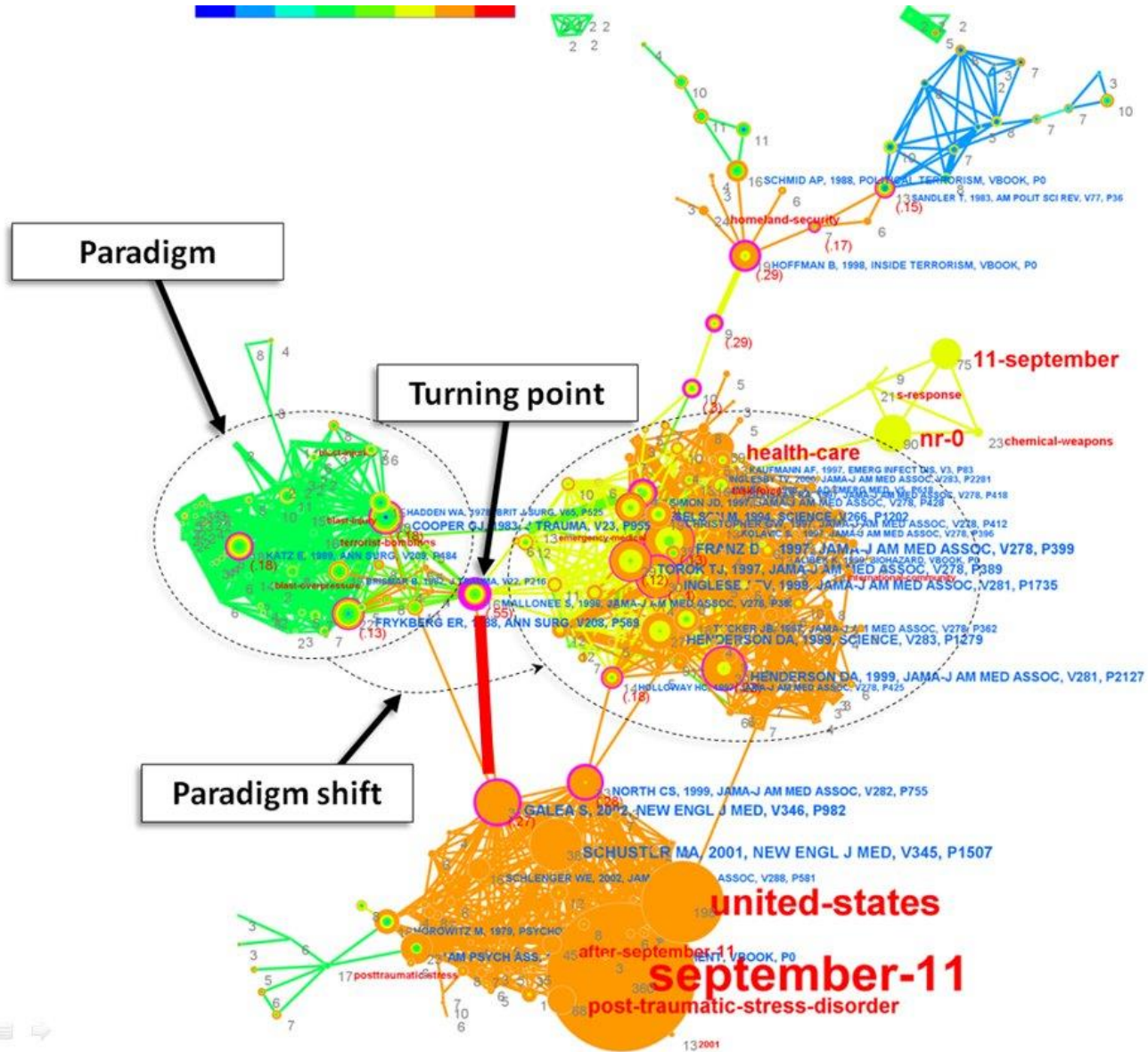
Second Edition



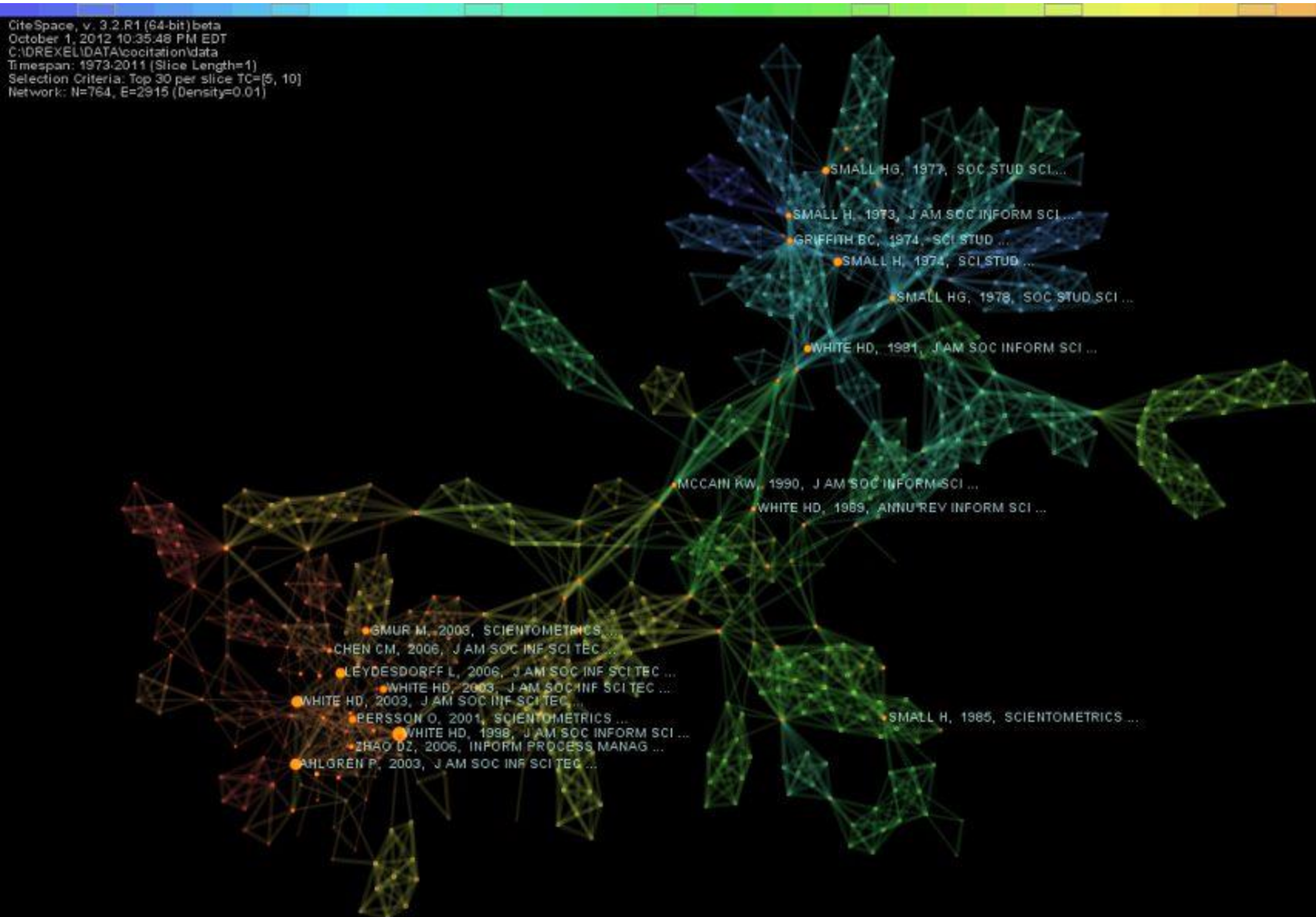
Introduction

- About You
 - Where are you from?
 - What do you do?
 - Have you used CiteSpace?
 - What would you like to know about CiteSpace?

Turning Points of Paradigm Shift

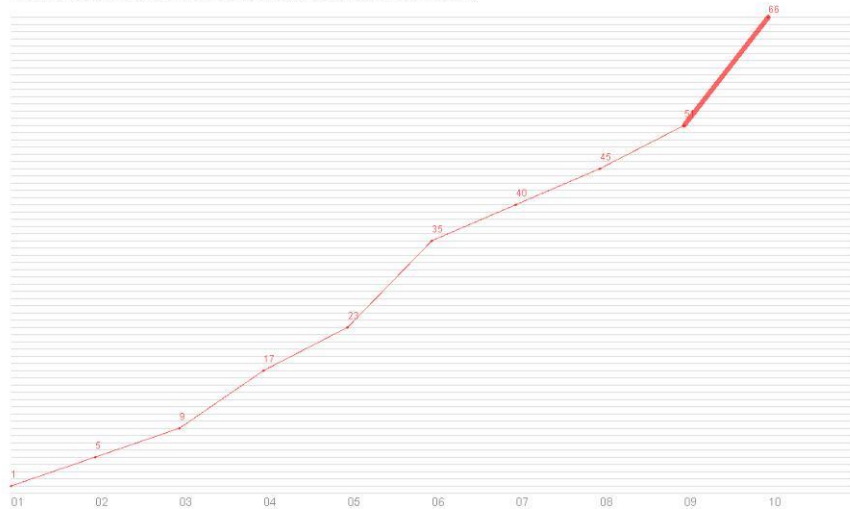


Networks of Co-cited References



Detecting Citation Bursts

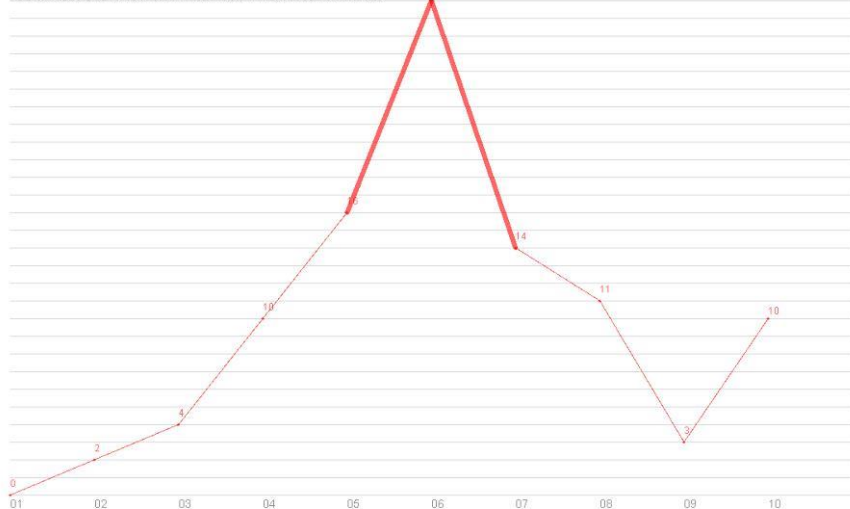
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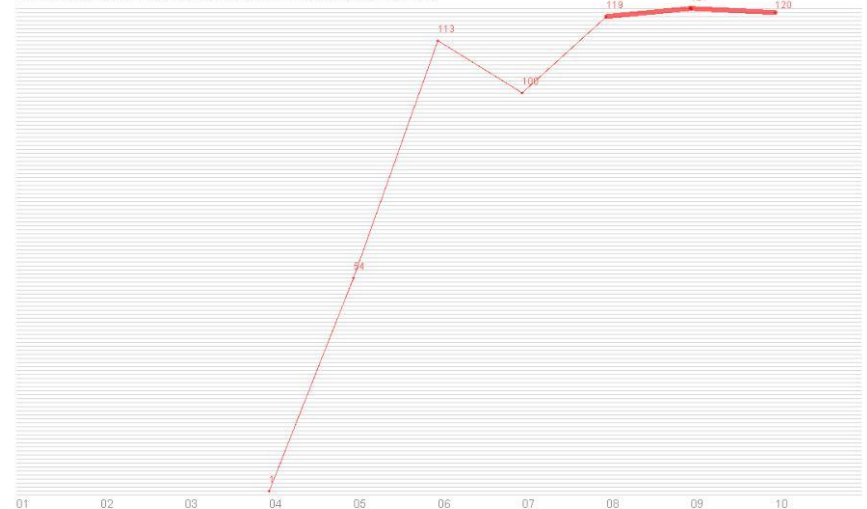
GHIRINGHELLI F, 2004, EUR J IMMUNOL, V34, P336, DOI 10.1002/EJL.200324191 burst=10.6945 [2009-2010]



BOUSQUET J, 2001, J ALLERGY CLIN IMMUN, V108, P147 burst=9.6246 [2005-2006]

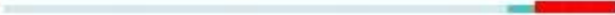


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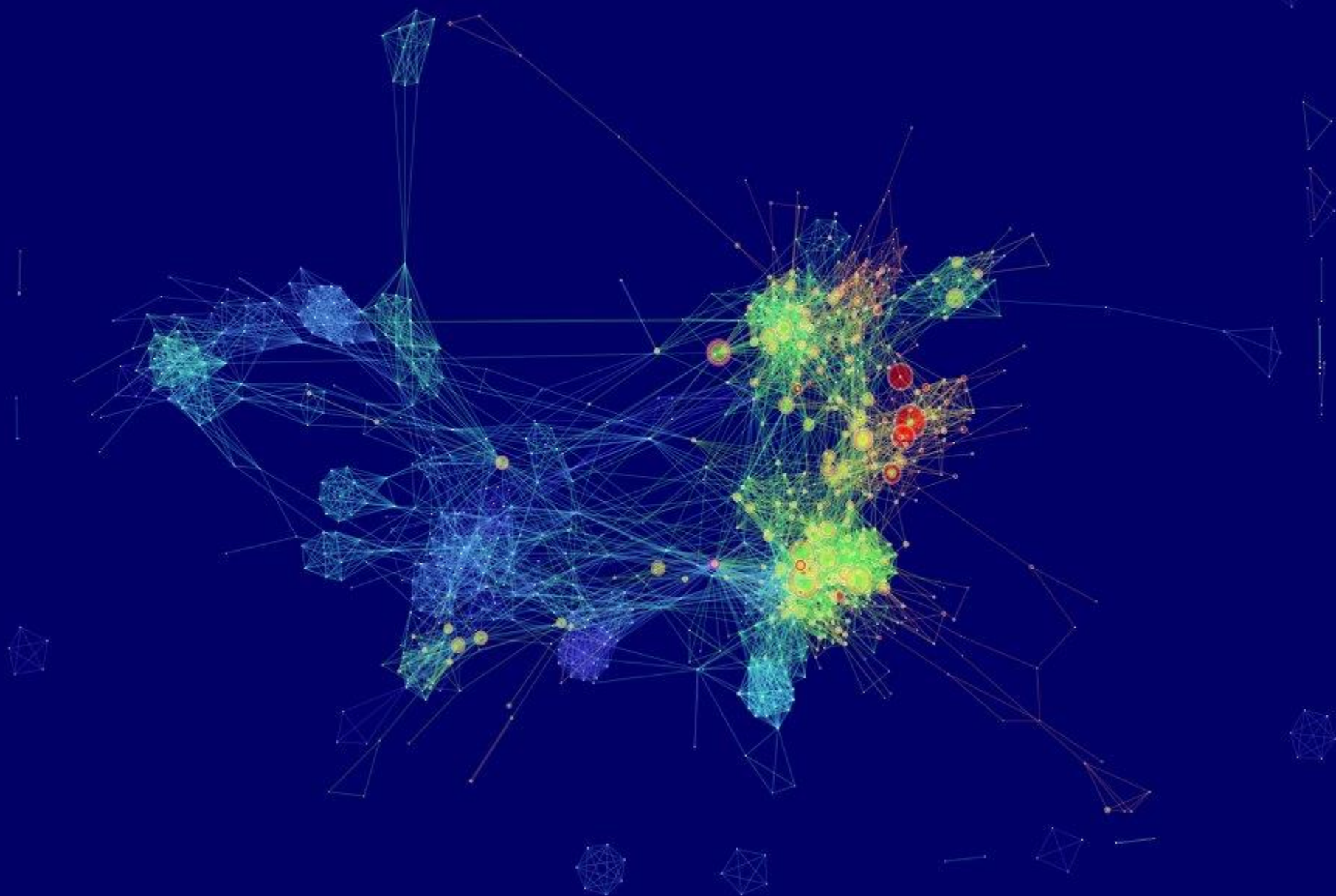


Detecting Citation Bursts

References with Citation Bursts (20 of 341)

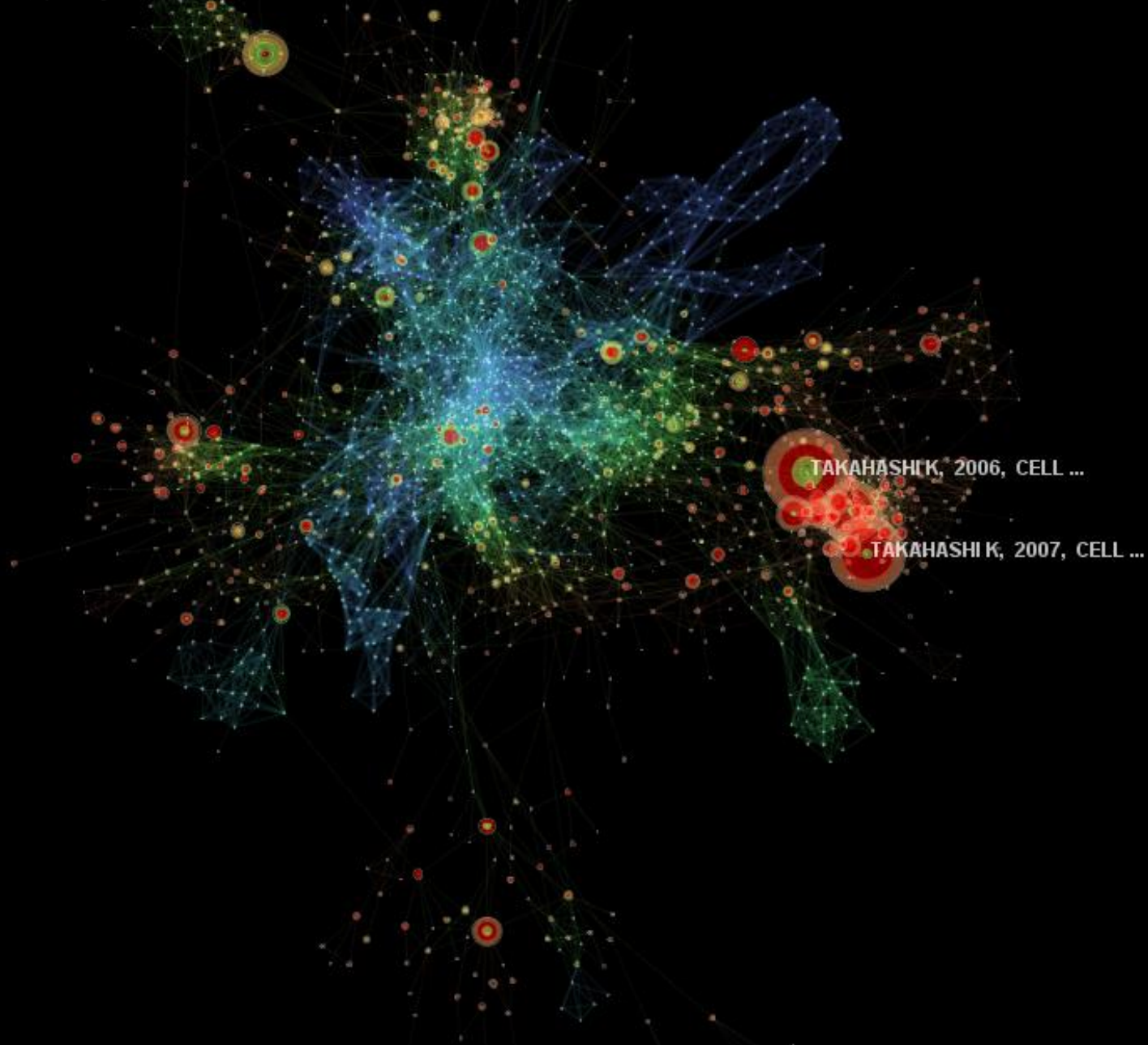
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THOMSON JA, 1998, SCIENCE, V282, P1147	1998	21.8966	2008	2009	
PITTENGER MF, 1999, SCIENCE, V284, P147	1999	17.4687	2009	2011	
LAGASSE E, 2000, NAT MED, V6, P1229, DOI	2000	16.2049	2001	2004	
KRAUSE DS, 2001, CELL, V105, P369, DOI	2001	15.1772	2001	2005	
YING QL, 2002, NATURE, V416, P545, DOI	2002	14.0655	2002	2007	
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JIANG YH, 2002, NATURE, V418, P41, DOI	2002	14.473	2003	2007	
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YU JY, 2007, SCIENCE, V318, P1917, DOI	2007	17.8018	2009	2011	
OKITA K, 2008, SCIENCE, V322, P949, DOI	2008	19.8041	2009	2011	
DIMOS JT, 2008, SCIENCE, V321, P1218, DOI	2008	17.792	2009	2011	
STADTFELD M, 2008, SCIENCE, V322, P945, DOI	2008	17.3993	2009	2011	
WOLTJEN K, 2009, NATURE, V458, P766	2009	16.0379	2009	2011	
ZHOU HY, 2009, CELL STEM CELL, V4, P381, DOI	2009	24.4872	2010	2011	
SOLDNER F, 2009, CELL, V136, P964, DOI	2009	21.1363	2010	2011	
YU JY, 2009, SCIENCE, V324, P797	2009	19.2513	2010	2011	
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KAJI K, 2009, NATURE, V458, P771	2009	15.997	2010	2011	
MIURA K, 2009, NAT BIOTECHNOL, V27, P743	2009	14.1345	2010	2011	

CiteSpace, v. 2.1, Release 12
September 6, 2008 9:24:11 AM EDT
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Network: N=1167, E=6549



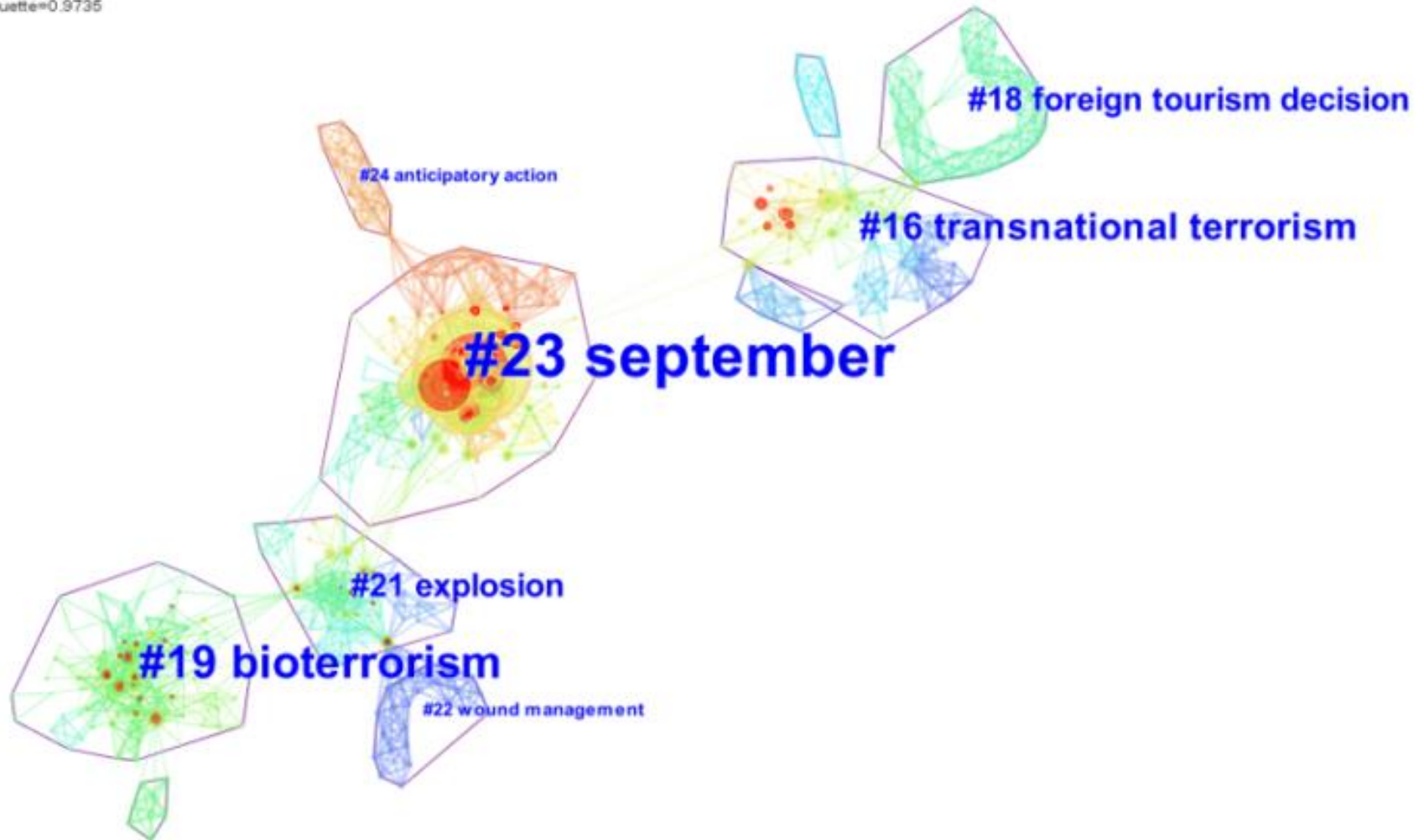
2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

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December 1, 2012 8:10:22 AM EST
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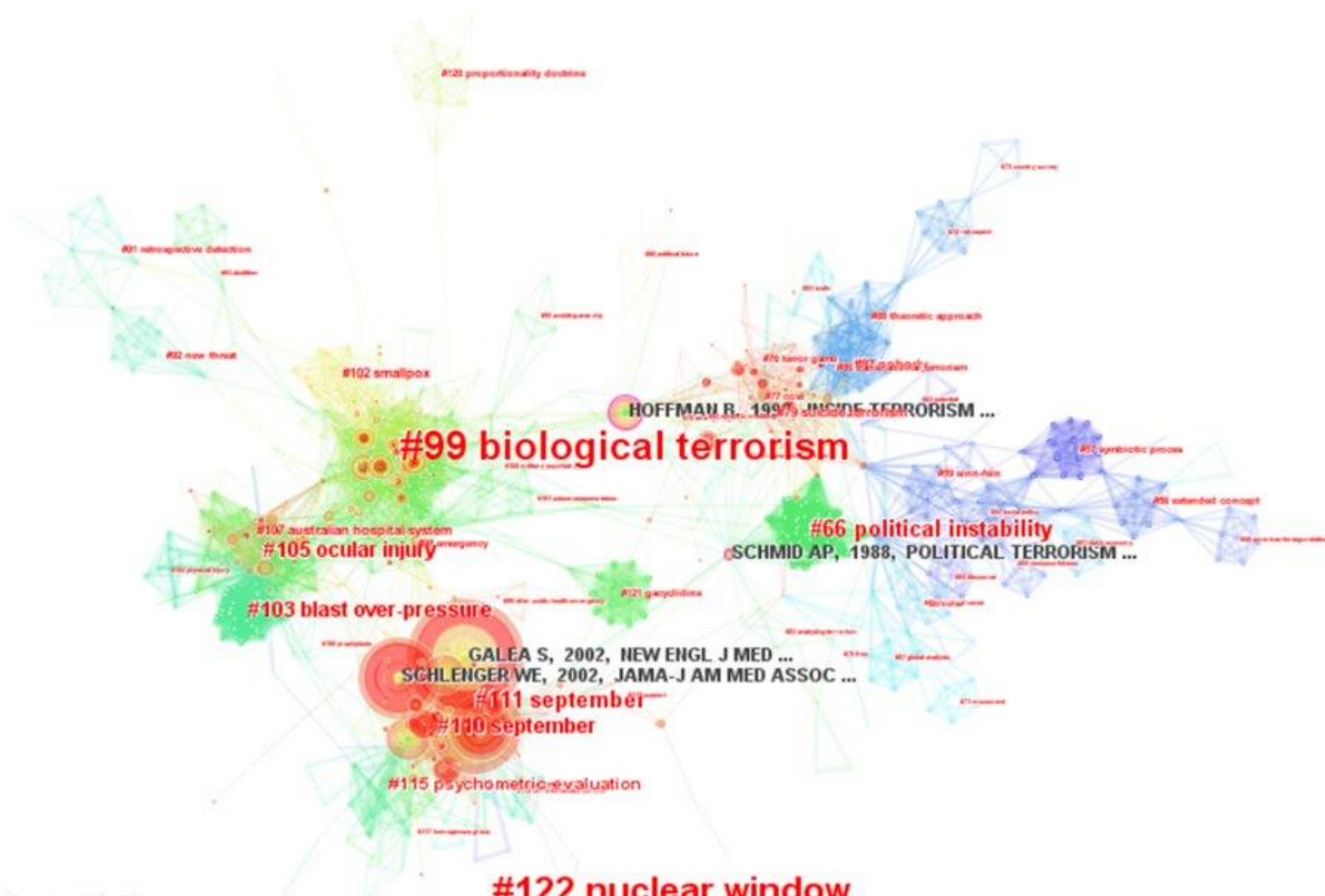


Discerning the Structure of a Network

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Modularity Q=0.8644
Mean Silhouette=0.9735



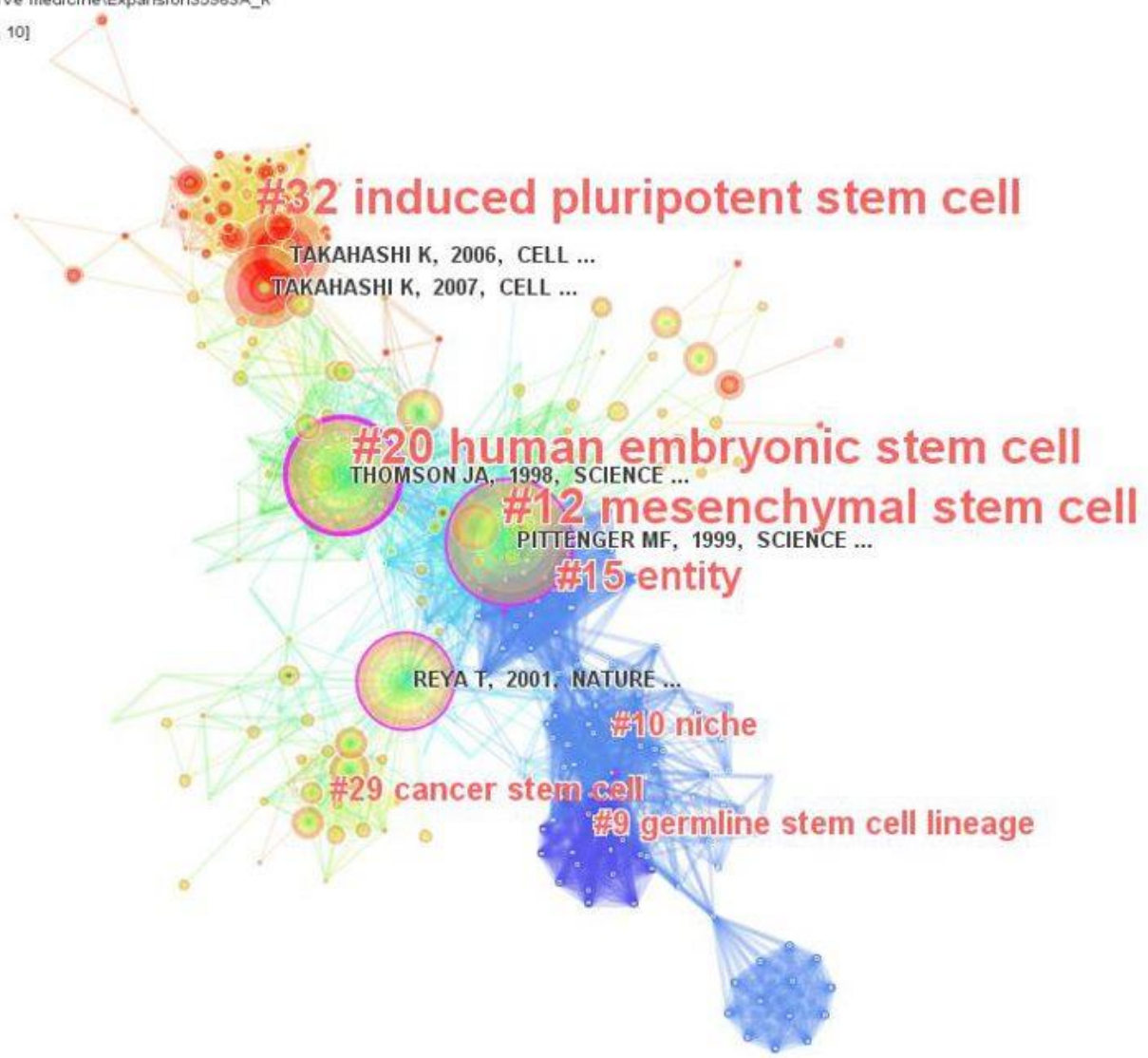
Terrorism (1990-2007)



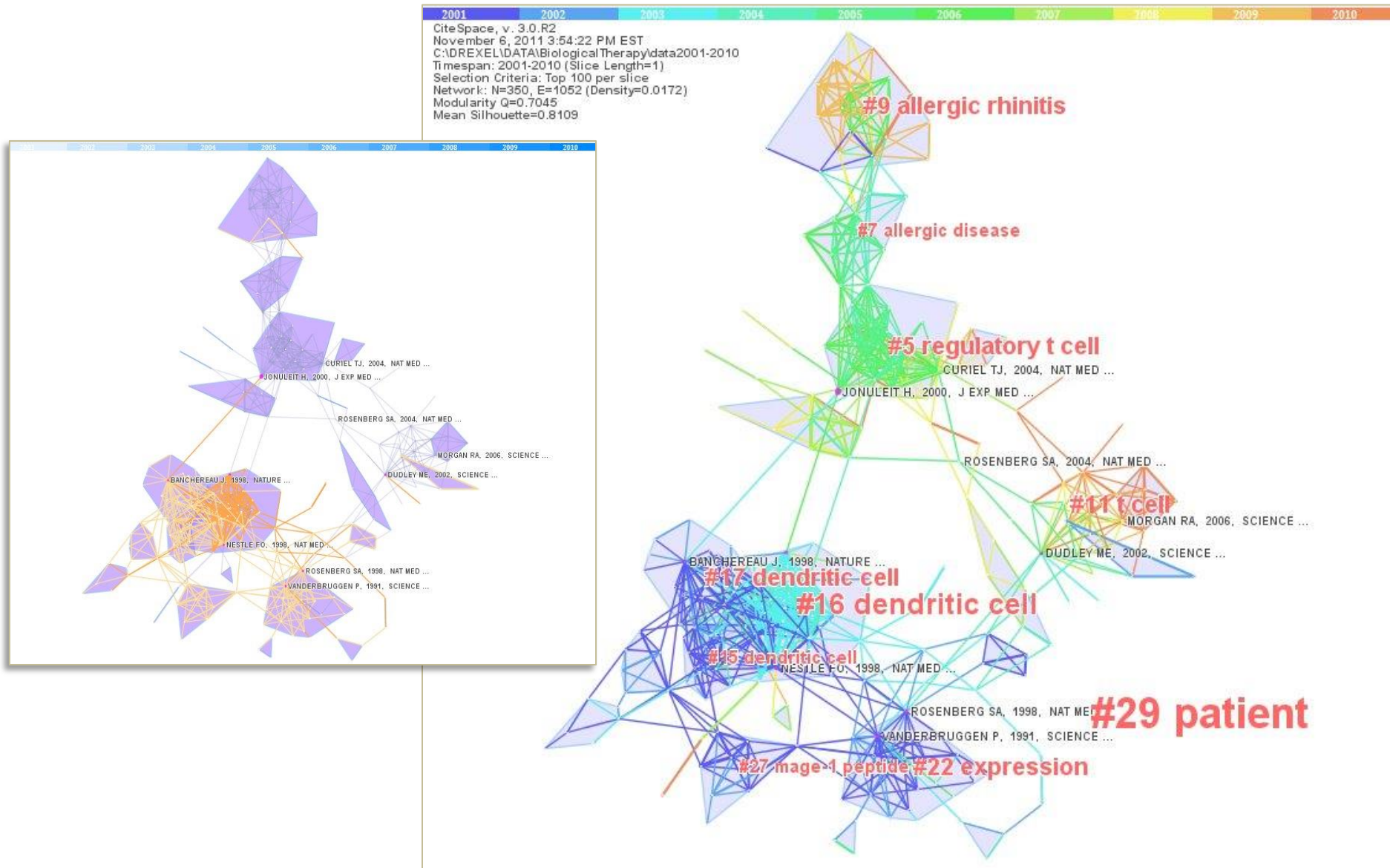
The Evolution of an Emerging Field

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

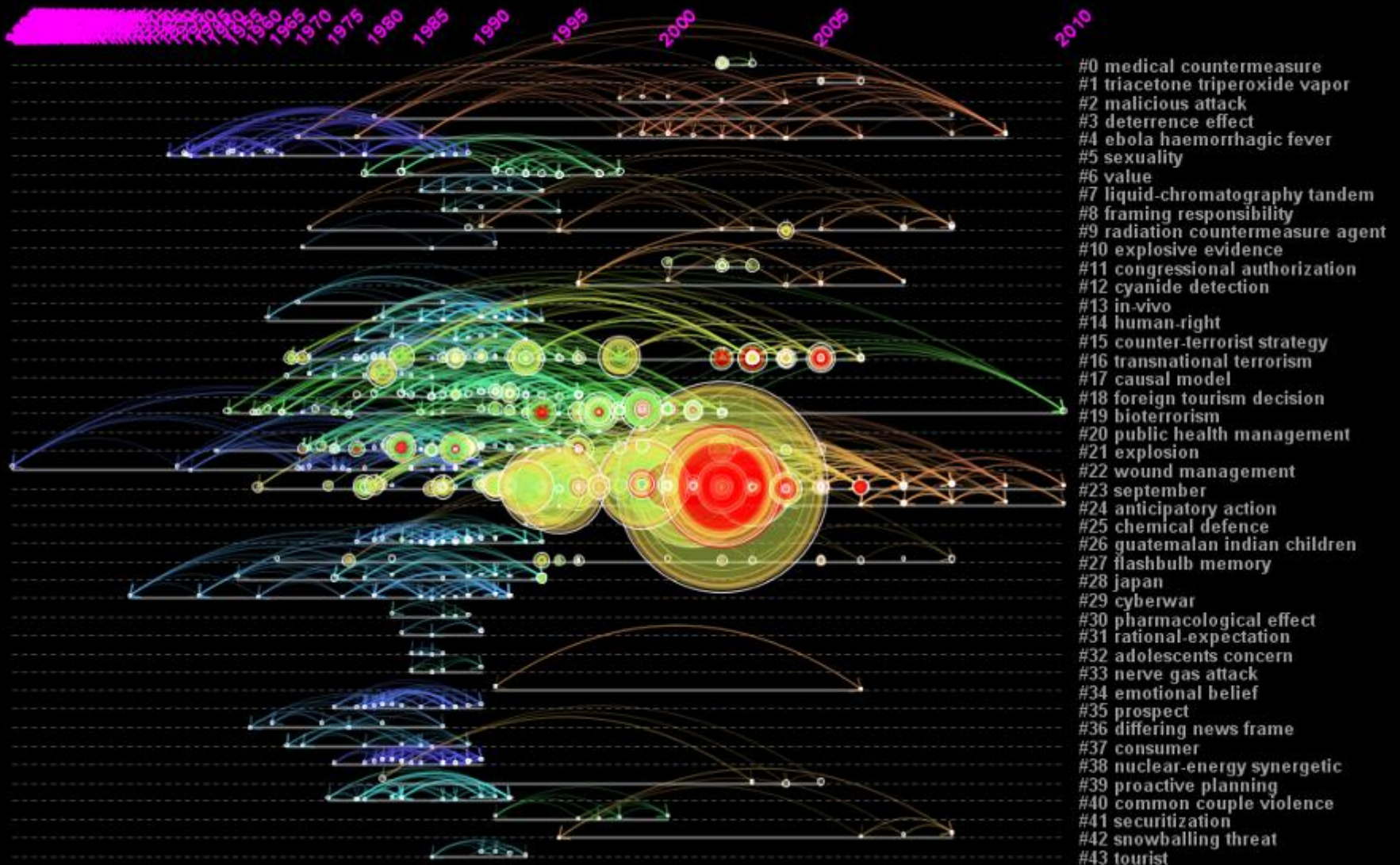
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Modularity Q=0.6817
Mean Silhouette=0.7768



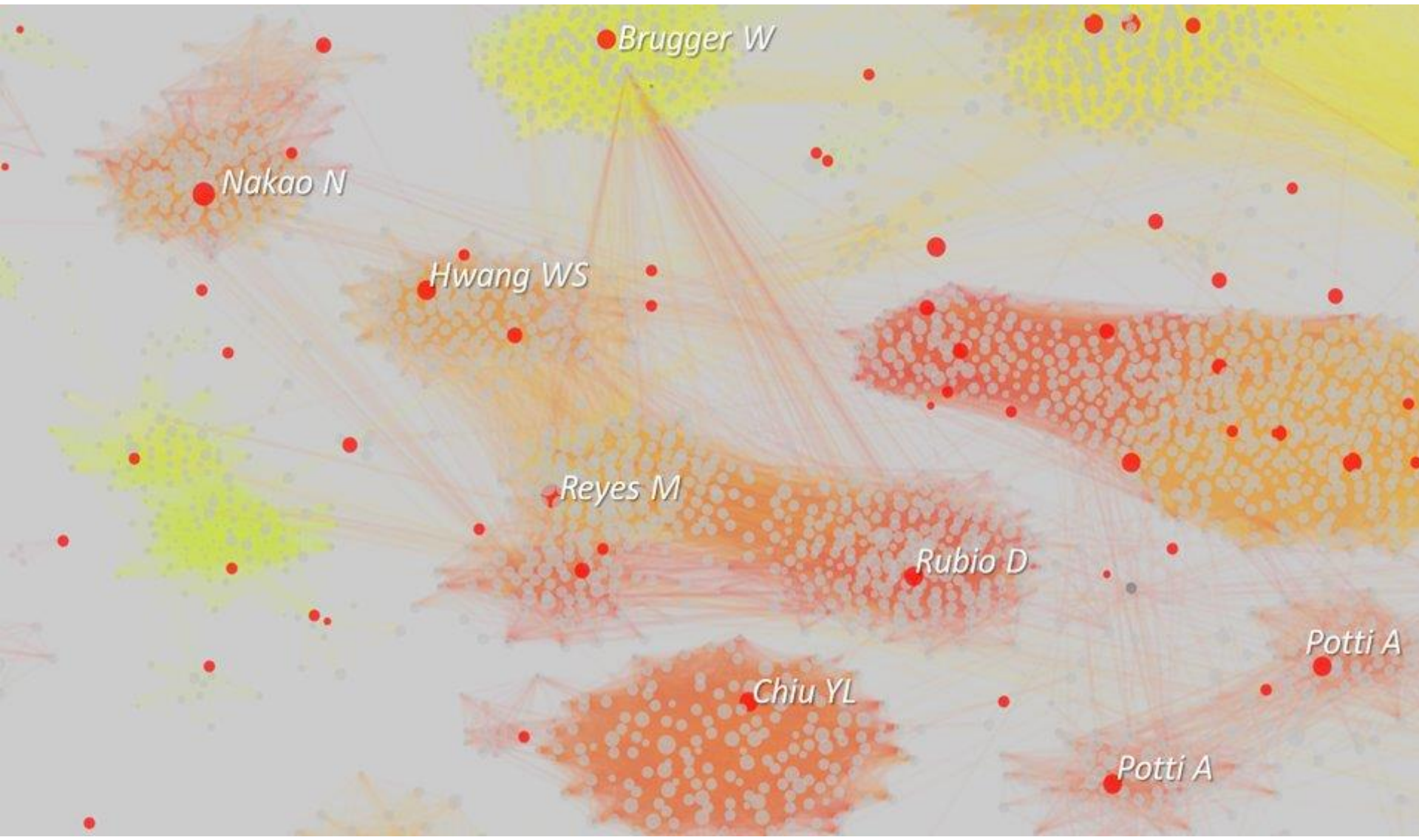
The Evolution of a Field: Biological Therapy



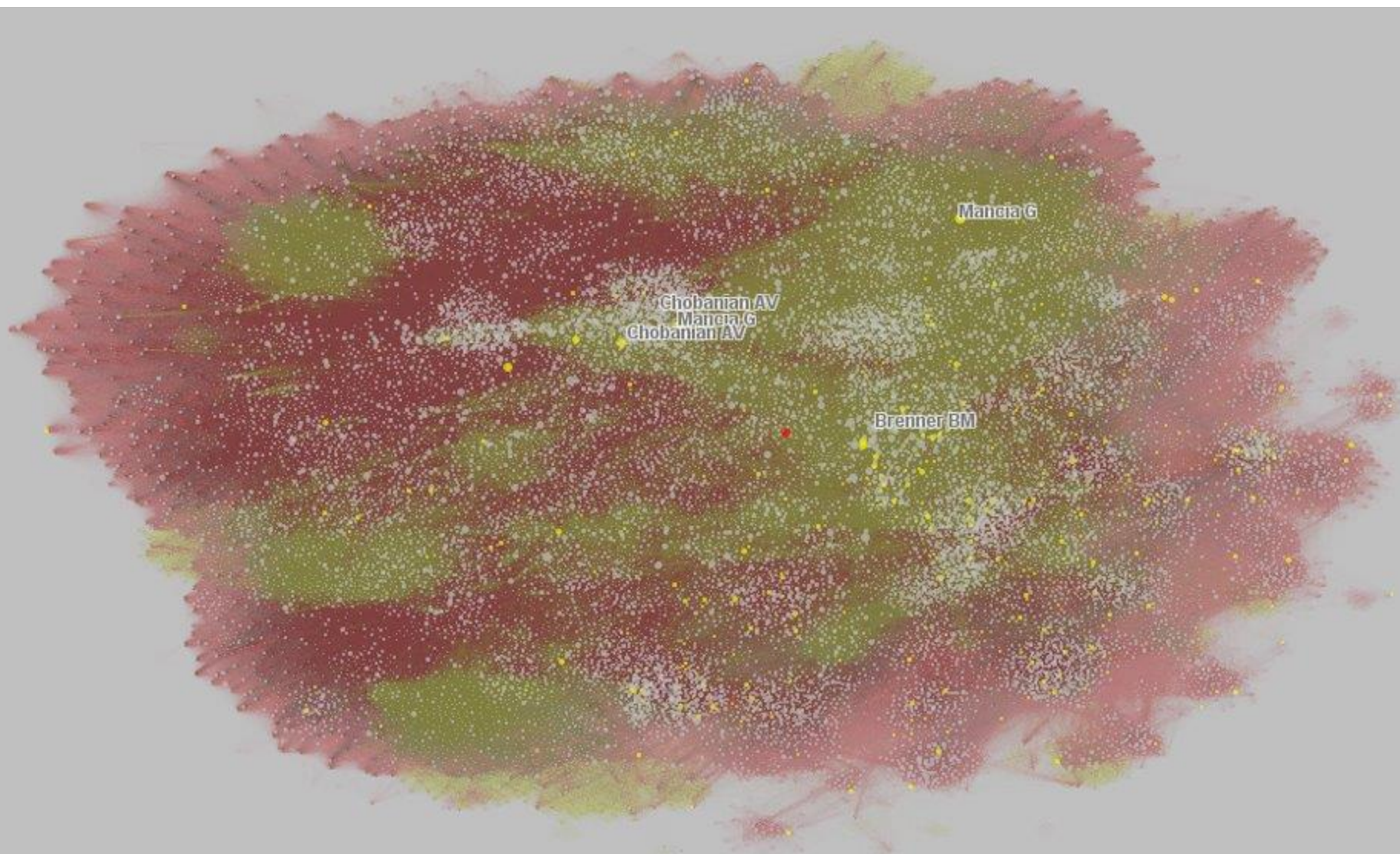
Timeline View of Evolution



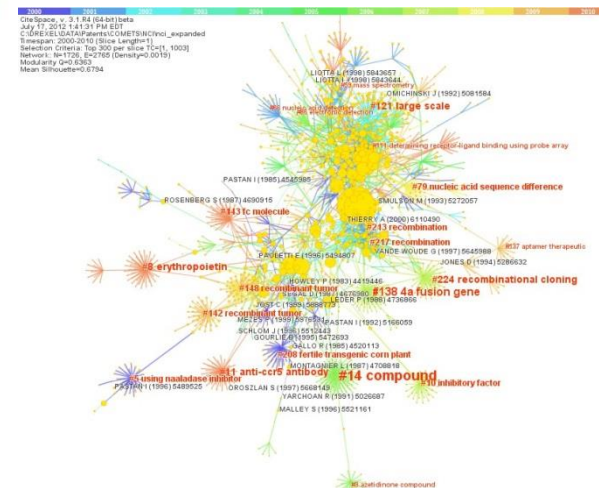
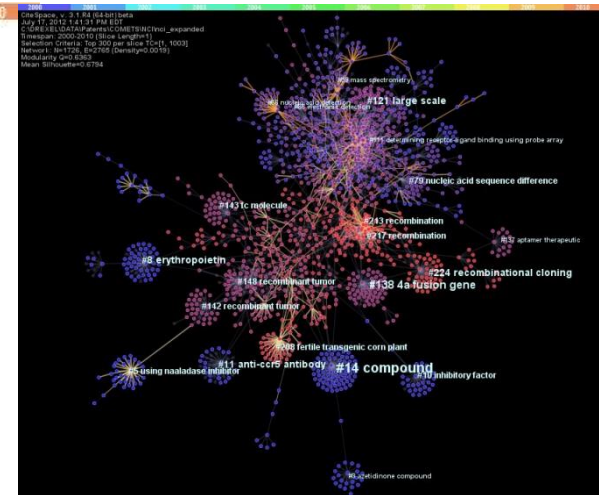
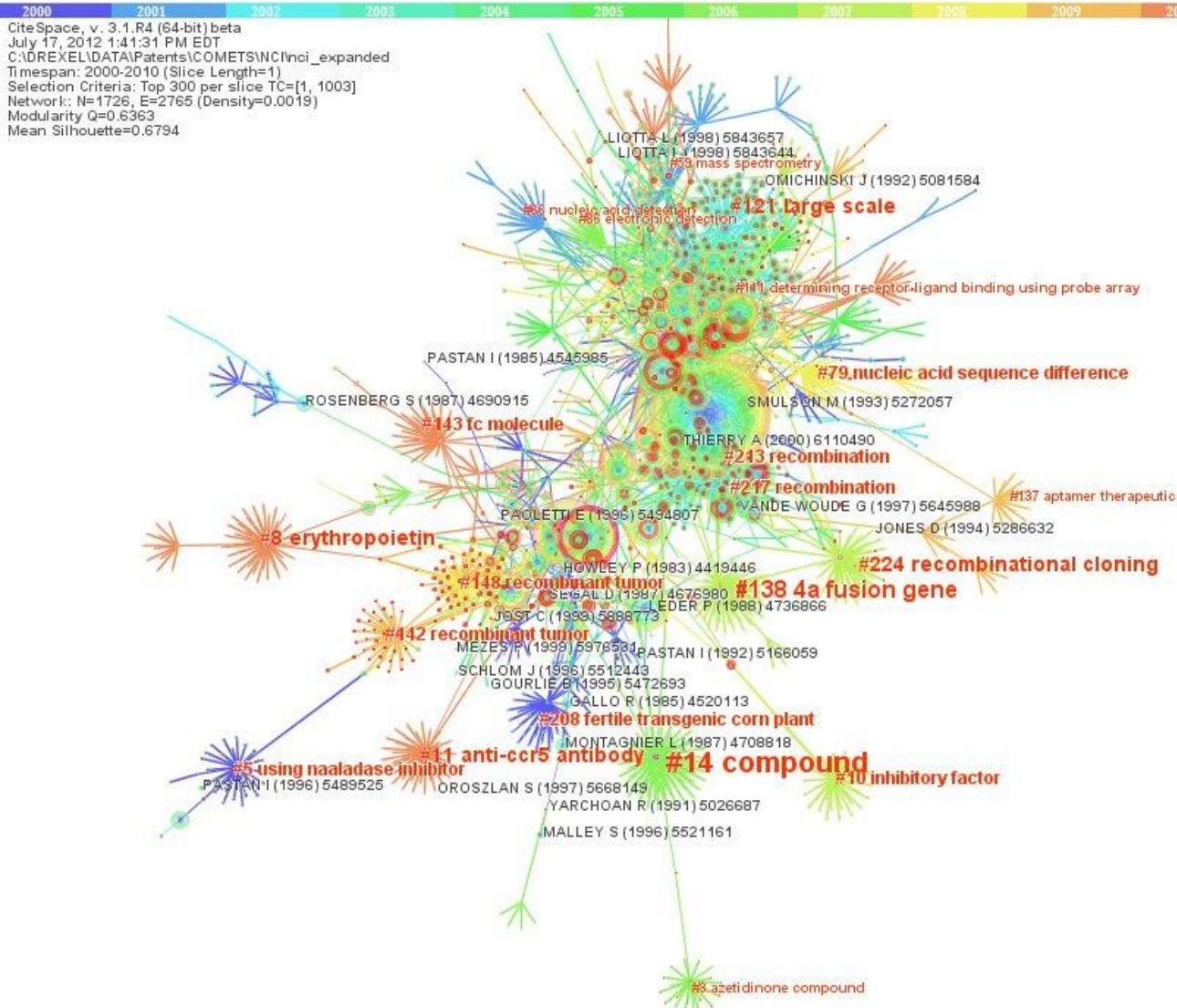
Citations to Retracted Articles



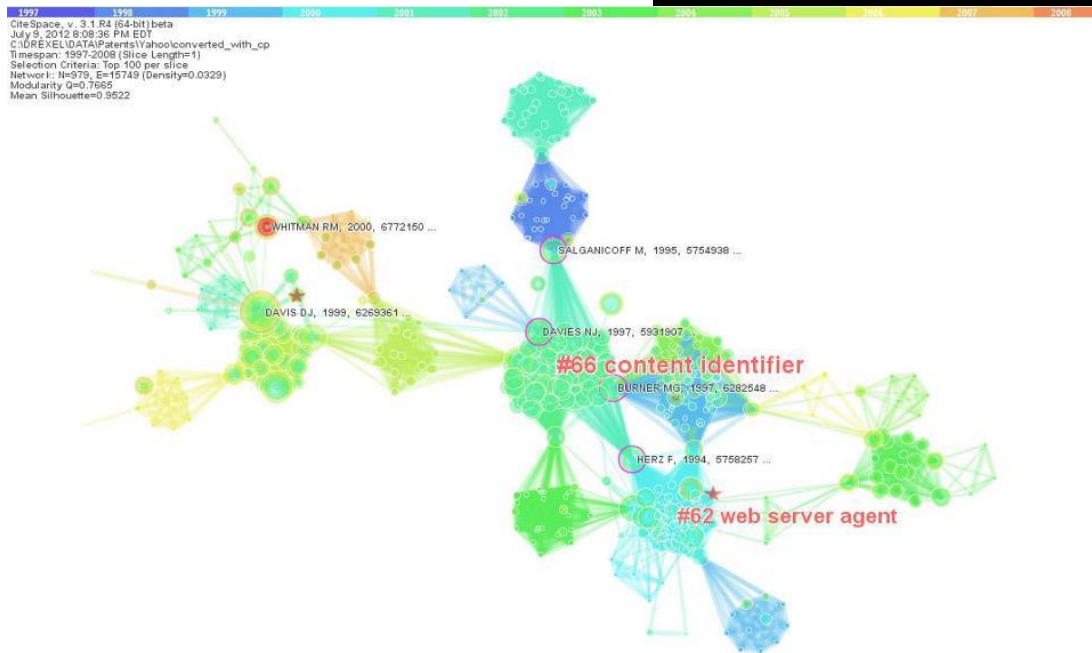
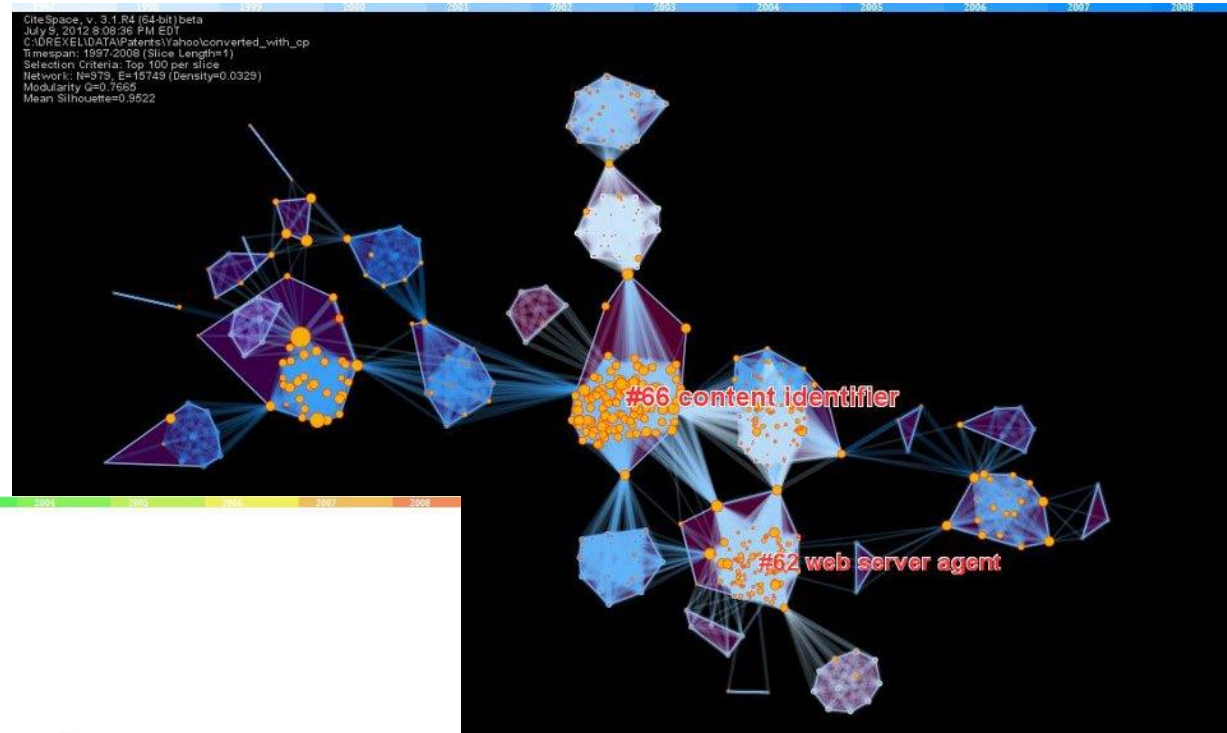
Citations to Retracted Articles



U.S. Patents



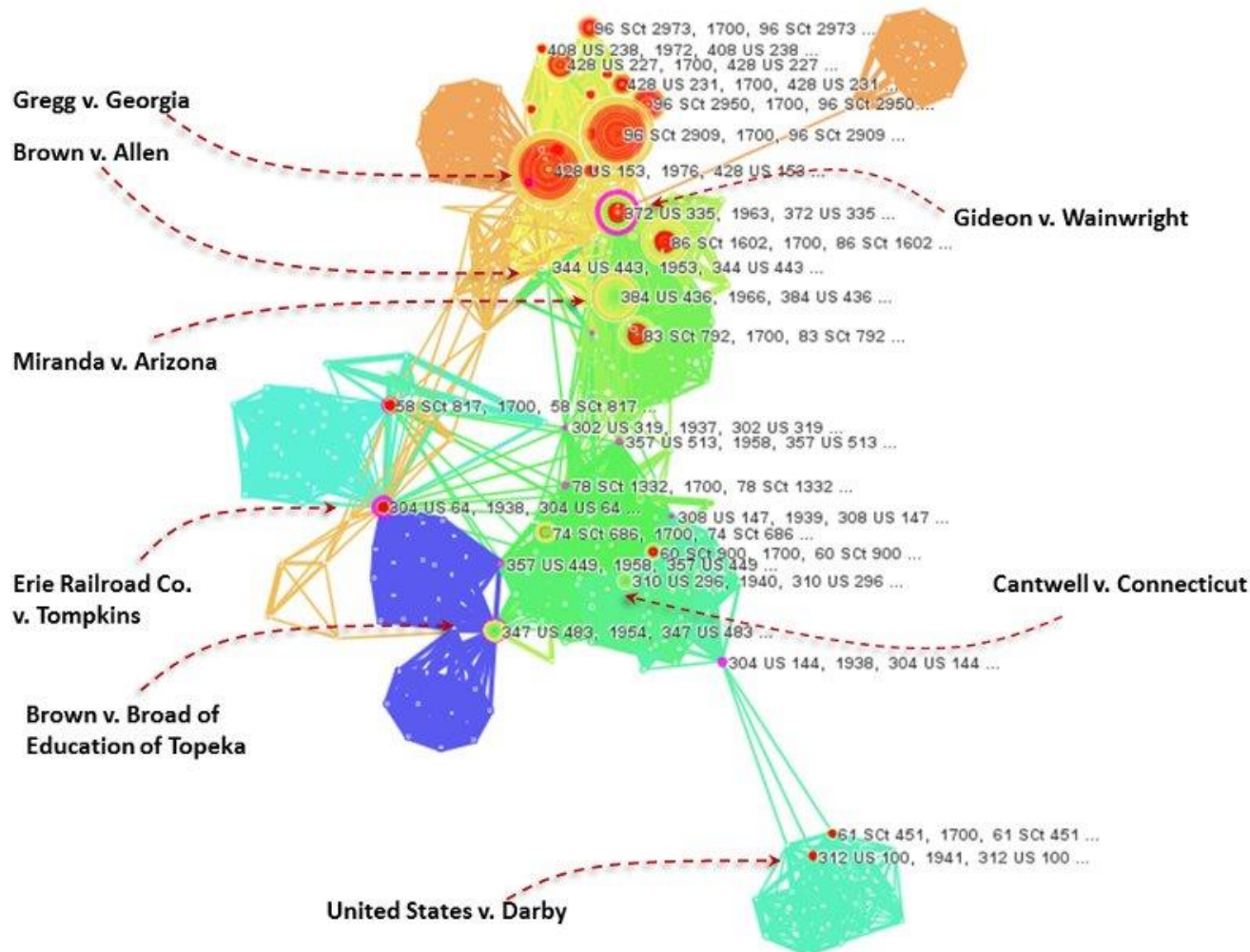
U.S. Patents: Yahoo!



U.S. Supreme Court Opinions

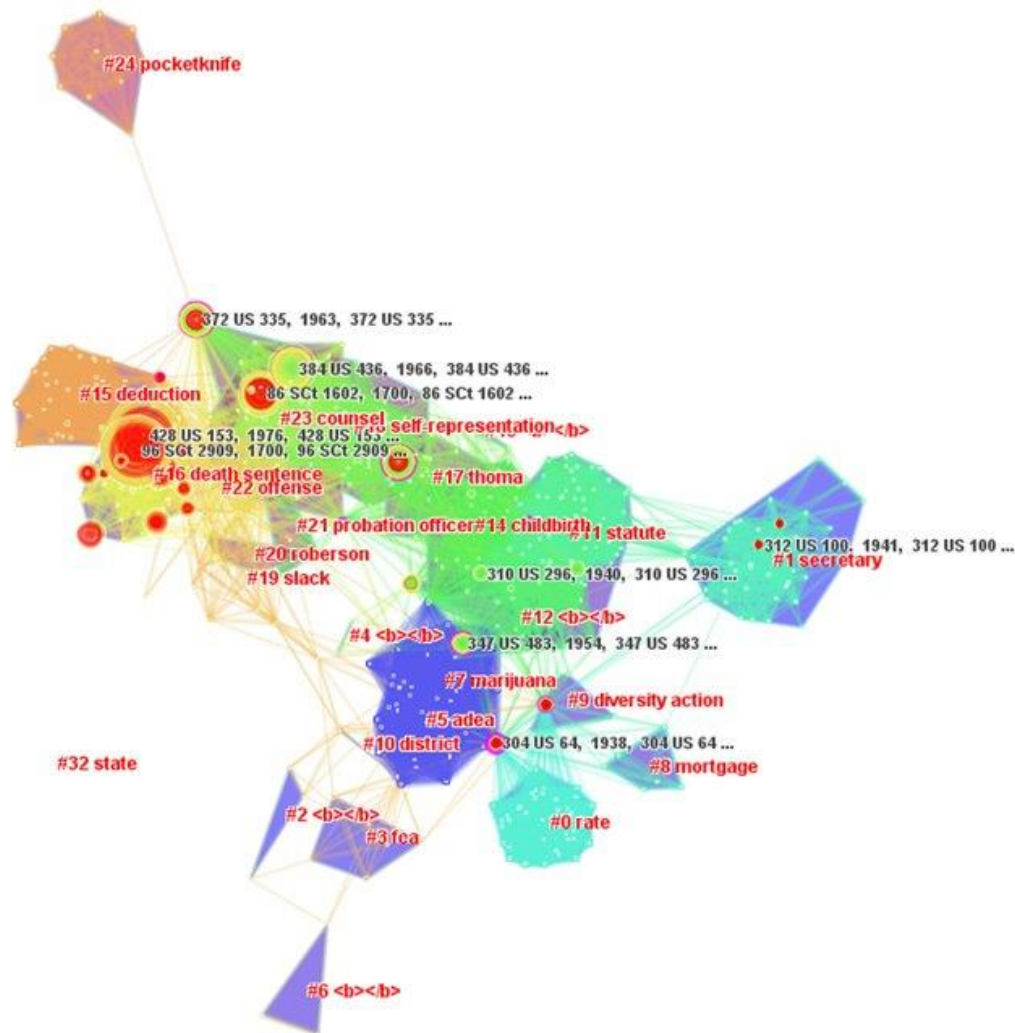
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Network: N=314, E=3061 (Density=0.0623)
Mean Silhouette=0.99

Landmark Cases



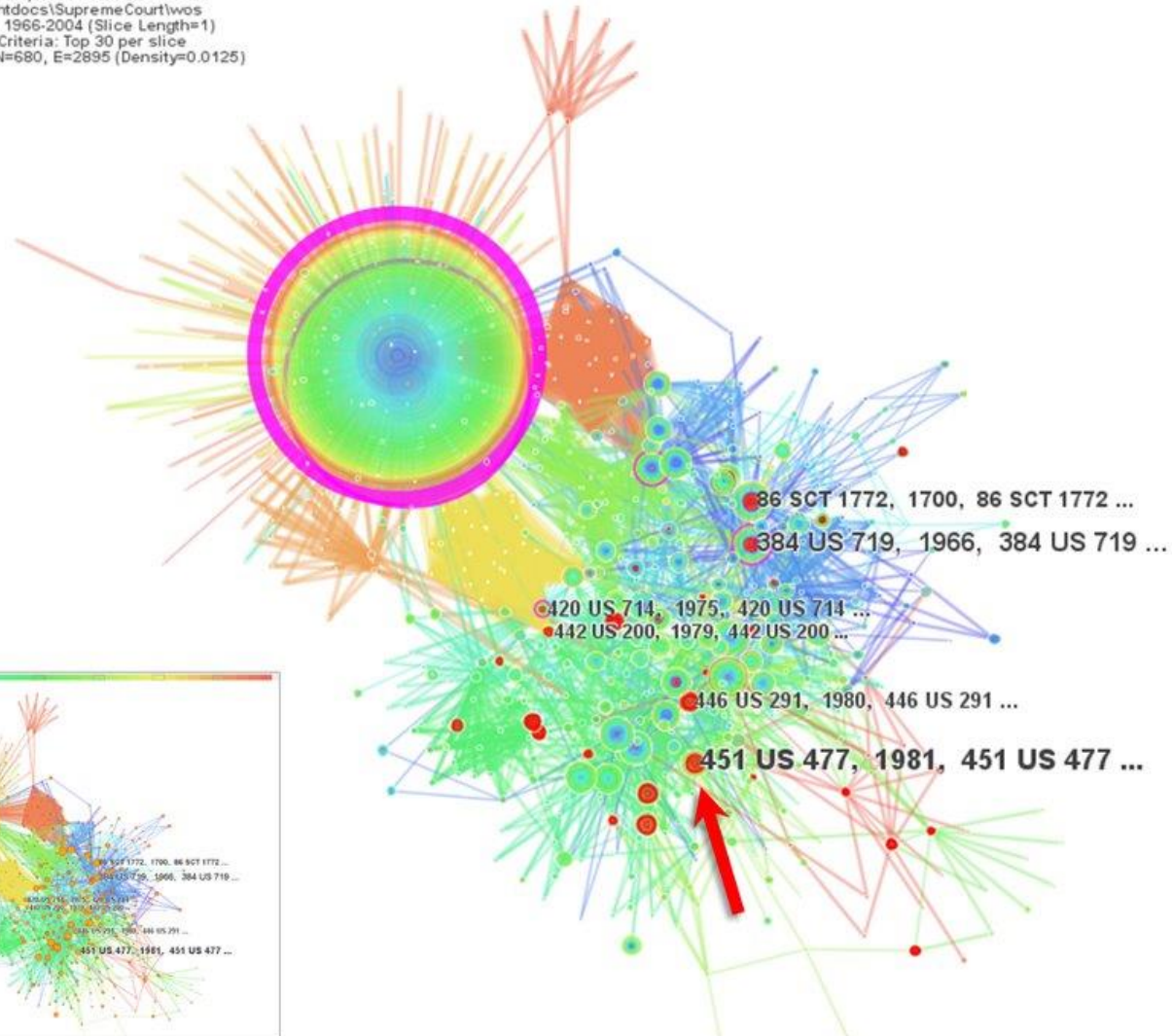
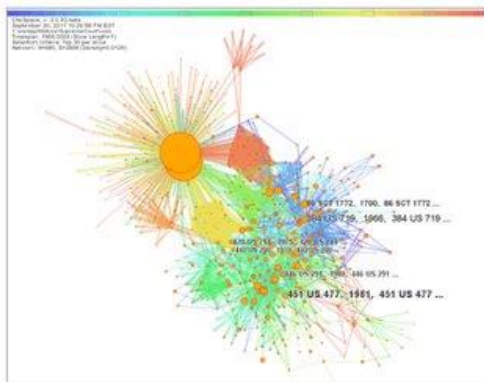
U.S. Supreme Court Opinions

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Mean Silhouette=0.8183

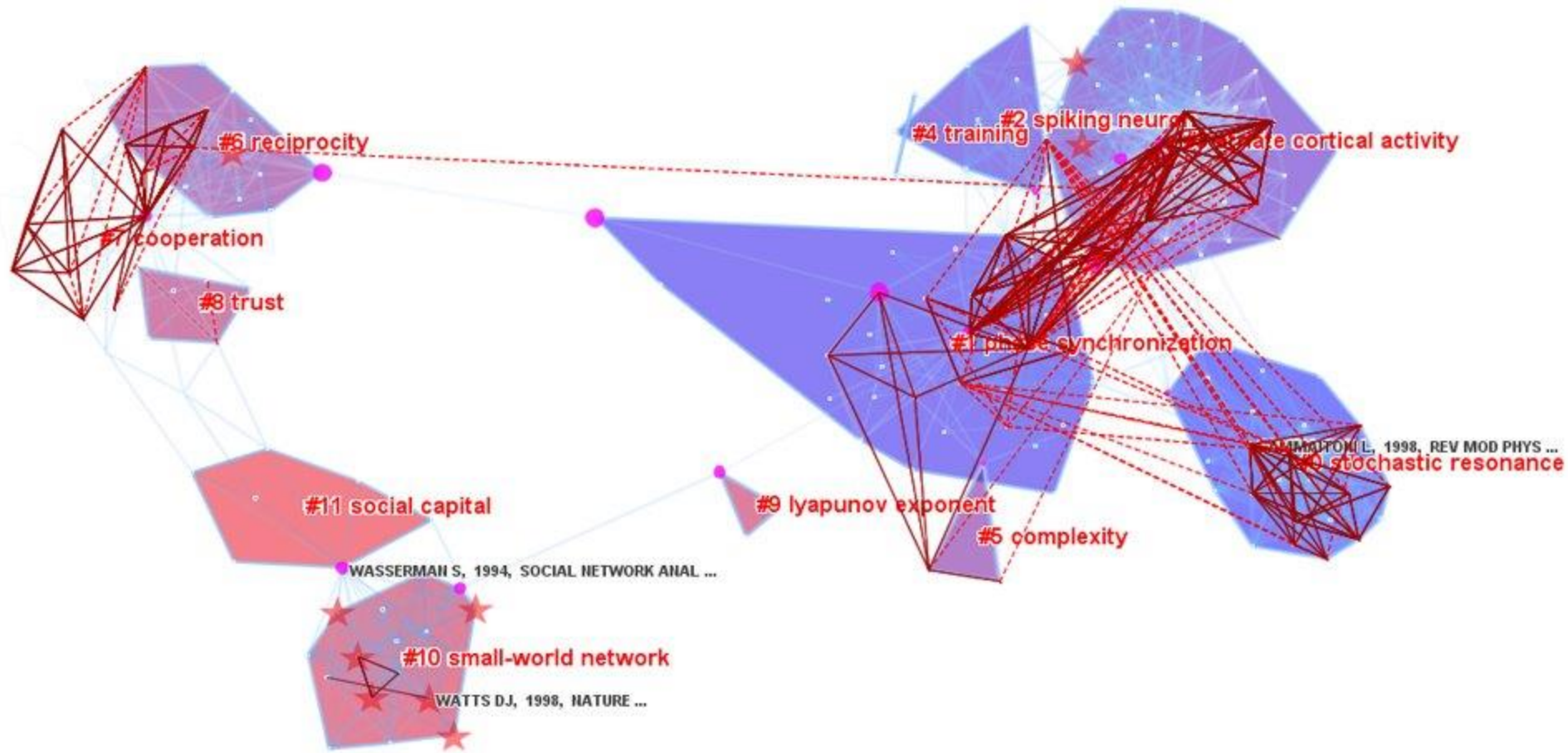


U.S. Supreme Court Opinions

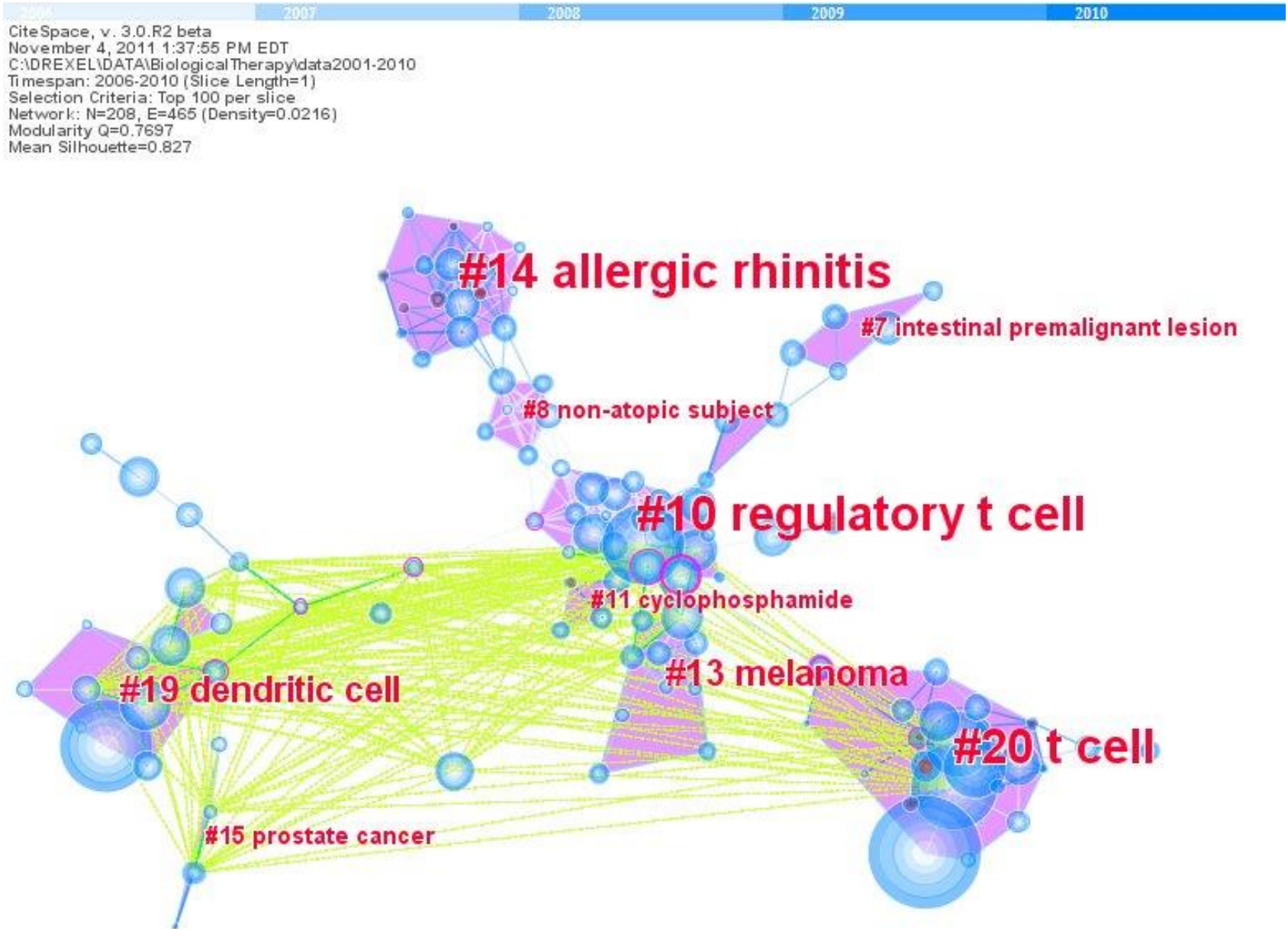
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Predictive Effects of Structural Variation



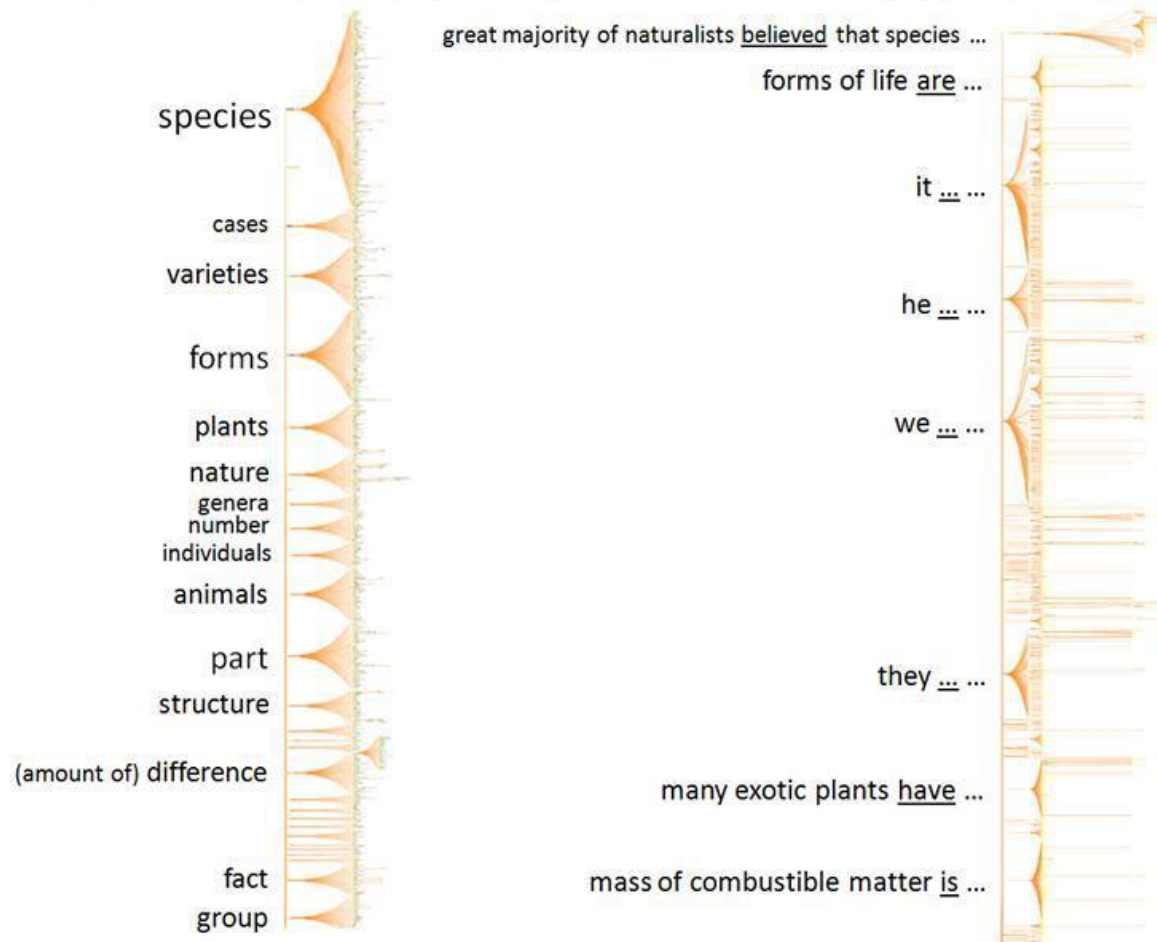
Predictive Effects



Concept Trees and Predicate Trees

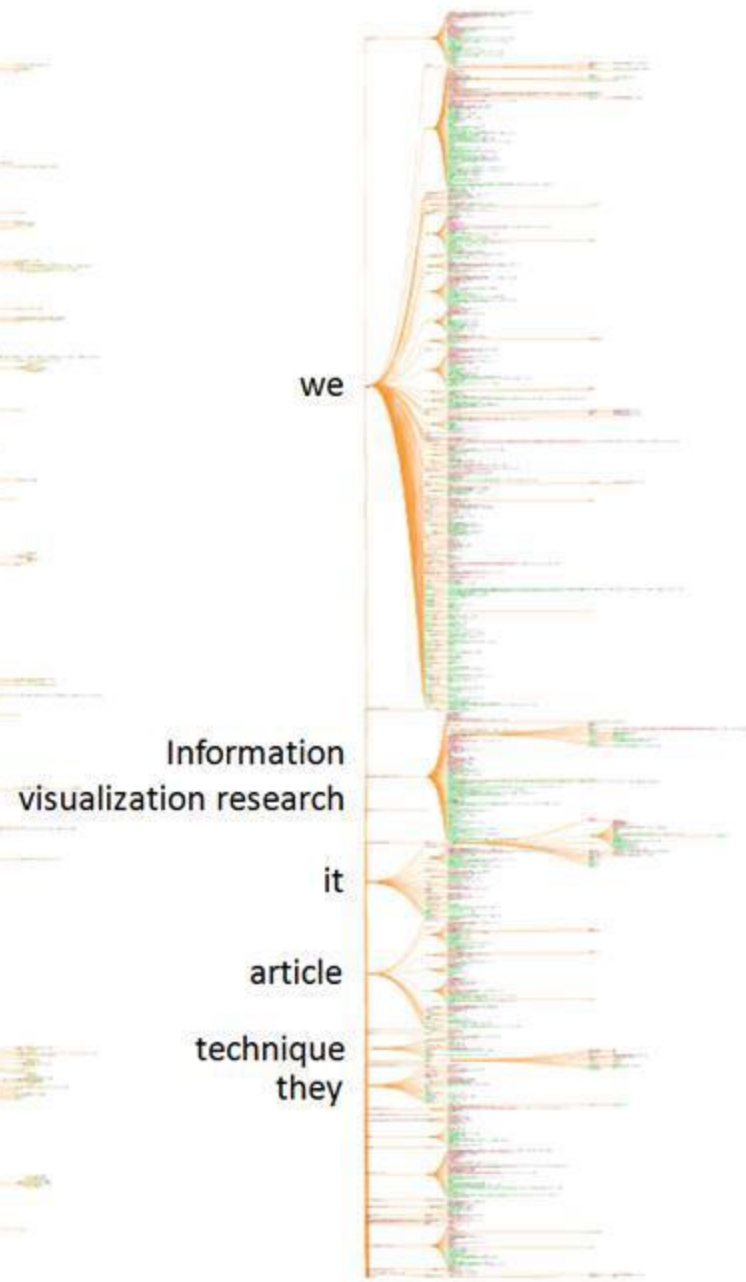
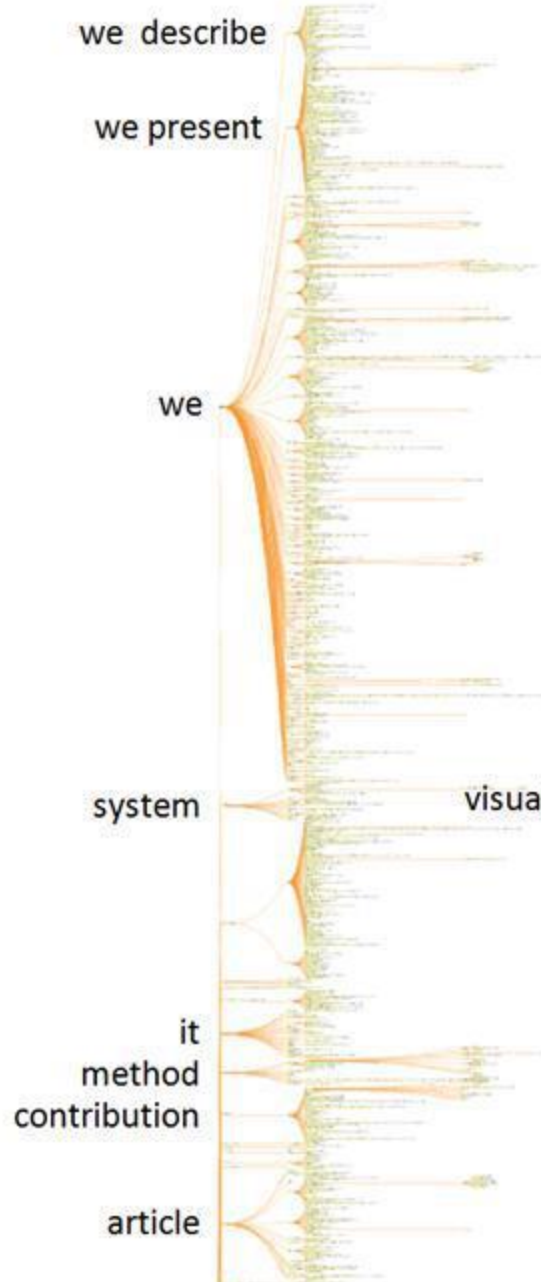
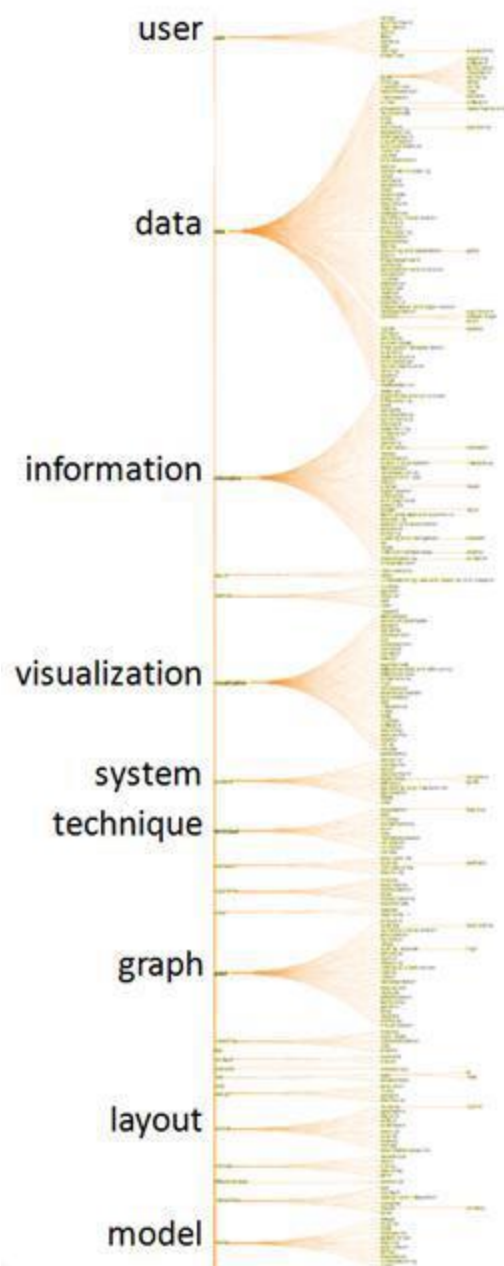
The Origin of Species by Charles Darwin (1872)

A 13,583-node concept tree (left) and a 5,180 node predicate tree (right) (both partially shown)



IEEE InfoVis (2000-2009)

Left: A 5,505-node concept tree (partial); Middle: A 2,266-node predicate tree (partial); Right: 2000-2004 versus 2005-2009

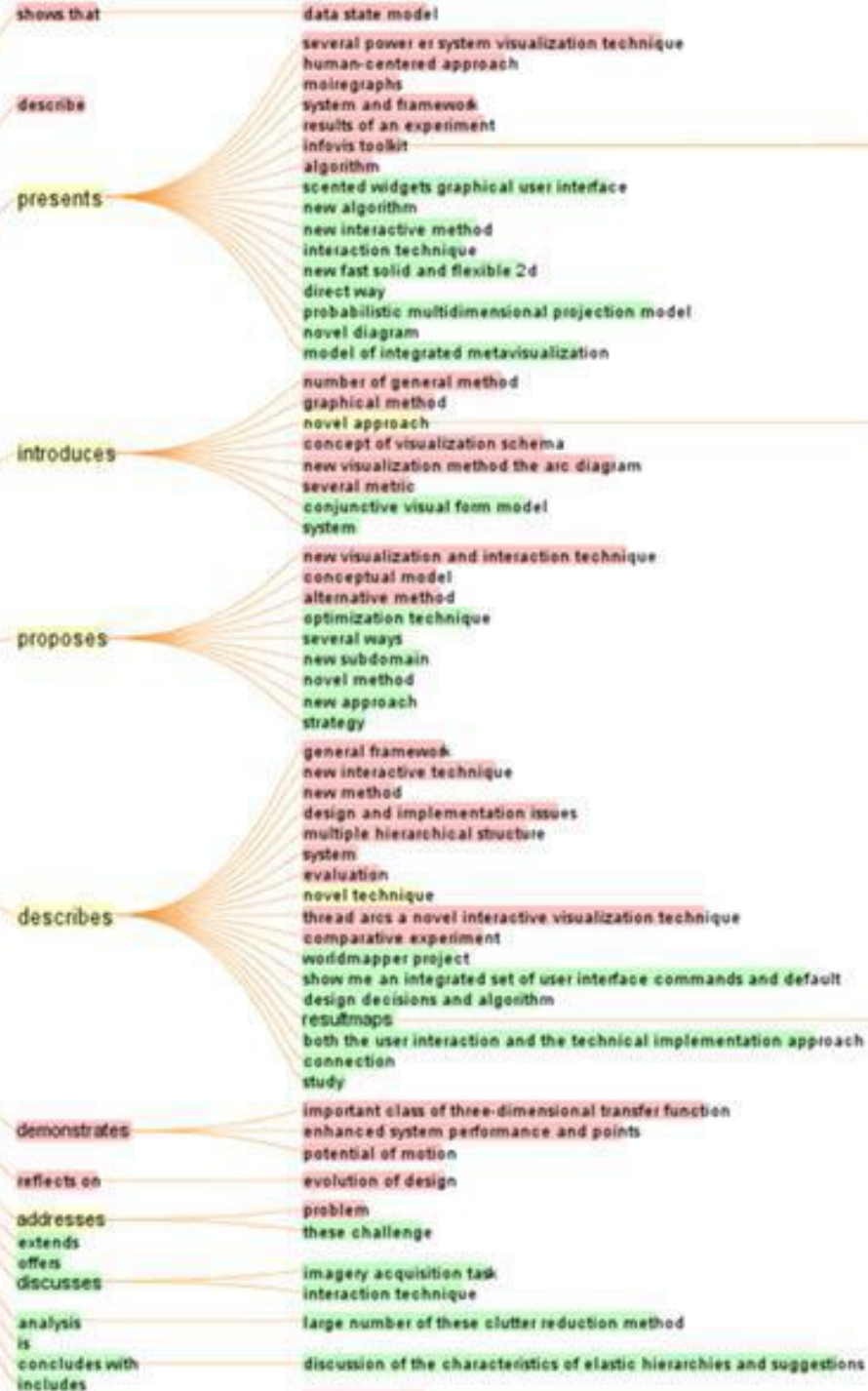


article

IEEE InfoVis

2000-2004

2005-2009





Geospatial Overlays



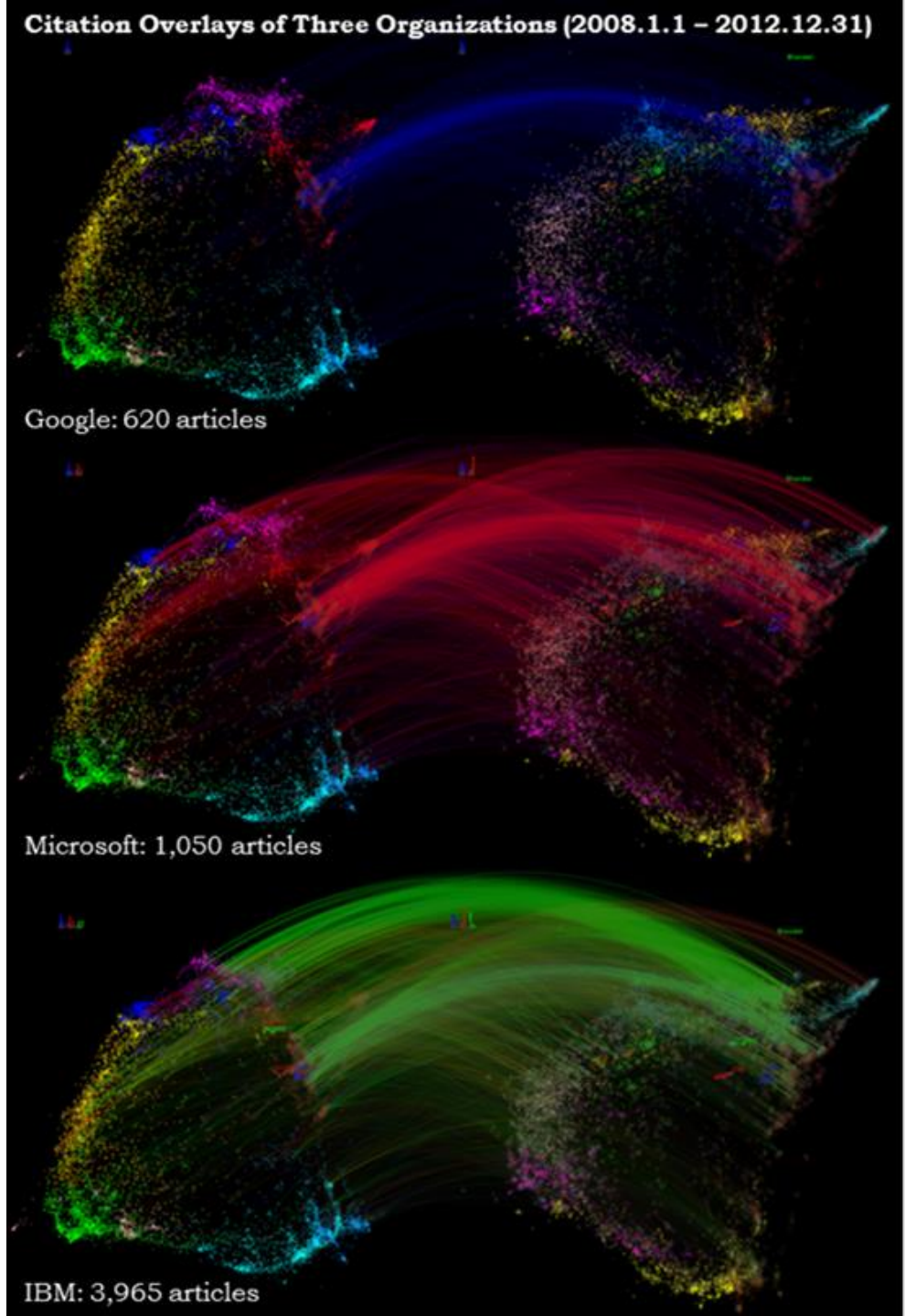
Dual-Map Overlays

Citation Overlays of Three Organizations (2008.1.1 – 2012.12.31)

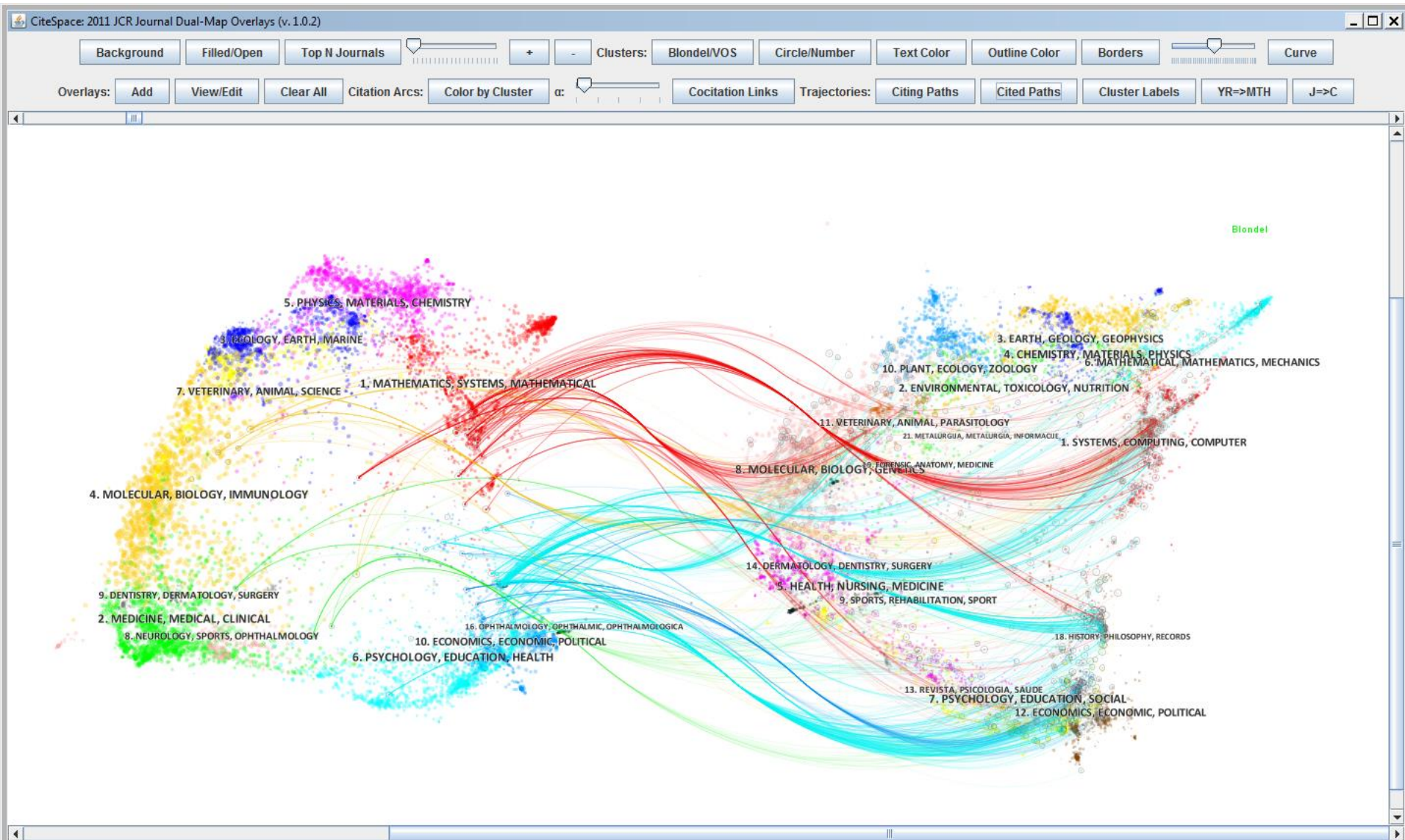
Google: 620 articles

Microsoft: 1,050 articles

IBM: 3,965 articles



JCR Journal Dual-Map Overlays



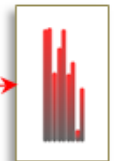
JCR Journal Dual-Map Overlays

Base Map of Citing Journals

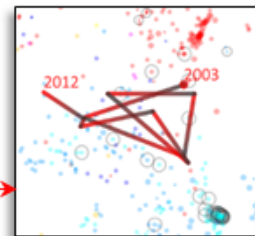
Base Map of Cited Journals



Show co-citation links



Drifts



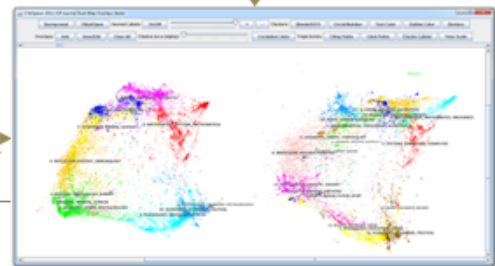
Trajectories



Show holistic trajectories



Show citation arcs



Add overlays

Show cited journals



Web of Science®



← Drifts in citing trajectory

Drifts in cited trajectory →

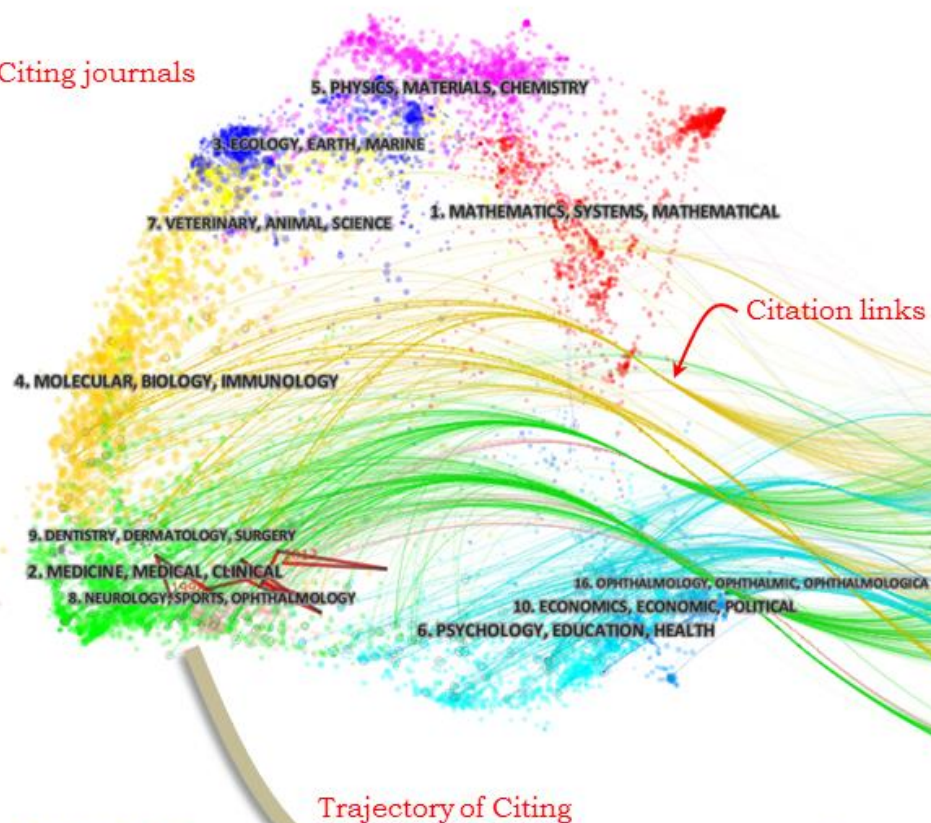


Time

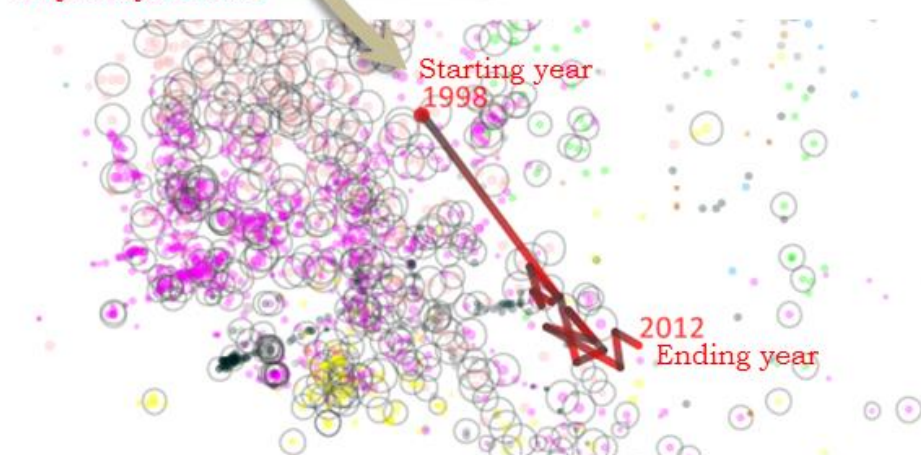
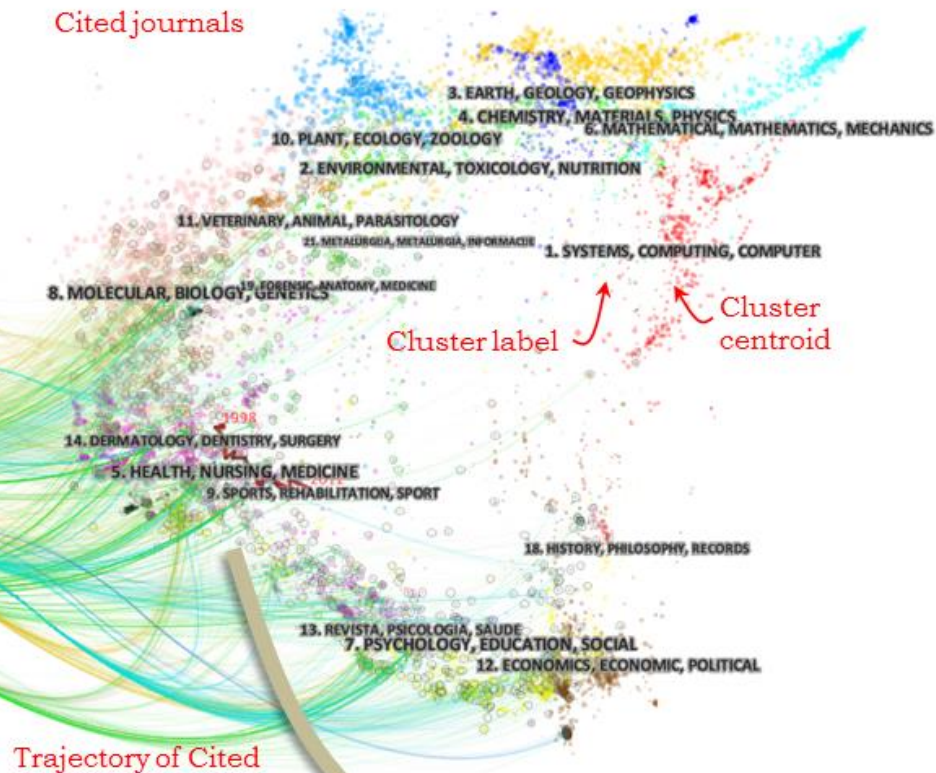
Source of the overlay:
405 articles citing Wakefield et al. (1998)

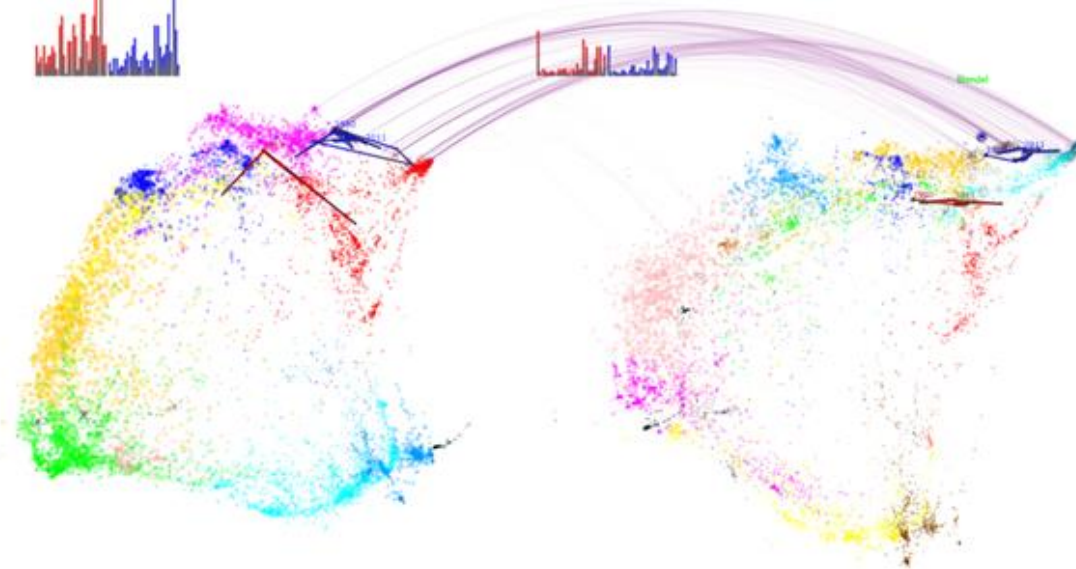
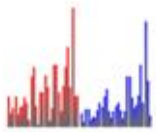
Blondel

Citing journals



Cited journals





Edward Witten

Articles : 206 (1980-2011)

Red: discipline level

Blue: journal level

Disciplines:

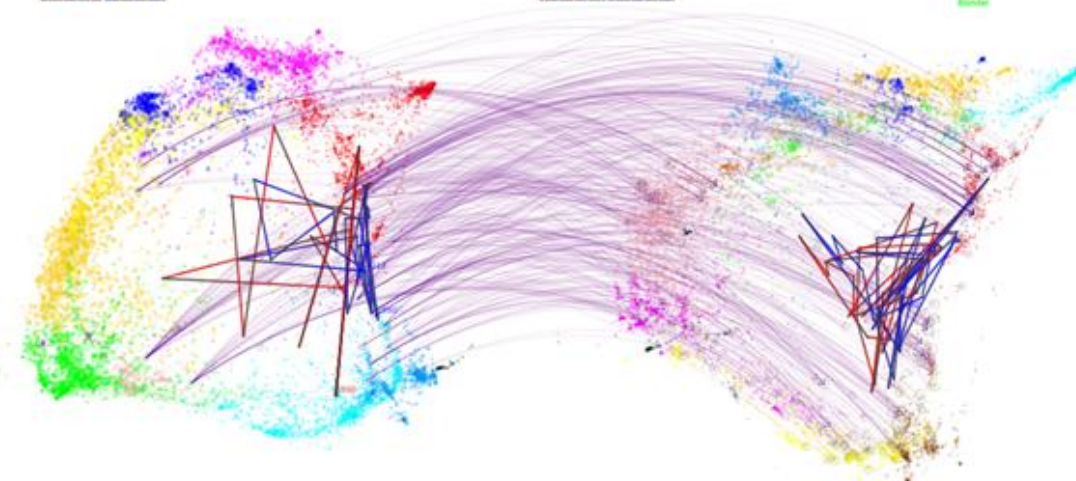
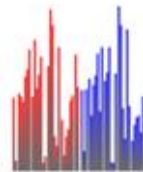
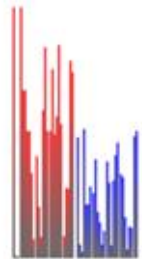
- Physics (29 times)
- Mathematics (3 times)

Trajectory of Citing Journals

- Stable and compact core
- Mostly short-range shifts
- Few long-range shifts

Trajectory of Cited Journals

- Mostly near-range shifts
- Occasionally short-range shifts



Ben Shneiderman

Articles: 132 (1980-2012)

Red: discipline level

Blue: journal level

Disciplines:

- Mathematics/Computing (17 times)
- Psychology (8 times)
- Biology (2 times)
- Ecology (1 time)

Trajectory of Citing Journals

- Recurring multiple cores
- Combined short- and long-range shifts

Trajectory of Cited Journals

- More long-range shifts and short-range ones
- No linear trend

Resources

My Homepage

<http://www.pages.drexel.edu/~cc345/>

CiteSpace

<http://cluster.cis.drexel.edu/~cchen/citespace>

Google Citation Profile

<http://scholar.google.com/citations?user=IjN4HSRsdakC&hl=en>

ResearchGate

http://www.researchgate.net/profile/Chaomei_Chen/

CiteSpace on Facebook

<https://www.facebook.com/pages/CiteSpace/276625072366558>