

Analyzing the Co-authorship Networks of Latin American Computer Science Research Groups

Objective To analyze the Computer Science Co-authorship Networks in Latin American to provide a view of both their topological structures and evolution

Abstract

We analyze the coauthorship networks of Latin American Computer Science research groups from 35 academic institutions in Argentina, Brazil, Chile, Colombia, Cuba, Mexico, Peru, Uruguay and Venezuela. Our analysis is based on data over a period of 20 years collected from DBLP, and aims to know the topological structure of each of these networks and provide a view of how they have evolved over time. As results, we identify the influential authors in the area according to complex network metrics and analyze the research networks originated from the coauthorships. Despite the increase in all per-country metrics, we observed that there is still a lot to improve, since most of the collaborations happen between just Brazil-Chile and Argentina-Brazil, although there is some growth in the diversity of the collaborations.

Basic statistics

Country	# Inst.	Total Researchers	Pub.	Overall Mean $\bar{X}_c$
Argentina	4	102		2.47
Brazil	13	508		3.06
Chile	5	145		2.44
Colombia	5	62		1.21
Costa Rica	1	15		0.89
Cuba	3	33		0.92
Mexico	4	121		2.23
Peru	1	8		0.87
Uruguay	1	41		1.42
Venezuela	4	59		1.58

The overall mean $\bar{X}_c$ of the scientific production per country was calculated according to Equation 1

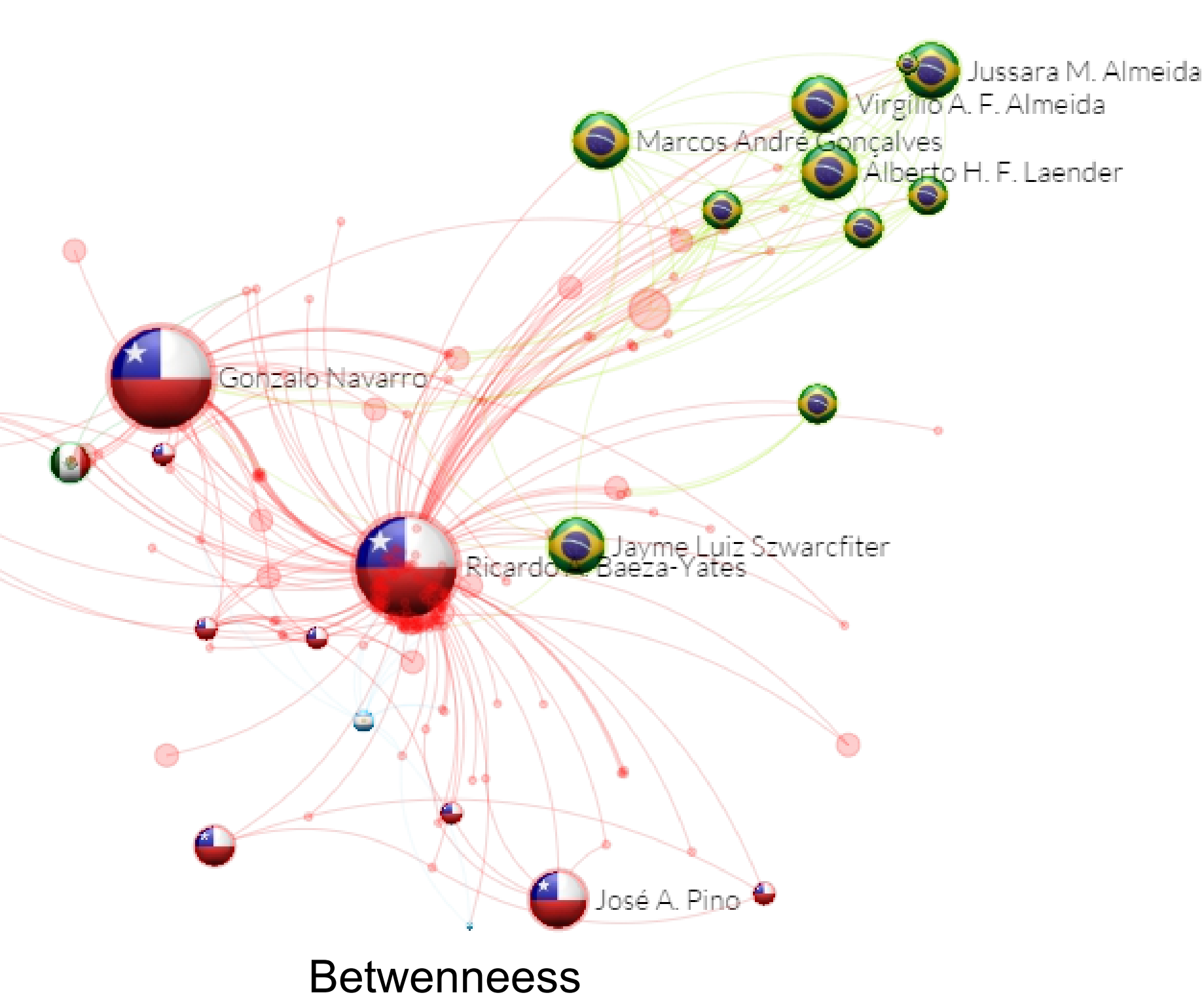
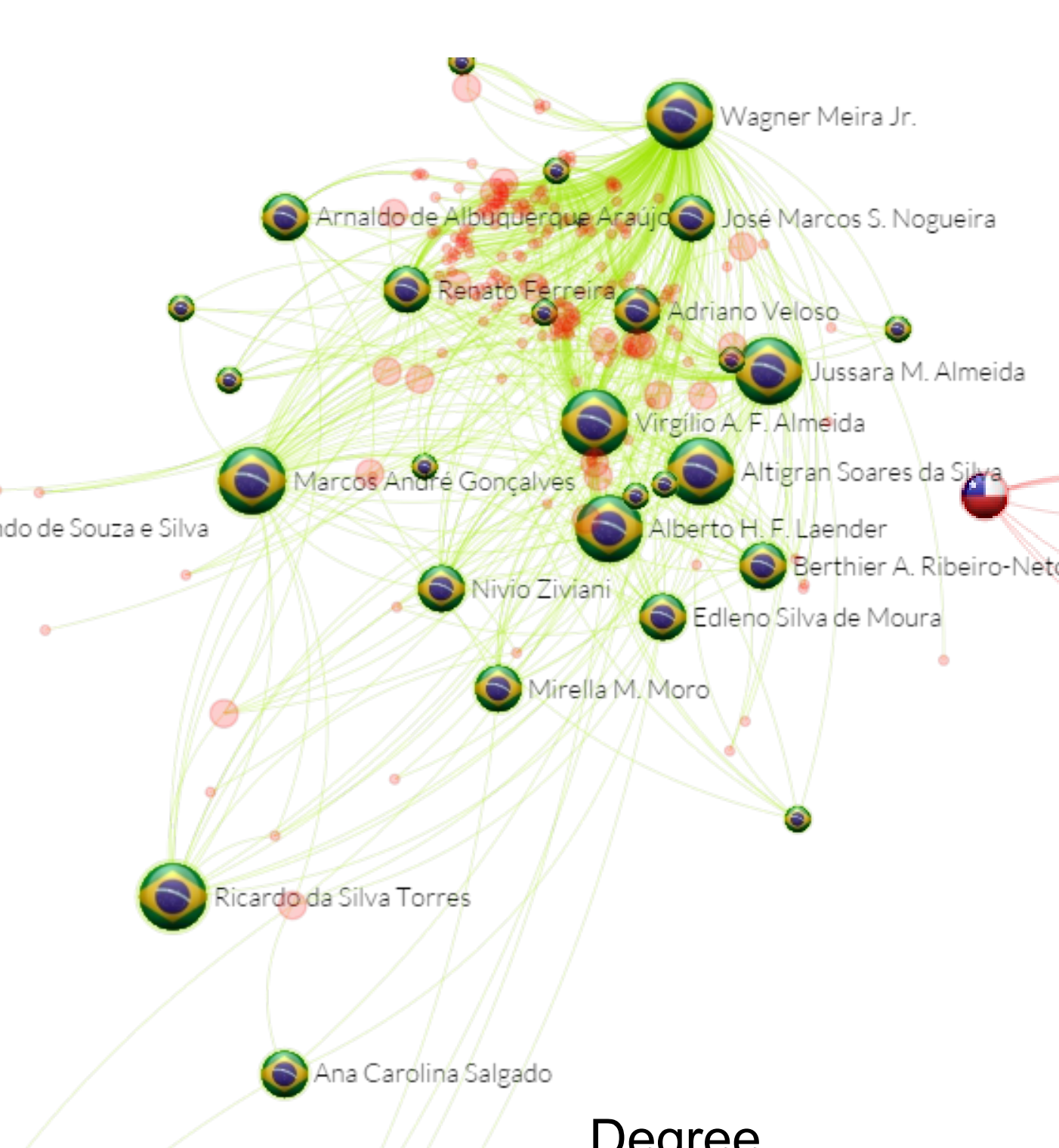
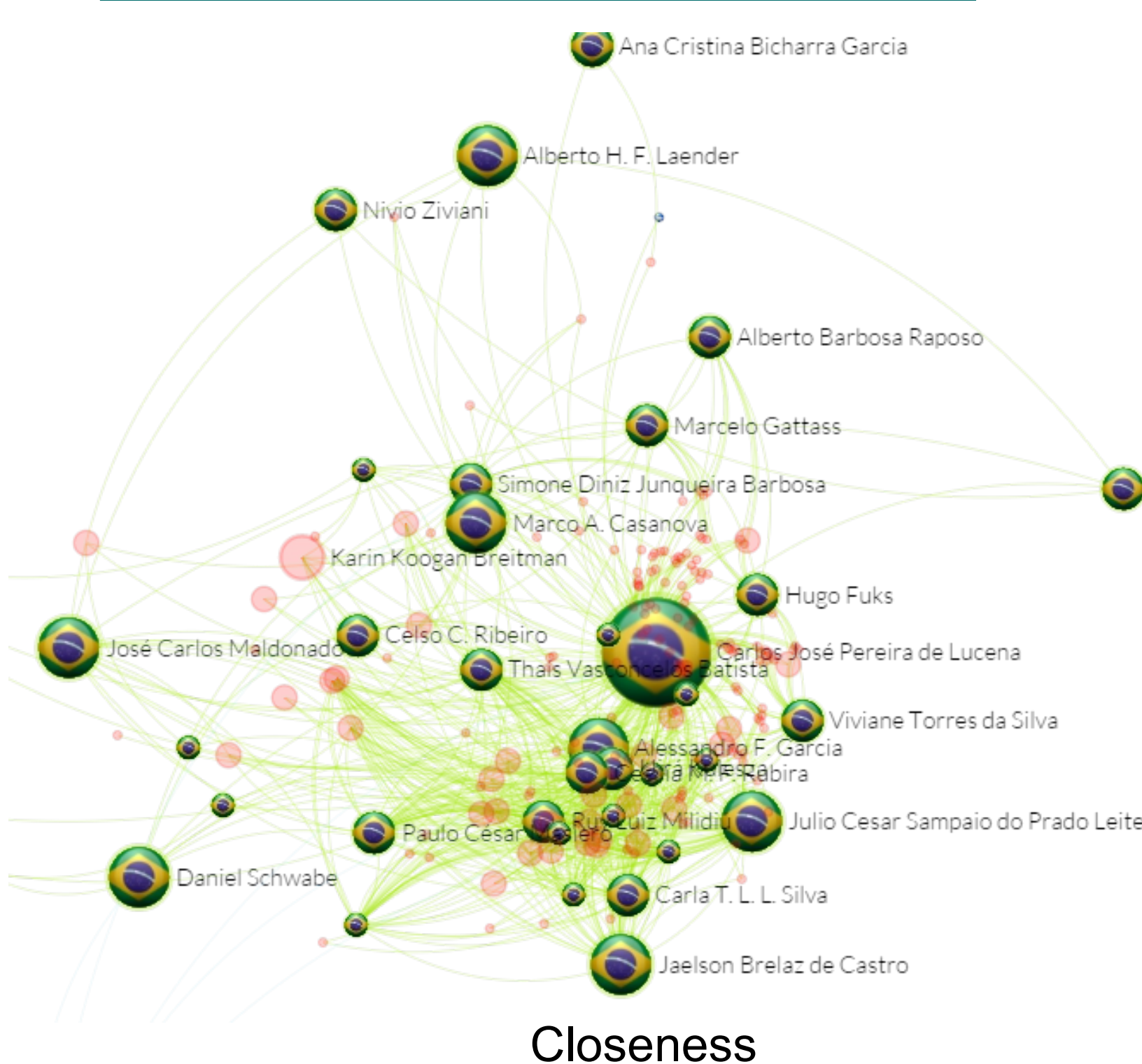
$$\bar{X}_c = \frac{\sum_{i \in U_c} \lambda_i}{|U_c|} \quad (1)$$

where U_c is the set of institutions from country c .

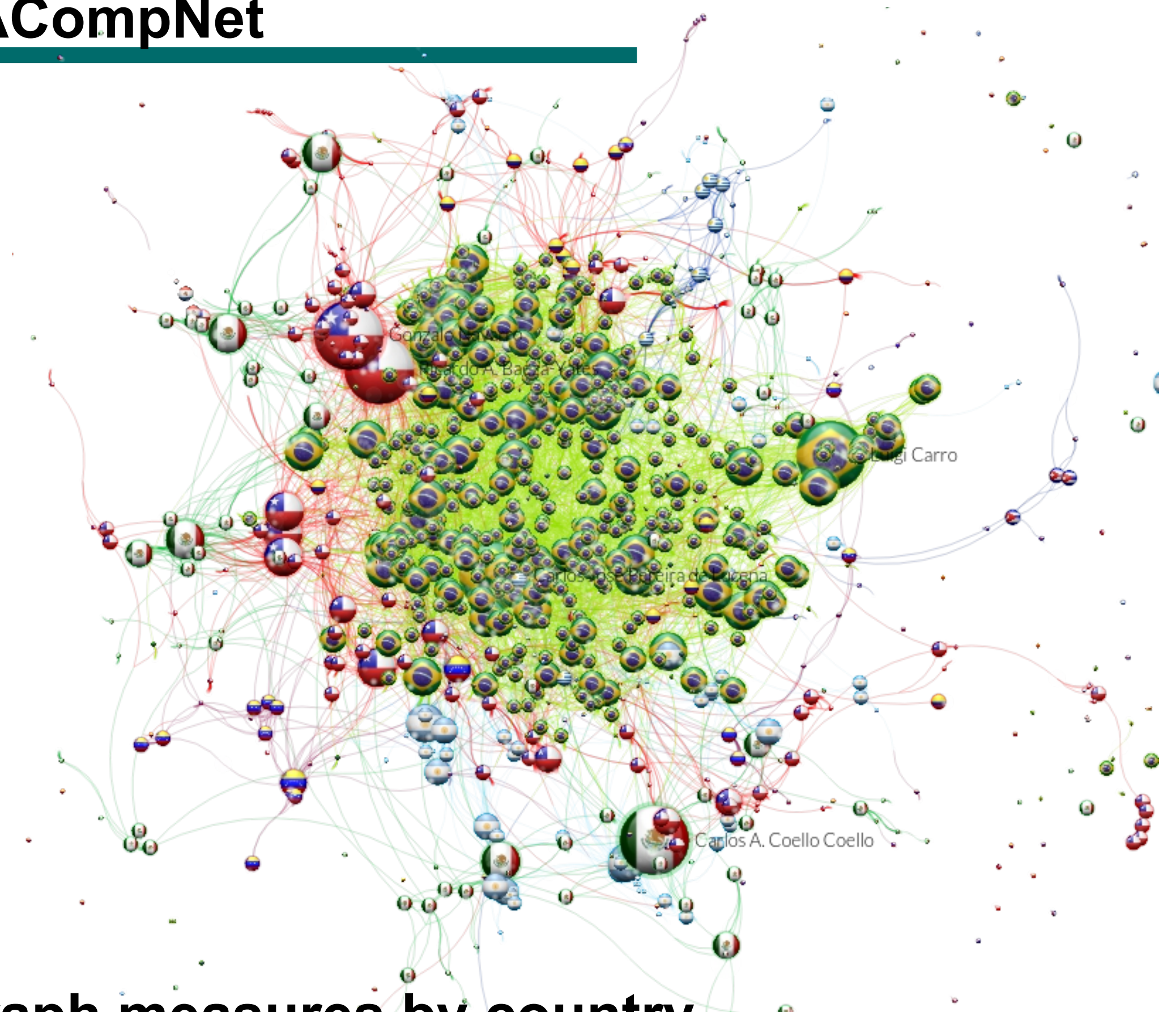
Papers by country groups

Country	1994 - 2003		2004 - 2013		Total
	Papers	% Total	Papers	% Total	
Argentina, Brazil	42	1.49	47	0.44	89
Argentina, Chile	0	0.00	10	0.32	10
Argentina, Colombia	0	0.00	1	0.07	1
Argentina, Mexico	0	0.00	1	0.04	1
Brazil, Chile	19	0.65	26	0.23	45
Brazil, Colombia	0	0.00	7	0.07	7
Brazil, Peru	2	0.08	1	0.01	3
Brazil, Uruguay	0	0.00	4	0.04	4
Brazil, Venezuela	2	0.07	3	0.03	5
Chile, Colombia	0	0.00	1	0.04	1
Chile, Mexico	0	0.00	3	0.09	3
Colombia, Venezuela	0	0.00	1	0.15	1
Cuba, Mexico	0	0.00	5	0.36	5

Centrality metrics



LACompNet

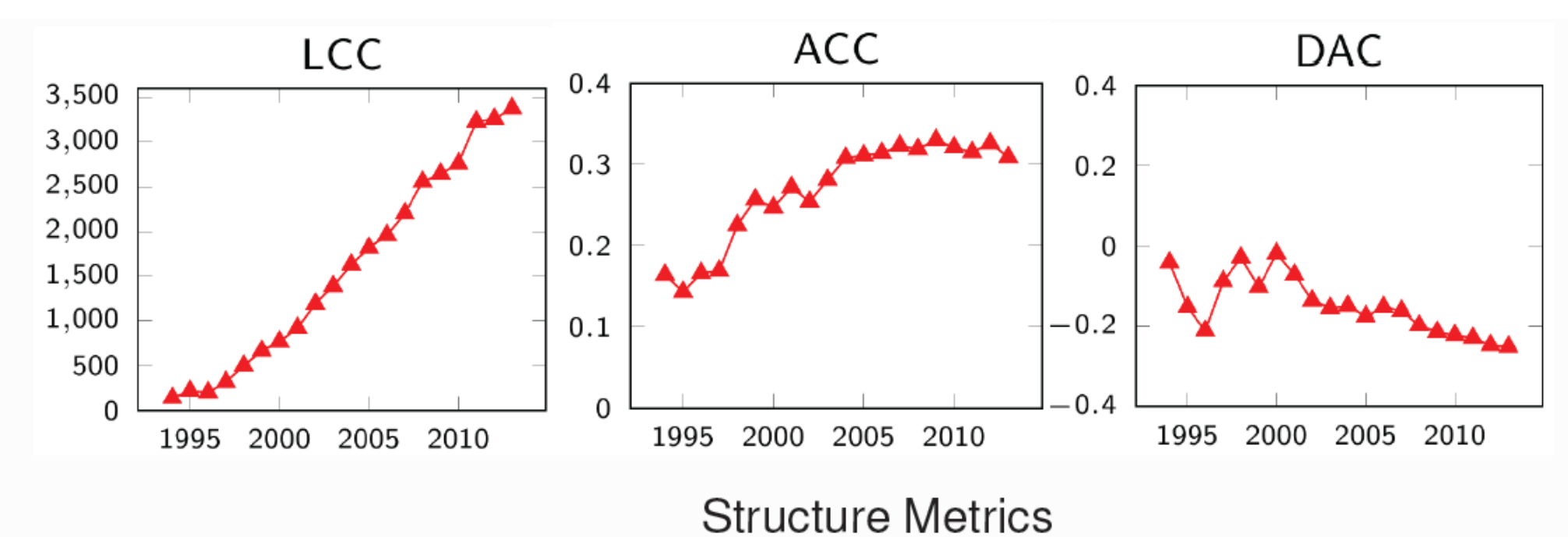


Graph measures by country

Country	Inst.	Graph Size $ E $	Deg. Ass. Coeff.	Avg Clust.	Cliques +	LCC *
Argentina	4	1839	-0.371	0.247	1273	964
Brazil	8	17567	-0.485	0.286	11756	10401
Chile	5	2674	-0.306	0.195	1982	1755
Colombia	5	553	-0.448	0.105	479	252
Cuba	3	291	-0.310	0.217	189	54
Mexico	4	1729	-0.291	0.096	1515	1278
Peru	1	61	-0.597	0.047	57	22
Uruguay	1	379	-0.386	0.158	271	232
Venezuela	4	677	-0.329	0.207	505	289

+ Cliques: Subsets of the vertex set $C \subseteq V$, such that for every two vertices in C , there exists an edge connecting the two.
* LCC: Largest Connected Component

Graphics over time



LCC: Largest Connected Component, **ACC**: Average Clustering Coefficient, **DAC**: Degree Assortativity Coefficient