



CitNetExplorer

Analyzing citation patterns in scientific literature

Getting started with CitNetExplorer version 1.0.0

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Universiteit
Leiden



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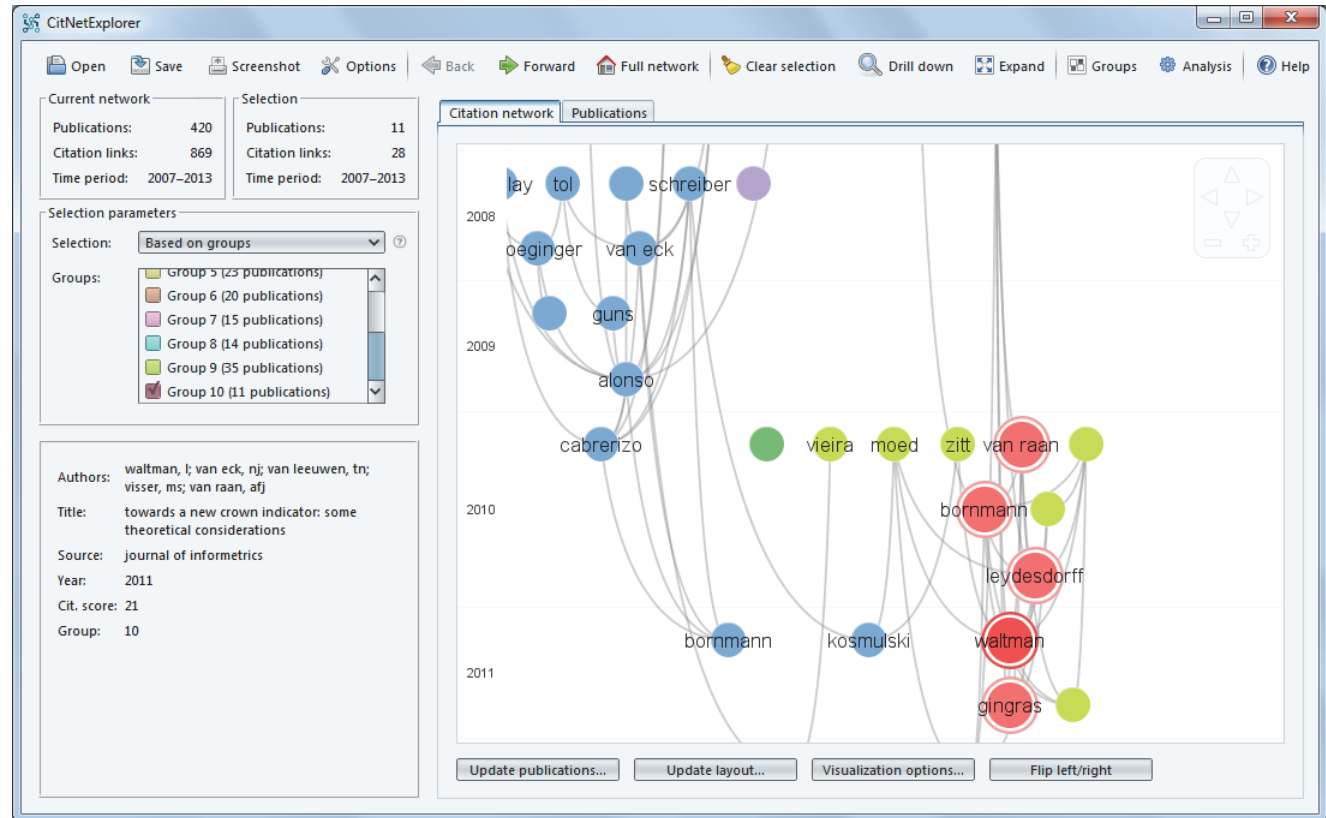
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- CitNetExplorer is a software tool for visualizing and analyzing citation networks of scientific publications
- For non-commercial research and teaching purposes, CitNetExplorer is freely available at www.citnetexplorer.nl

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Introduction

- This tutorial offers an introduction into CitNetExplorer
- The citation network of all publications in the *Journal of Informetrics (JOI)* in the period 2007–2013 is studied



- The analysis is based on data from Web of Science and focuses on the topic of field-normalized citation impact indicators

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We start by demonstrating how to download Web of Science data on all publications in JOI in the period 2007–2013

- Open a web browser and go to www.webofscience.com
- Change **All Databases** into **Web of Science™ Core Collection**

The screenshot shows the top navigation bar of the Web of Science website. The 'All Databases' dropdown menu is open, displaying the following options: 'All Databases', 'Web of Science™ Core Collection', 'Current Contents Connect®', and 'MEDLINE®'. Below the dropdown, the search interface includes a search box with the placeholder text 'Example: oil spill* mediterr', a 'Topic' dropdown menu, and a 'Search' button. A 'Learn More' link and an 'Add Another Field' button are also visible.

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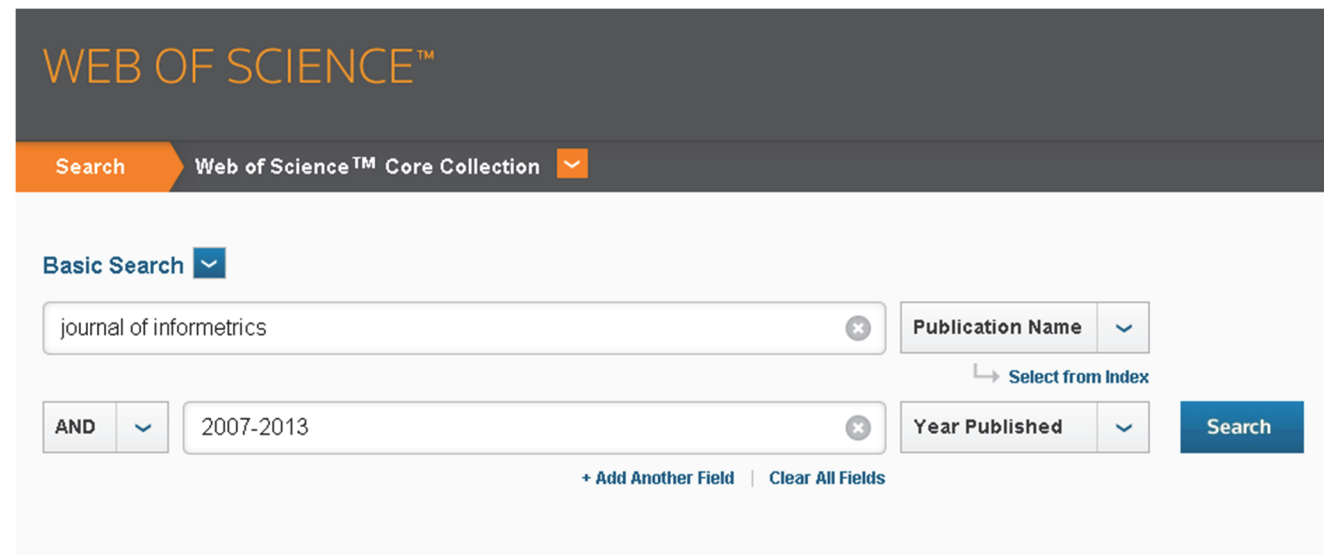
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- In the search field, choose **Publication Name** and enter 'journal of informetrics'
- Click **Add Another Field**, choose **Year Published**, and enter '2007-2013'



The screenshot shows the Web of Science search interface. At the top, it says "WEB OF SCIENCE™" in orange. Below that, there's a navigation bar with "Search" in an orange arrow, "Web of Science™ Core Collection" with a dropdown arrow, and a "Basic Search" dropdown menu. The search area contains two input fields. The first field contains "journal of informetrics" and has a dropdown menu set to "Publication Name". Below this field is a link that says "Select from Index". The second field contains "2007-2013" and has a dropdown menu set to "Year Published". To the left of the second field is a dropdown menu set to "AND". At the bottom of the search area, there are links for "+ Add Another Field" and "Clear All Fields". A blue "Search" button is on the right side of the search area.

- Click **Search**

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- There turn out to be 420 publications in *JOI* in the period 2007–2013
- To save the bibliographic data of these publications in a file, choose the **Save to Other File Formats** option

WEB OF SCIENCE™

[Back to Search](#)

Results: 420

You searched for:
PUBLICATION NAME: (*journal of informetrics*) **AND YEAR PUBLISHED:** (2007-2013) [...More](#)

[Create Alert](#)

Refine Results

Search within results for...

Sort by: **Publication Date -- newest to oldest** ▾

Select Page

1. **Accuracy of simple, initial**
By: Milojevic, Stasa
JOURNAL OF INFORMETRICS [Full Text](#) [View Abstract](#) **Save to EndNote online** ▾ [Add to Marked List](#)
Save to EndNote online
Save to EndNote desktop
Save to ResearcherID - I wrote these
Save to Other File Formats
Save to RefWorks

2. **The h-index: A case of the tail wagging the dog?**
By: Burrell, Quentin L.
JOURNAL OF INFORMETRICS Volume: 7 Issue: 4 Pages: 774-783 Published: 2013
[Full Text](#) [View Abstract](#)

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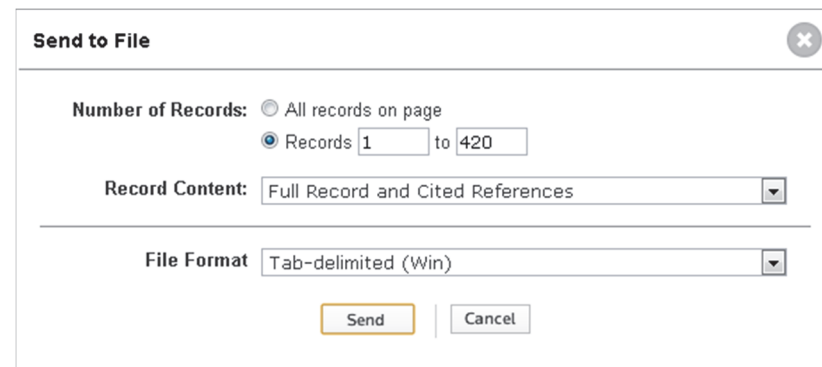
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- In the **Send to File** dialog box, select records 1 to 420
- Choose the **Full Record and Cited References** option
- Choose the **Tab-delimited (Win)** option. Alternatively, the **Plain Text** option can be chosen as well



Send to File

Number of Records: All records on page
 Records 1 to 420

Record Content: Full Record and Cited References

File Format: Tab-delimited (Win)

Send | Cancel

- Click **Send**. The bibliographic data is downloaded in a file called 'savedrecs.txt'. Change the name of the file into 'JOI.txt' and save the file at a convenient location

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We now show how to open the citation network of JOI publications in CitNetExplorer, and we introduce the CitNetExplorer user interface

- If you have not yet done so, first download CitNetExplorer:
 - Go to www.citnetexplorer.nl/download/
 - Download the appropriate ZIP file for your system
 - Extract all files from the ZIP file and save the files at a convenient location
- Launch CitNetExplorer:
 - On Windows systems, run the Windows executable of CitNetExplorer. On other systems, run the Java JAR file of CitNetExplorer
 - CitNetExplorer is launched and the **Open Citation Network** dialog box appears

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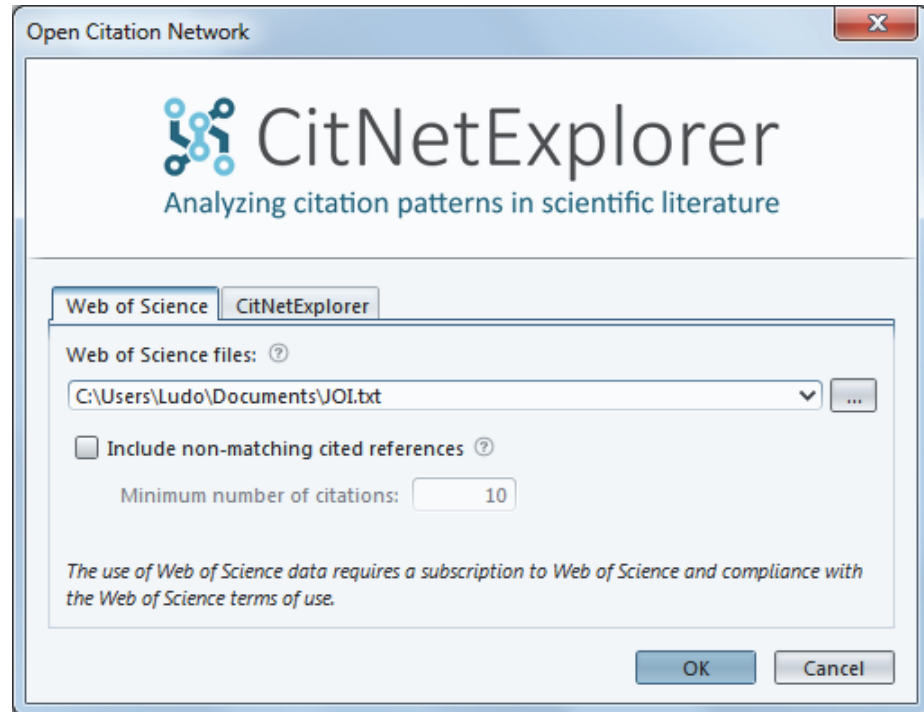
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- In the **Open Citation Network** dialog box, select the Web of Science file 'JOI.txt'



- Uncheck **Include non-matching cited references**. In this way, publications in journals other than *JOI* that are cited by publications in *JOI* are not included in the citation network
- Click **OK**. A visualization of the citation network of *JOI* publications appears

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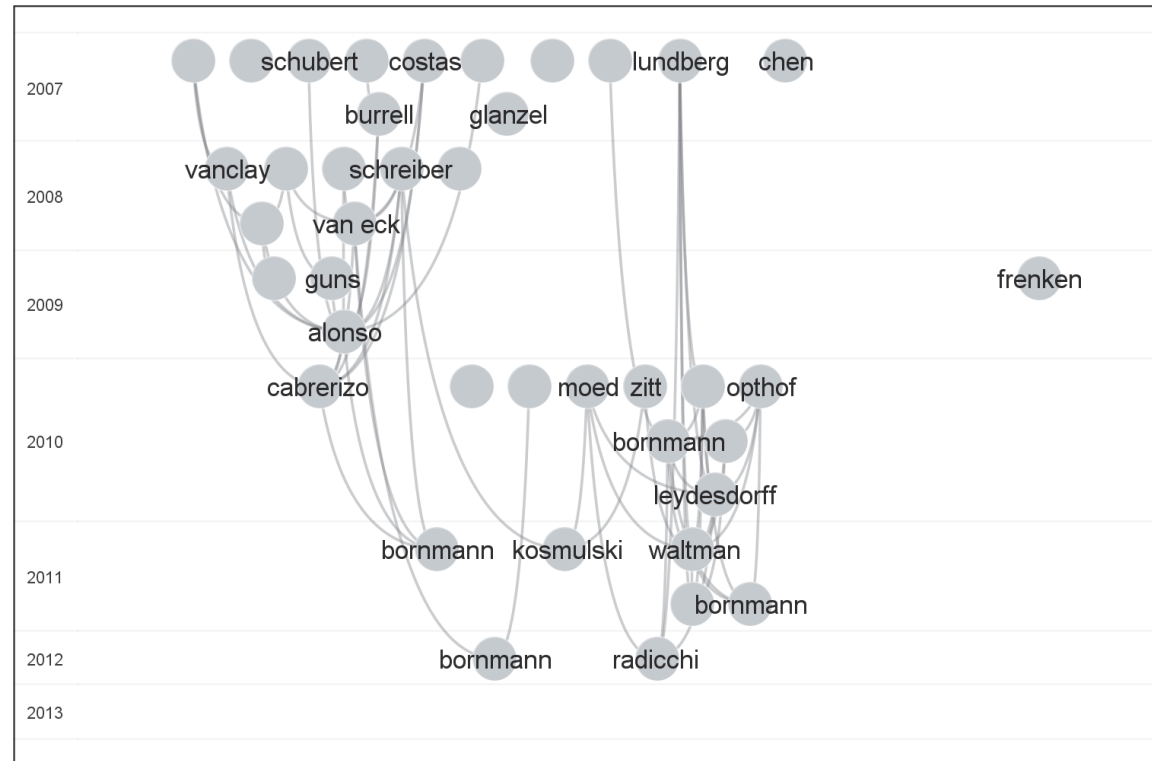
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- Each circle represents a publication
- Publications are labeled by the last name of the first author
- To avoid overlapping labels, some labels may not be displayed
- By default, only the 40 most frequently cited publications are included in the visualization

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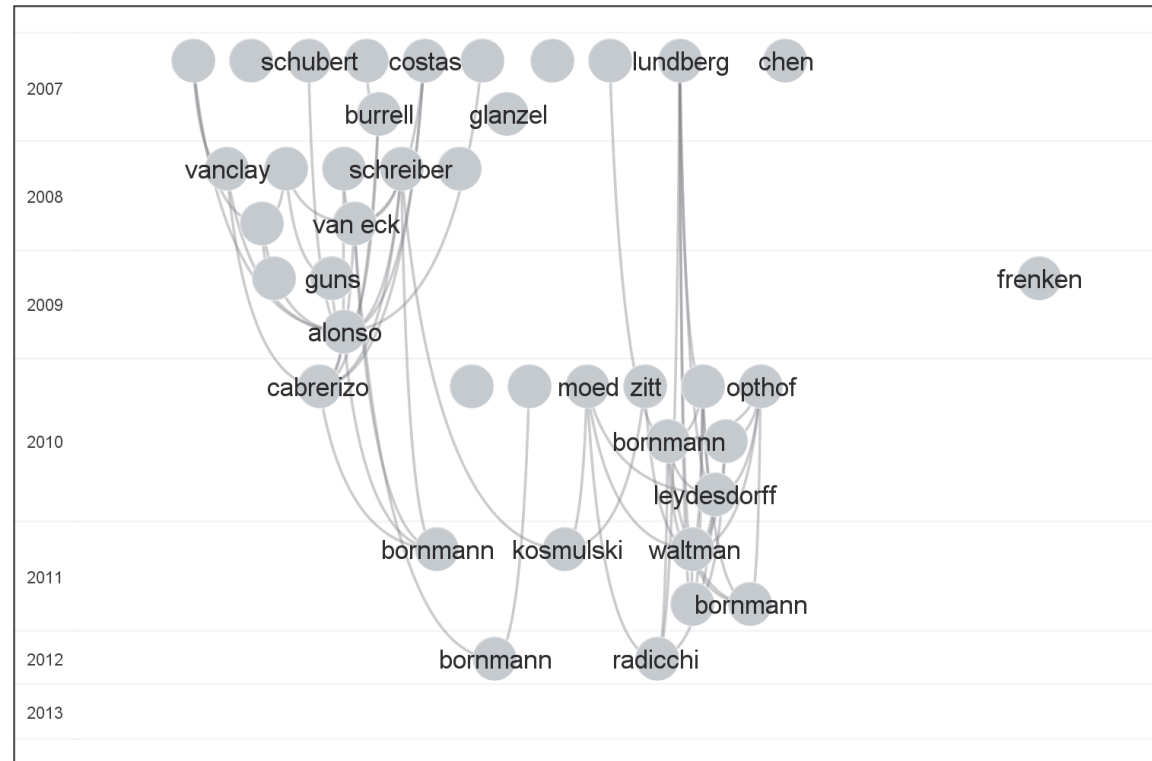
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- The horizontal location of a publication is determined by its citations relations with other publications
- The vertical location of a publication is determined by its publication year
- The curved lines represent citation relations
- Citations point in upward direction. The cited publication is always located above the citing publication

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The **Current network** panel shows the number of publications and the number of citation relations in the citation network

Current network	
Publications:	420
Citation links:	869
Time period:	2007–2013

When the mouse is moved over a publication, some bibliographic information is shown in the information panel

Authors:	van eck, nj; waltman, l
Title:	generalizing the h- and g- indices
Source:	journal of informetrics
Year:	2008
Cit. score:	15

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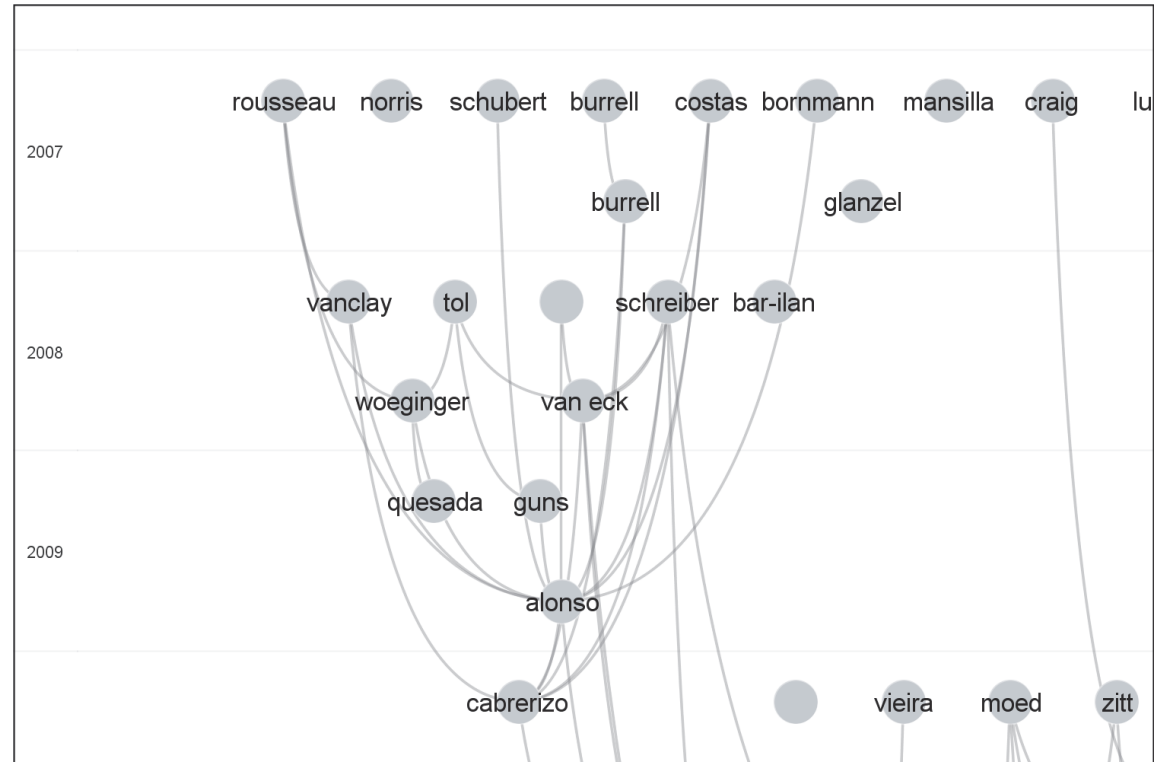
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- Use the mouse wheel or the right mouse button for zooming
- Use the left mouse button for panning/scrolling
- Alternatively, the navigation panel can be used



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- Go to the **Publications** tab
- In the **Author** field, enter 'van eck* OR waltman*'
- Click **Search**. There turn out to be 13 *JOI* publications by Van Eck and/or Waltman

Search

Author: ? First year: Last year:

Title: ? Min. cit. score: Max. cit. score:

Source: ? Group: ▾

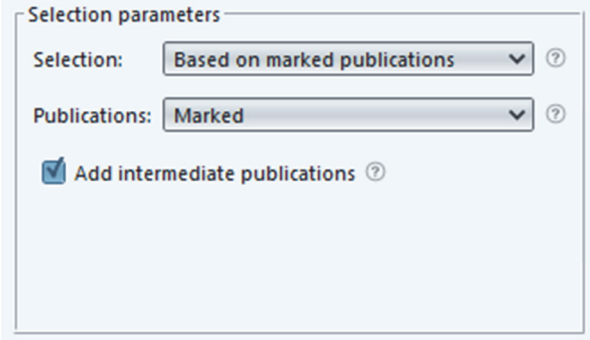
All publications (13) Selected publications Marked publications

	Authors	Title	Source	Year	Cit. score ▾	
<input type="checkbox"/>	waltman, l; van eck, nj; van leeuw...	towards a new crown indicator: s...	journal of informetrics	2011	21	▲
<input type="checkbox"/>	van raan, afj; van leeuwen, tn; vis...	rivals for the crown: reply to oph...	journal of informetrics	2010	18	
<input type="checkbox"/>	van eck, nj; waltman, l	generalizing the h- and g- indices	journal of informetrics	2008	15	
<input type="checkbox"/>	waltman, l; van eck, nj; noyons, e...	a unified approach to mapping a...	journal of informetrics	2010	3	
<input type="checkbox"/>	waltman, l; van eck, nj; van leeuw...	some modifications to the snip jo...	journal of informetrics	2013	3	
<input type="checkbox"/>	waltman, l; van eck, nj	some comments on egghe's deriv...	journal of informetrics	2009	2	
<input type="checkbox"/>	bornmann, l; waltman, l	the detection of "hot regions" in t...	journal of informetrics	2011	2	
<input type="checkbox"/>	waltman, l; tijssen, rjw; van eck, nj	globalisation of science in kilome...	journal of informetrics	2011	2	
<input type="checkbox"/>	waltman, l	an empirical analysis of the use of...	journal of informetrics	2012	2	
<input type="checkbox"/>	waltman, l; van eck, nj	a systematic empirical comparison...	journal of informetrics	2013	1	
<input type="checkbox"/>	waltman, l; van eck, nj	some comments on the journal w...	journal of informetrics	2008	0	
<input type="checkbox"/>	van eck, nj; waltman, l	on the proper understanding of t...	journal of informetrics	2009	0	
<input type="checkbox"/>	waltman, l; van eck, nj; wouters, p	counting publications and citatio...	journal of informetrics	2013	0	

Drill down

We now demonstrate the use of the drill down and expand functionality of CitNetExplorer to explore the citation network of JOI publications on the topic of field-normalized citation impact indicators

- Go back to the **Citation network** tab
- In the **Selection parameters** panel, make sure that the **Based on marked publications** option is chosen



Selection parameters

Selection: Based on marked publications ?

Publications: Marked ?

Add intermediate publications ?

- Also make sure that **Add intermediate publications** is checked

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- In the visualization, click 'lundberg' in 2007 and 'radicchi' in 2012. Both publications have now been marked
- Based on the current settings in the **Selection parameters** panel, a publication is selected if it is either a marked or an intermediate publication

Intermediate publications are publications located on a citation path between two marked publications

- The **Selection** panel shows that there are 10 selected publications. There are 26 citation relations between these publications

Selection	
Publications:	10
Citation links:	26
Time period:	2007–2012

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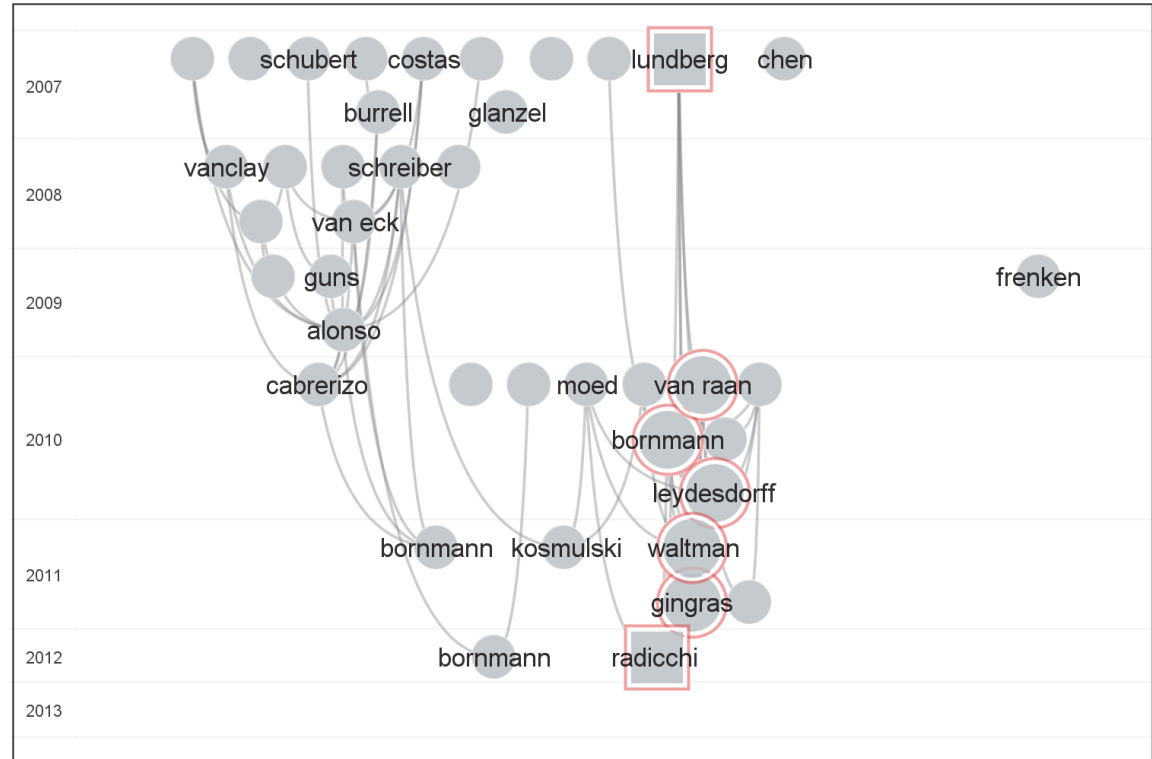
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- Marked publications are represented by a square instead of a circle
- Selected publications are indicated by a red border

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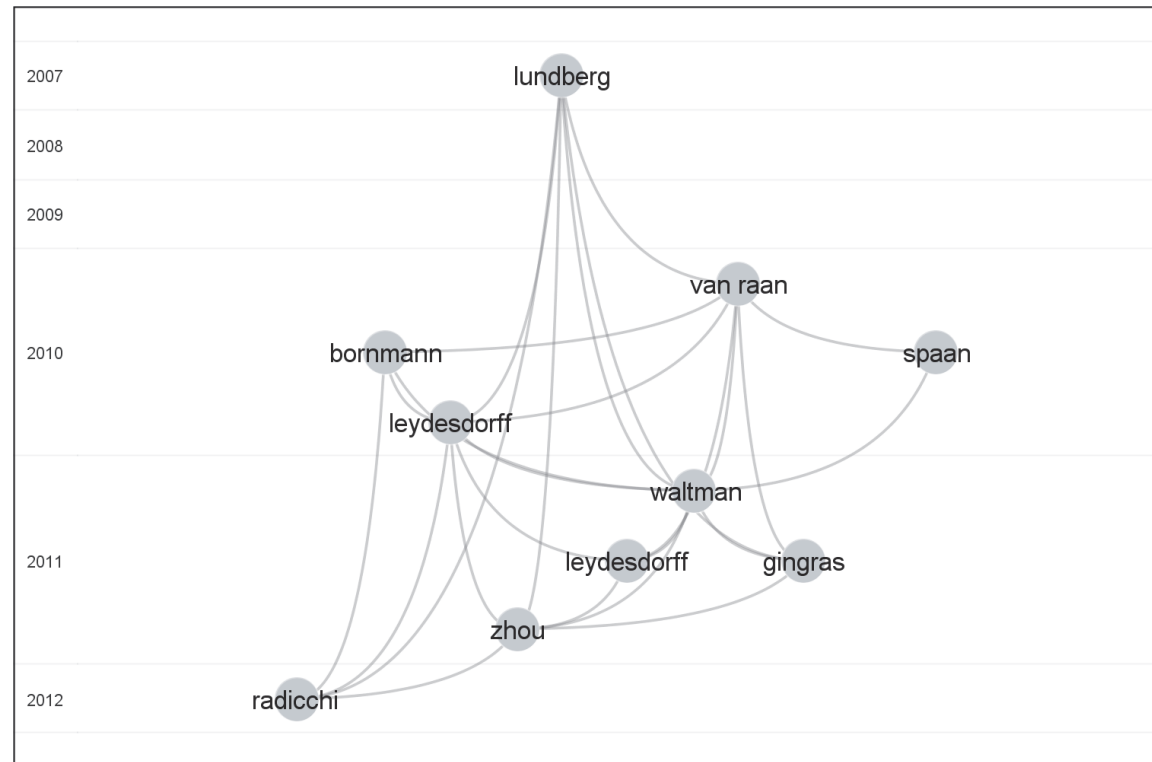
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Drill down

- Click  **Drill down** to drill down to the subnetwork consisting of the 10 selected publications
- The visualization is updated



- The **Current network** panel is updated as well

Current network	
Publications:	10
Citation links:	26
Time period:	2007–2012

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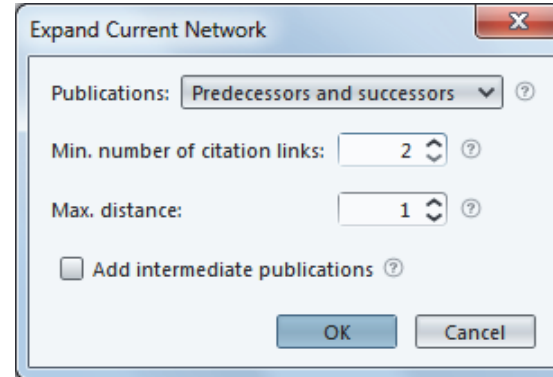
Core publications

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Expand

- Click  **Expand** . The **Expand Current Network** dialog box appears



- Make sure that the **Predecessors and successors** option is chosen

- Predecessors are publications cited by at least a certain minimum number of publications in the current subnetwork
- Successors are publications citing at least a certain minimum number of publications in the current subnetwork

- Set **Min. number of citation links** to 2

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Expand

- Make sure that **Max. distance** is set to 1
- Also make sure that **Add intermediate publications** is unchecked

Intermediate publications are publications located on a citation path between two predecessors/successors

- Click **OK** to expand the current subnetwork

Expand

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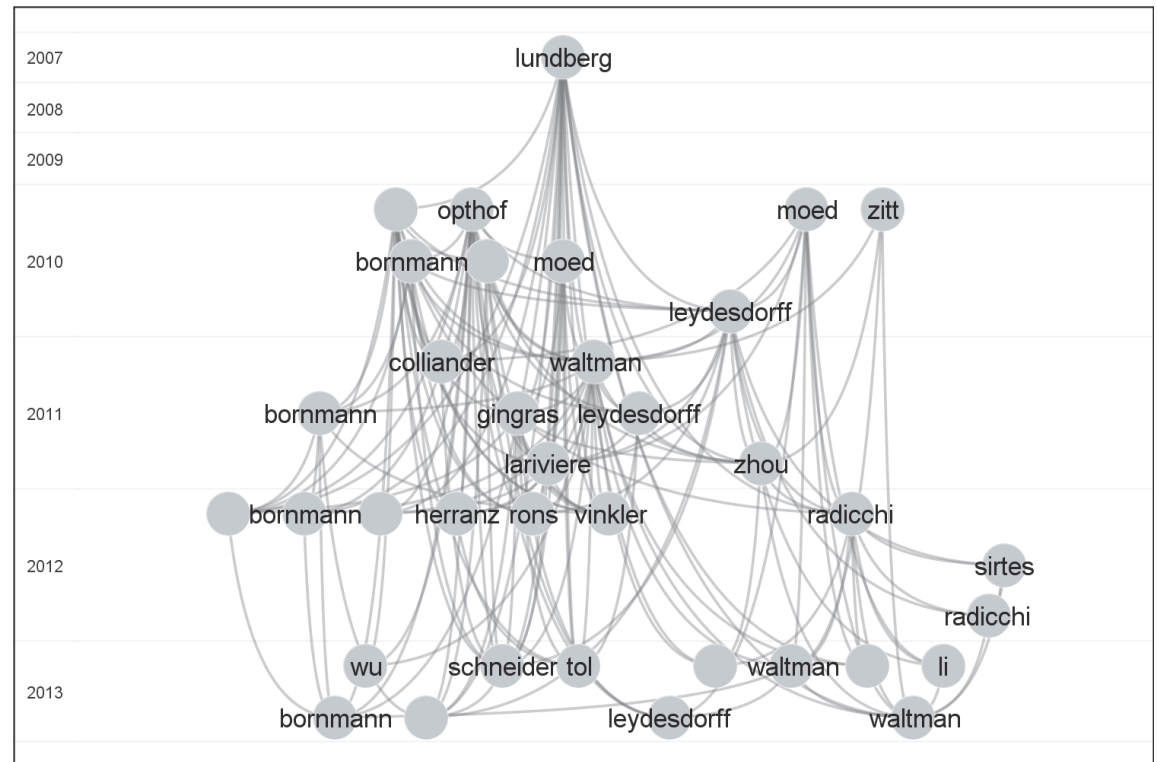
Core publications

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- After the expansion, the current subnetwork includes 36 publications

Current network	
Publications:	36
Citation links:	164
Time period:	2007–2013



Back/forward

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We have shown the use of CitNetExplorer's drill down and expand functionality to explore the citation network of JOI publications on the topic of field-normalized citation impact indicators. We now demonstrate an alternative approach that uses CitNetExplorer's clustering and core publications functionality

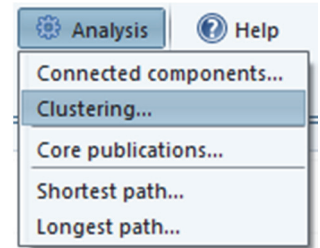
- Click  **Back** to move back to the previous subnetwork. This is the subnetwork that includes 10 publications
- Click  **Back** again to move back another time. You now get back to the original full network

- The  **Back** and  **Forward** buttons can be used to move back and forward between subnetworks, analogous to the back and forward buttons in a web browser
- The  **Full network** button can be used to move to the full network, analogous to the home button in a web browser

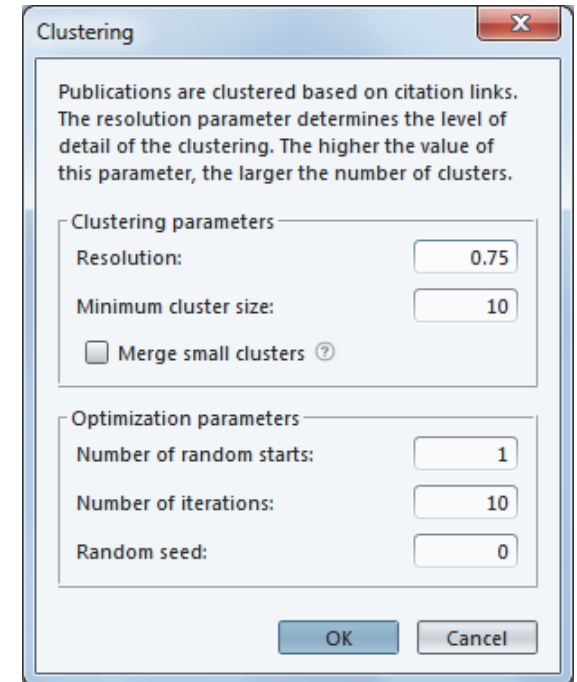
- Click  **Clear selection** to unselect all selected publications and to unmark all marked publications

Clustering

- Click **Clustering** in the **Analysis** menu
- In the **Clustering** dialog box, set the **Resolution** parameter to 0.75. The values of the other parameters need not be changed



- Publications are clustered based on their citation relations. Publications assigned to the same cluster tend to be closely connected to each other in the citation network
- The **Resolution** parameter determines the level of detail of the clustering. The higher the value of this parameter, the larger the number of clusters that will be obtained



- Click **OK**

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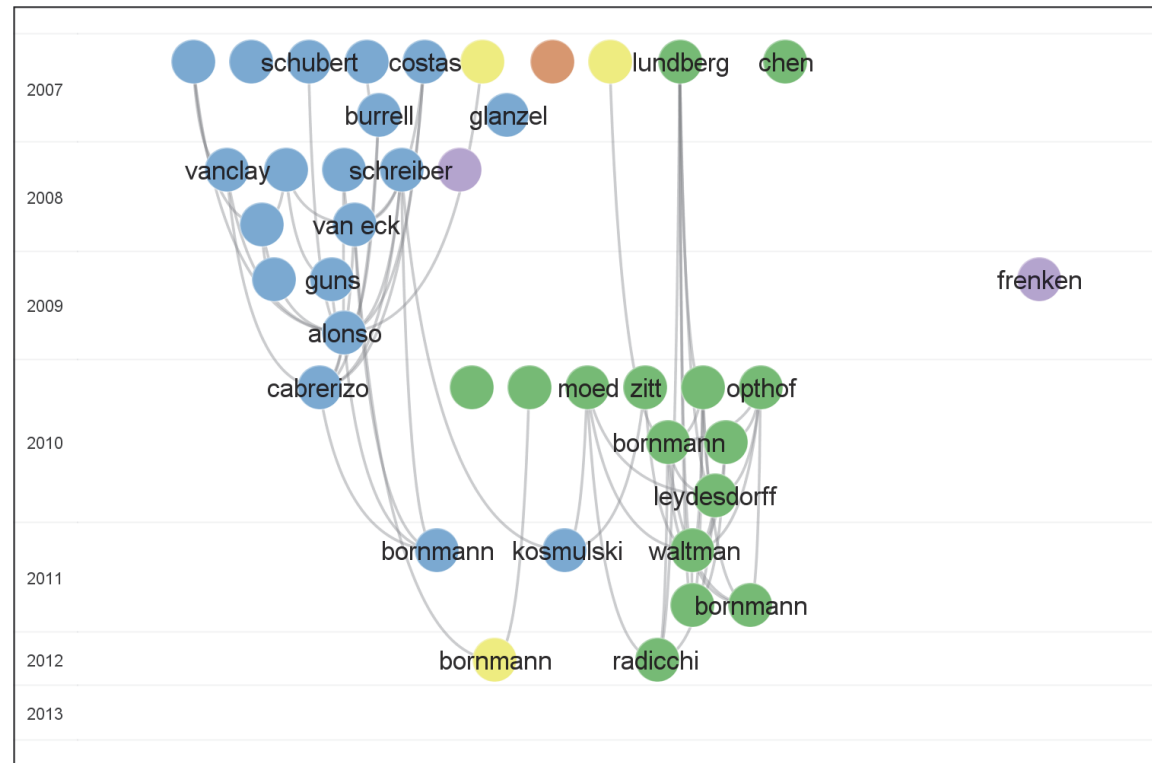
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- 8 clusters of publications are identified and the visualization is updated



- The color of a publication indicates the group to which the publication is assigned
- Each group corresponds with one of the 8 clusters of publications that have been identified

Clustering

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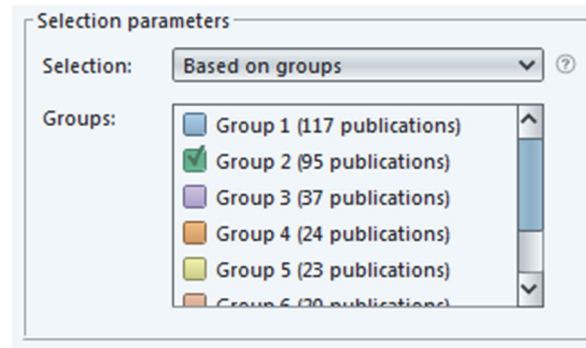
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- In the **Selection parameters** panel, choose the **Based on groups** option
- Check **Group 2** to select the 95 publications assigned to group 2



- Click  **Drill down** to drill down to the subnetwork consisting of these 95 publications

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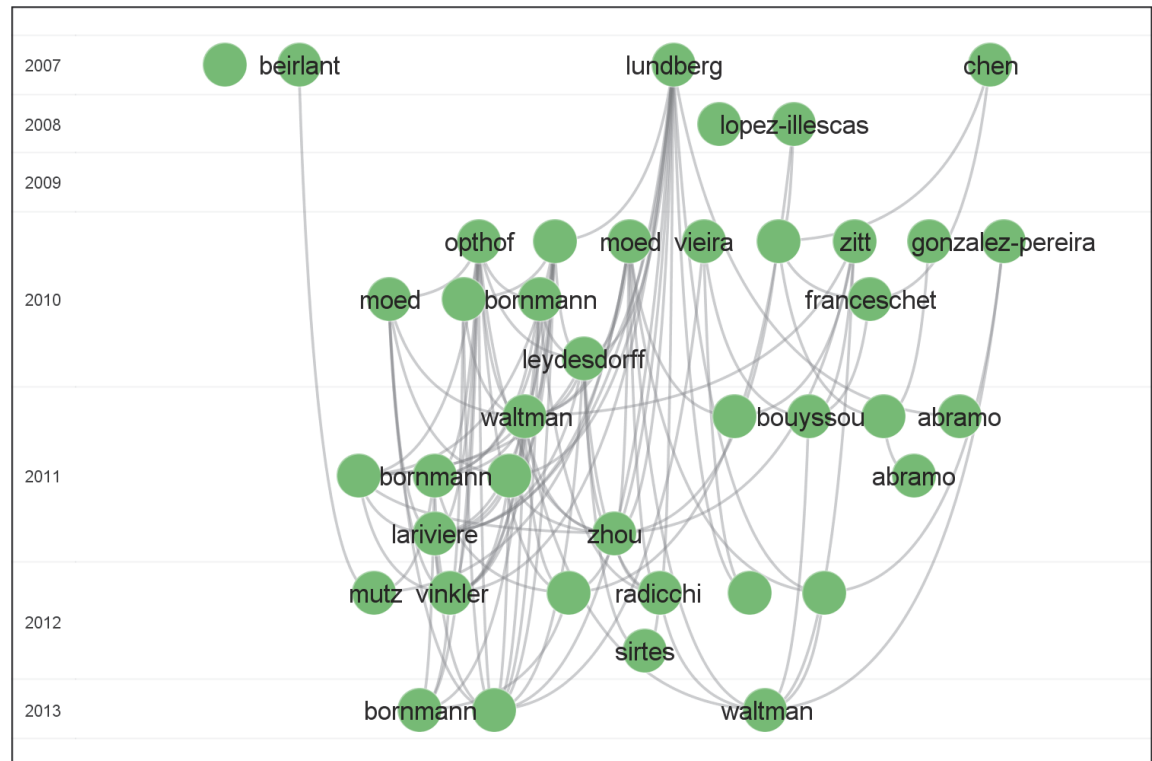
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- After drilling down, the current subnetwork includes 95 publications

Current network	
Publications:	95
Citation links:	295
Time period:	2007–2013



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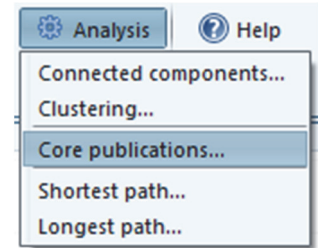
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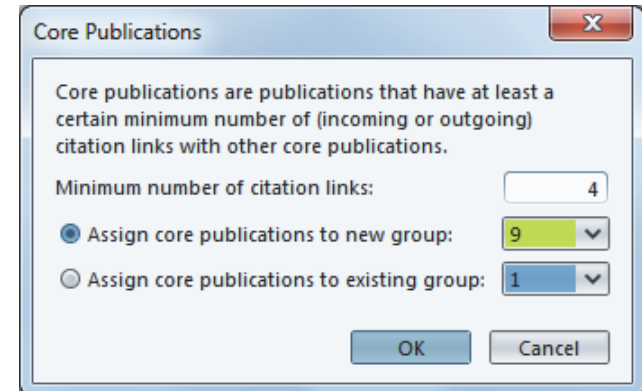
Core publications

- Click **Core publications** in the **Analysis** menu



- In the **Core Publications** dialog box, set the **Minimum number of citation links** parameter to 4

- Core publications are publications that have at least a certain minimum number of citation relations with other core publications
- Incoming and outgoing citation relations are treated identically



- Click **OK**

Core publications

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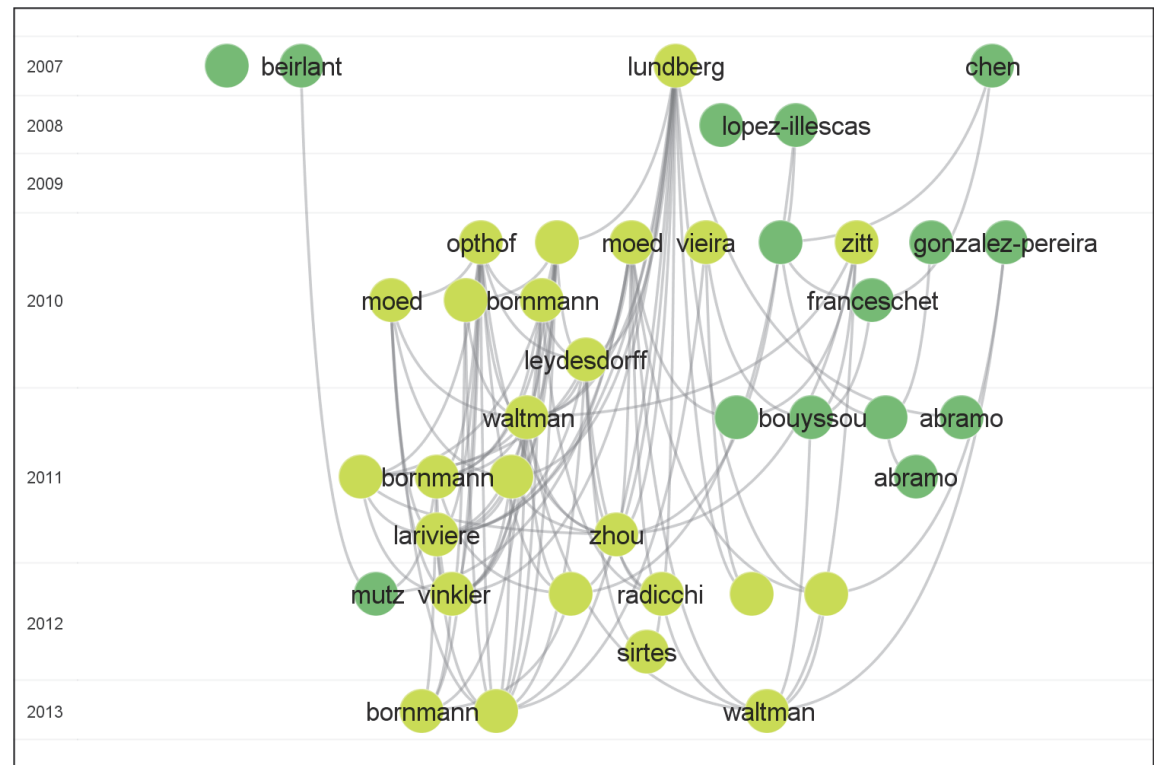
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- There are 46 core publications. Each of these publications has at least 4 citation relations with other core publications
- The core publications are assigned to group 9 and the visualization is updated



Core publications

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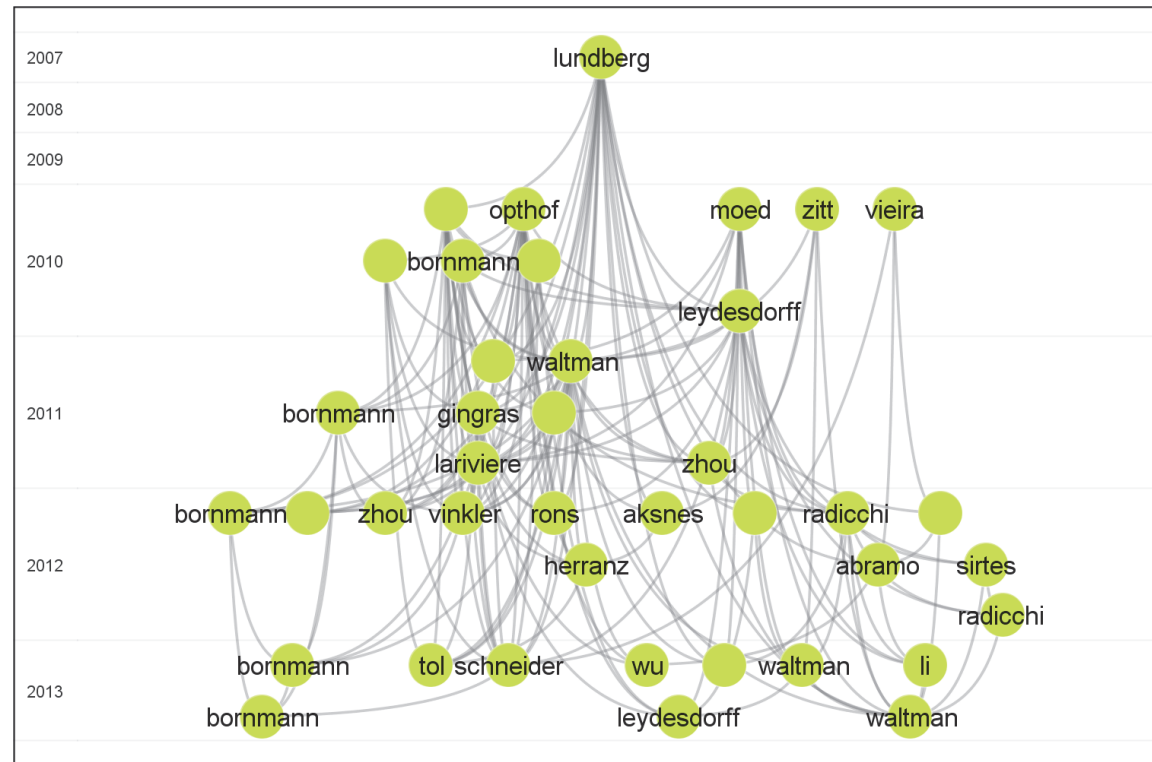
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- In the **Selection parameters** panel, check **Group 9** to select the 46 publications assigned to group 9
- Click  **Drill down** to drill down to the subnetwork consisting of these 46 publications



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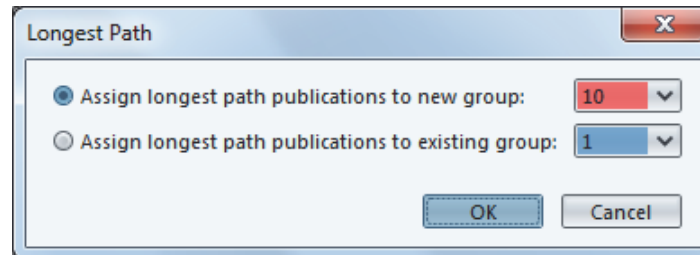
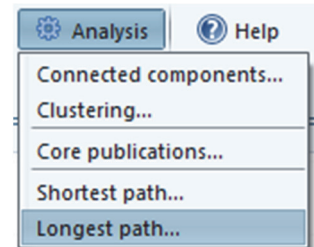
Core publications

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We now demonstrate the use of the shortest/longest path functionality of CitNetExplorer. We focus on the identification of the longest path between two publications. The shortest path can be identified in a similar way

- In the visualization, click 'lundberg' in 2007 and 'leydesdorff' in 2013 to mark these two publications
- Click **Longest path** in the **Analysis** menu

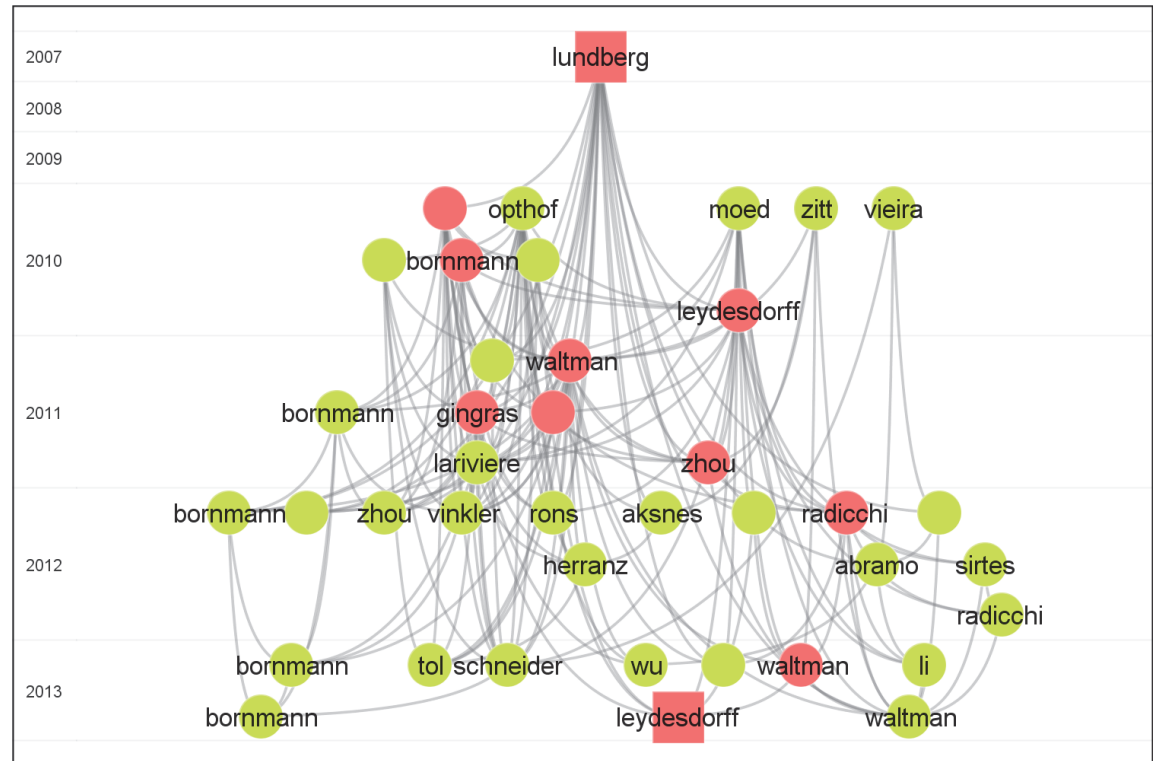


- In the **Longest Path** dialog box, click **OK**

Shortest/longest path

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- Multiple longest paths of length 9 are identified. The publications on these paths are assigned to group 10 and the visualization is updated



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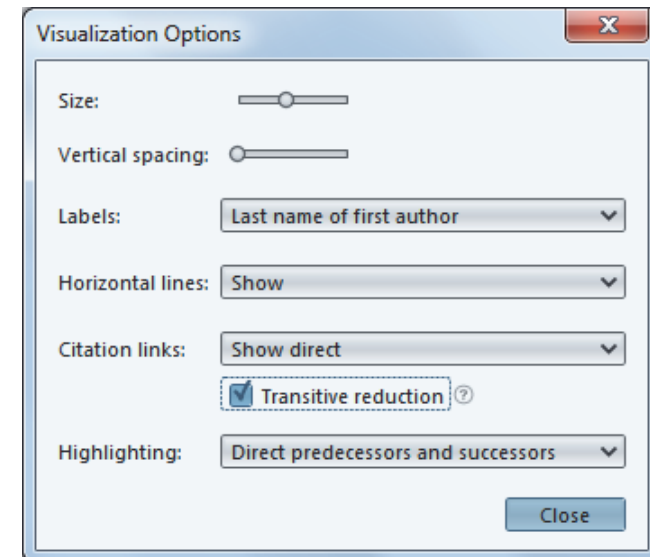
Shortest/longest path

Save citation network

Shortest/longest path

- In the **Selection parameters** panel, check **Group 10** to select the 11 publications assigned to group 10
- Click  **Drill down** to drill down to the subnetwork consisting of these 11 publications
- Click **Visualization options**
- In the **Visualization Options** dialog box, check **Transitive reduction**

- In the transitive reduction of a citation network, citation relations are kept only if they are necessary to preserve the connectivity structure of the network
- Example: If A cites B and C and if B cites C, the citation relation between A and C is not included in the transitive reduction, since A and C are also connected through B



- Click **Close**

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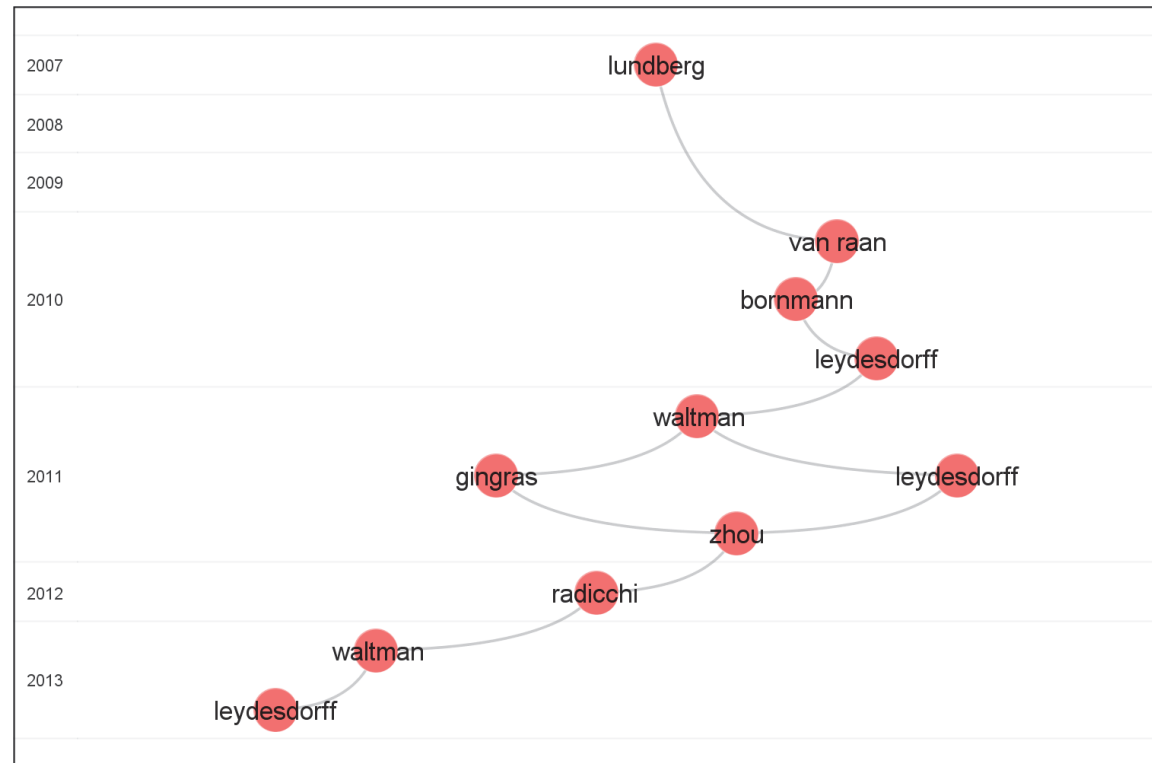
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Shortest/longest path

- The visualization shows that there are two longest paths. The two paths coincide almost completely



Save citation network

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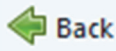
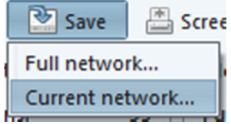
Clustering

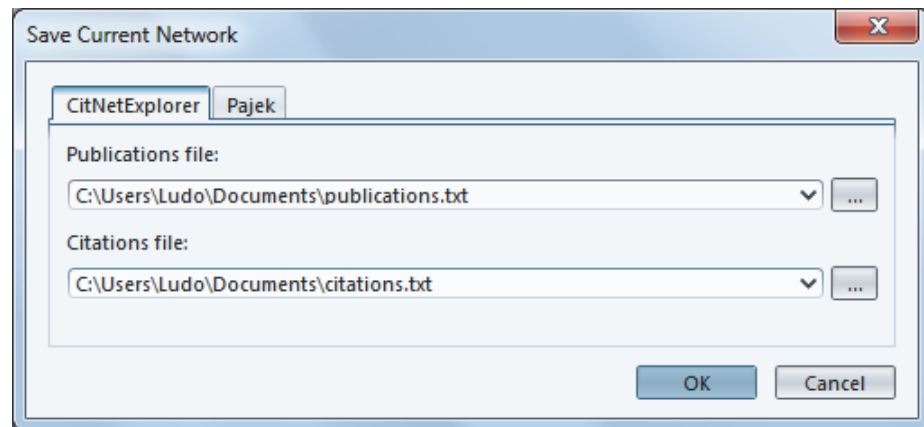
Core publications

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Finally, we show how to save a citation network and how to open it again

- Click  **Back** twice to move back to the subnetwork that includes 95 publications
- To save this subnetwork, click **Current network** in the **Save** menu 
- In the **Save Current Network** dialog box, choose 'publications.txt' as the name of the publications file and 'citations.txt' as the name of the citations file



- Click **OK**

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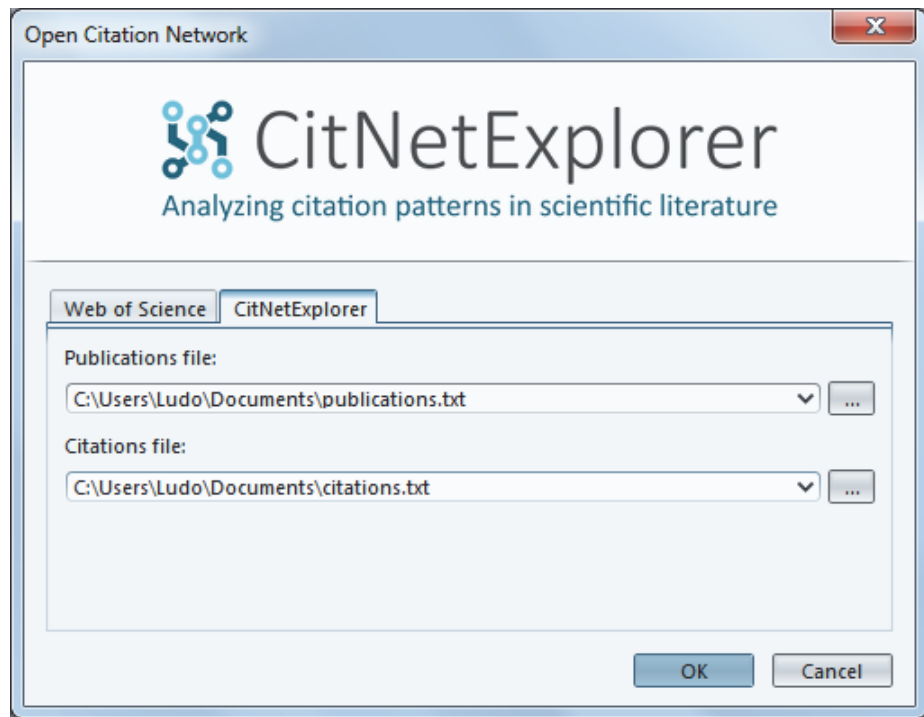
Core publications

Shortest/longest path

Save citation network

Save citation network

- Click  **Open** to open the citation network again
- In the **Open Citation Network** dialog box, go to the **CitNetExplorer** tab
- Select the publications file 'publications.txt' and the citations file 'citations.txt'



- Click **OK**

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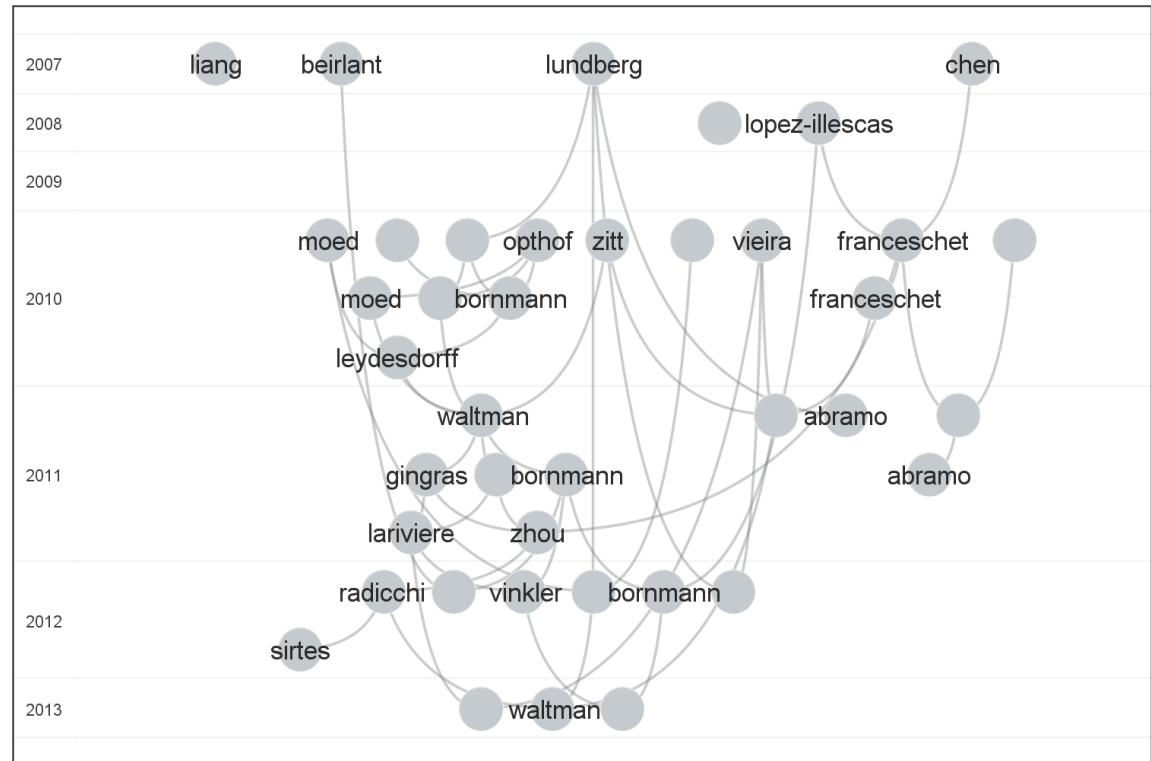
Back/forward

Clustering

Core publications

Shortest/longest path

Save citation network



- When saving a citation network and opening it again, the selection of publications included in the visualization may change. To avoid this, use external citation scores instead of internal ones (see the **Options** dialog box)
- When saving a citation network and opening it again, the assignment of publications to groups is lost. Use **Export groups** and **Import groups** in the **Groups** menu if you do not want to lose this information