An Assortativity Analysis of Co-Authorship Networks and Authors' Swing among Various Types of Open Access of Sources of Publications on "Open Science" from 1999 to 2018

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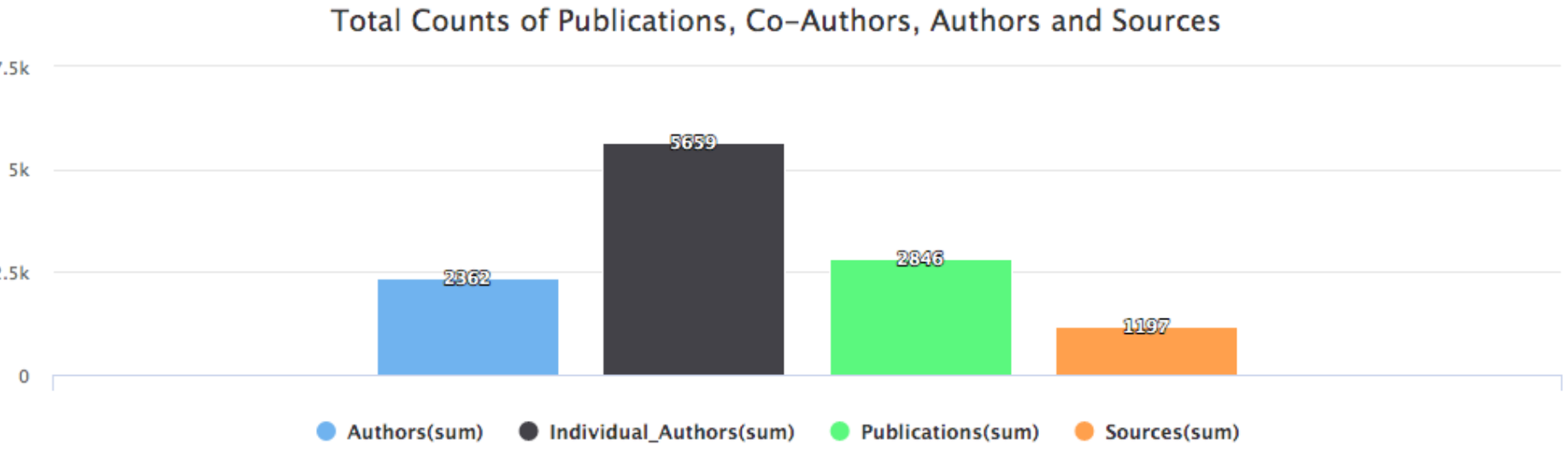
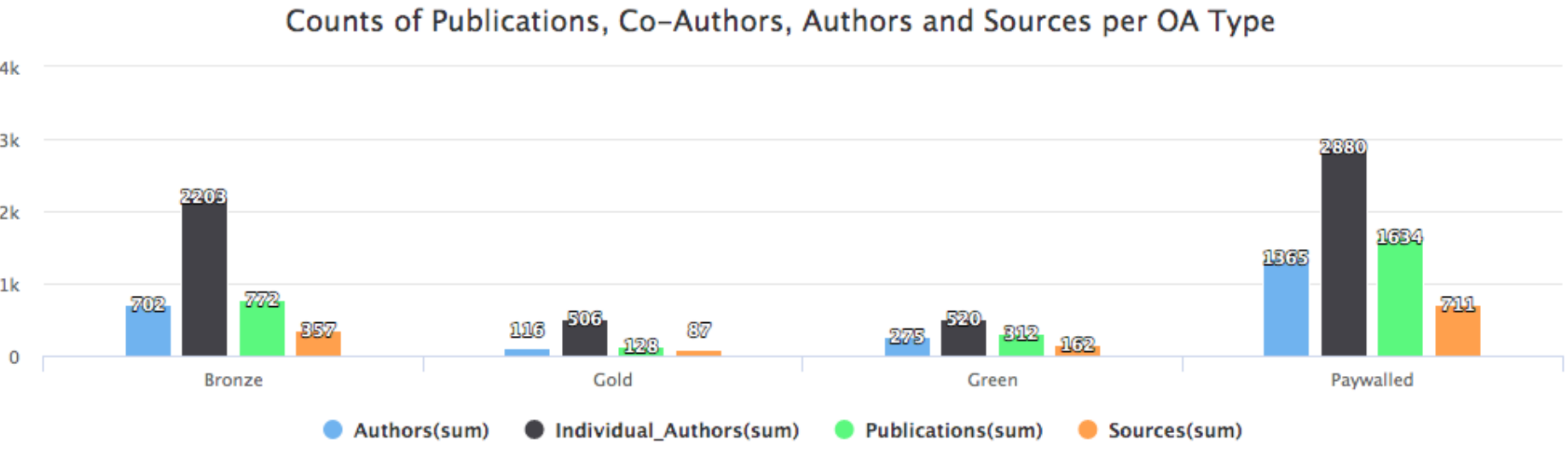
The Dataset

Input

- 2,846 publications / March 2019
- Data retrieved from / structured data / OA versioning scheme
- Timespan: 1999-2018

- Basic query: `TITLE: ("Open Science") OR TITLE: ("Open Access")`
- Refinements: `NOT TOPIC: (endoscop*) NOT TOPIC: (fish*) NOT TOPIC: (enteroscop*) NOT TOPIC: (schedul*) ...`

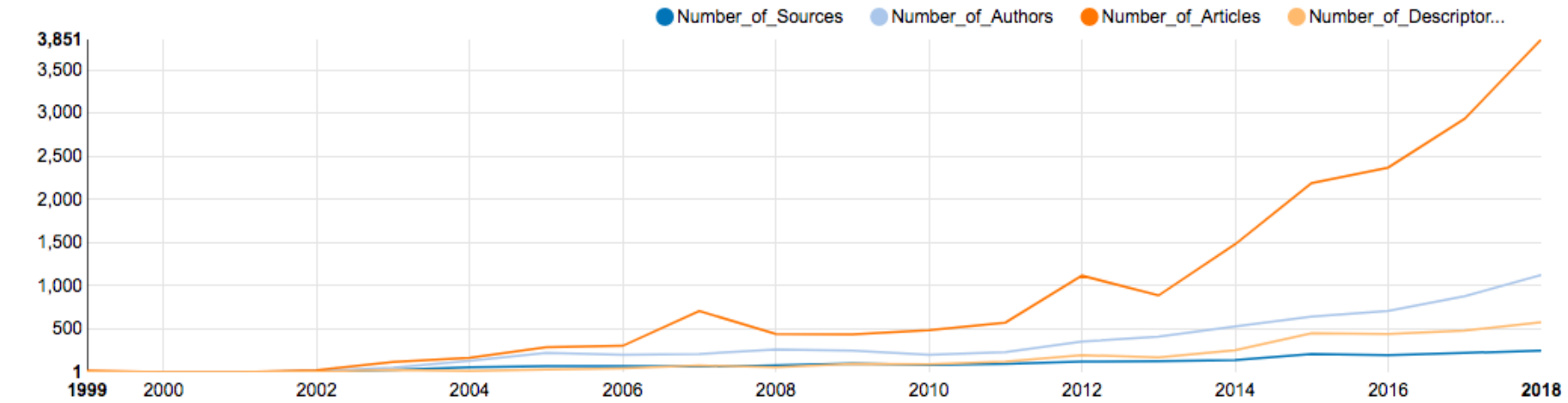

Total Counts of Publications, Co-Authors, Authors and Sources
7.5k
5k
2.5k
0
2362
5659
2846
1197
Authors(sum)
Individual_Authors(sum)
Publications(sum)
Sources(sum)


Counts of Publications, Co-Authors, Authors and Sources per OA Type
4k
3k
2k
1k
0
702
2203
772
357
116
506
128
87
275
520
312
162
1365
2880
1634
711
Bronze
Gold
Green
Paywalled
Authors(sum)
Individual_Authors(sum)
Publications(sum)
Sources(sum)

Number of Publications, Individual Authors, Sources and Descriptors per Year

READY

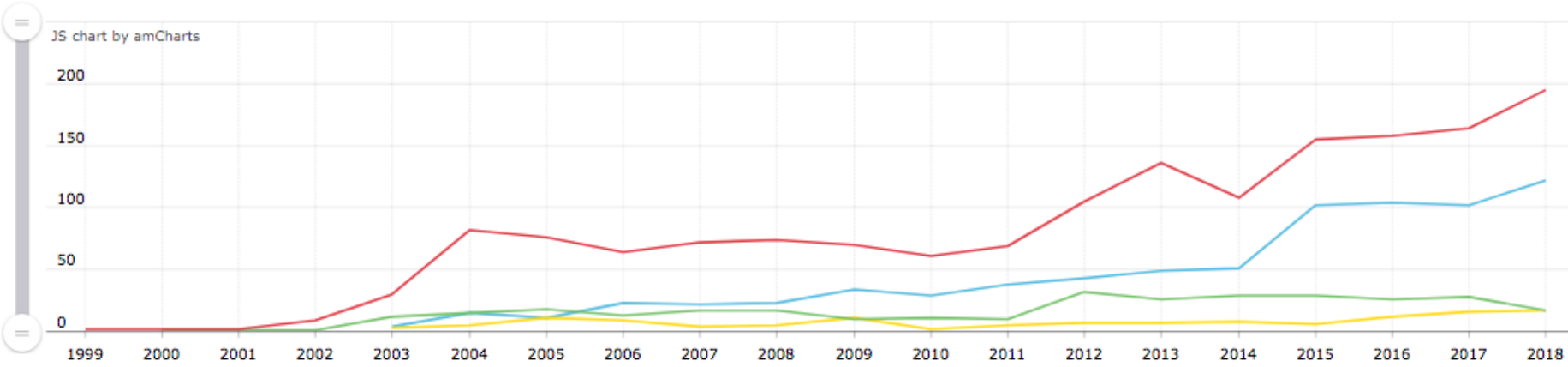
settings



Number of Open Access Type of Publications per Year

READY

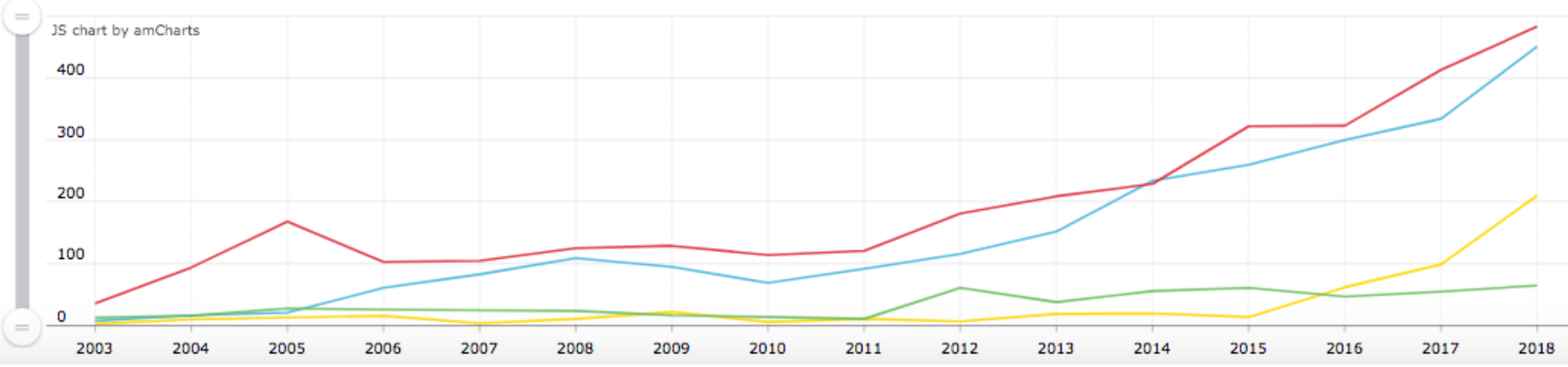
settings



Number of Open Access Type of Individual Authors per Year

READY

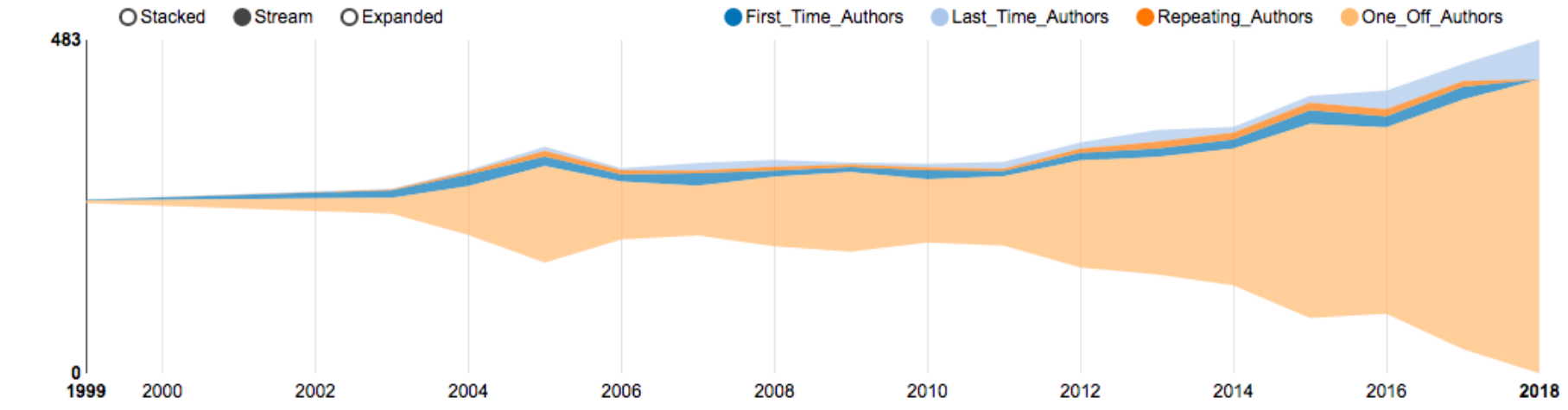
settings



First Time, Last Time, Repeating and One-Off Paywalled Authors per Year

READY

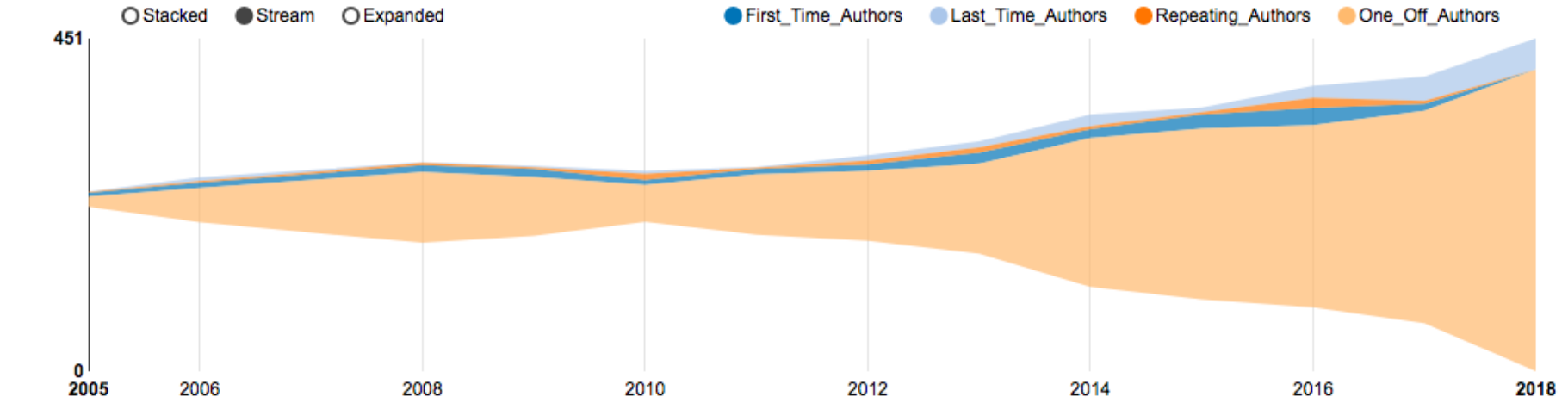
settings

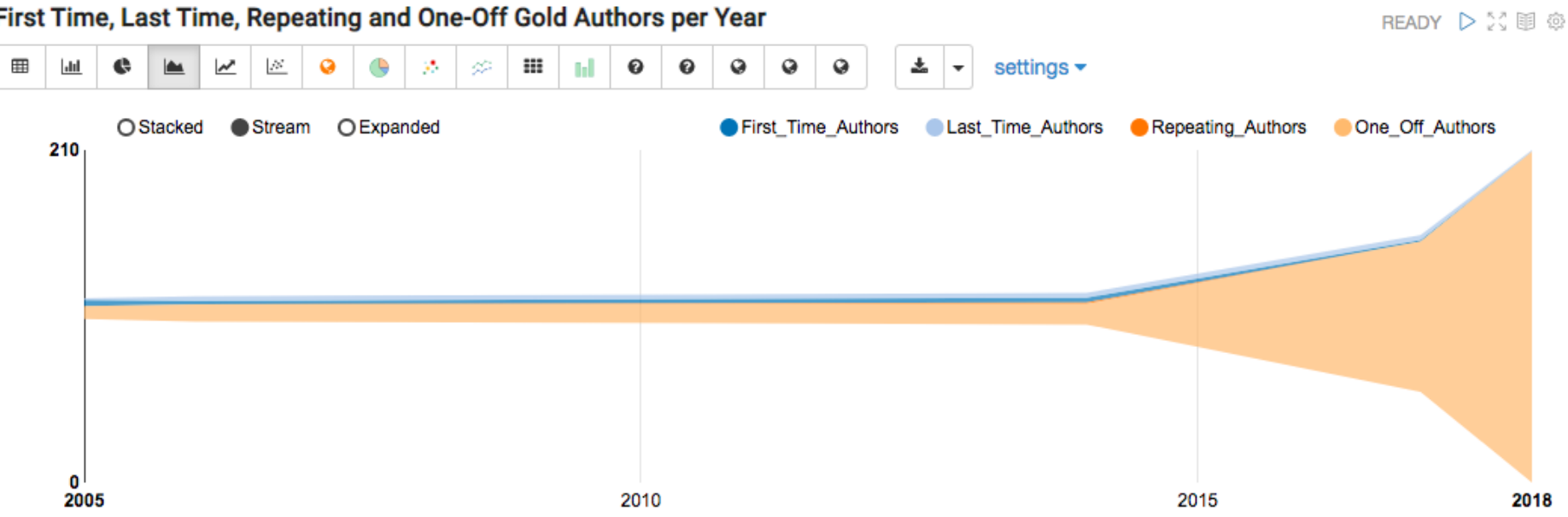


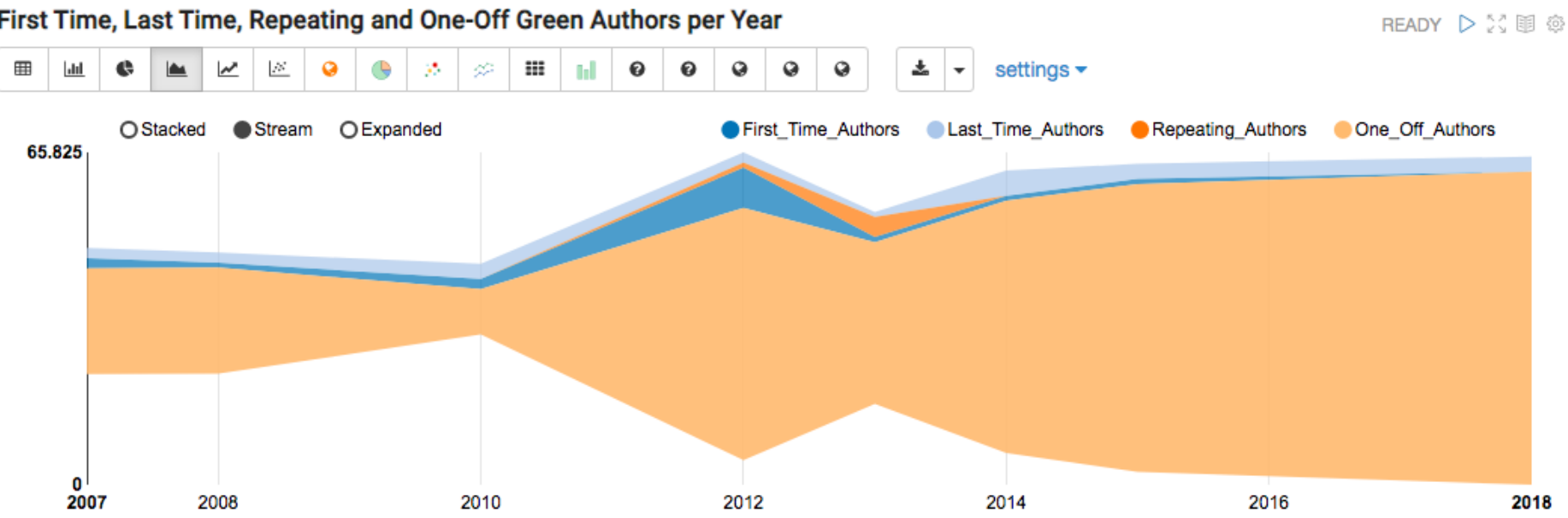
First Time, Last Time, Repeating and One-Off Bronze Authors per Year

READY

settings

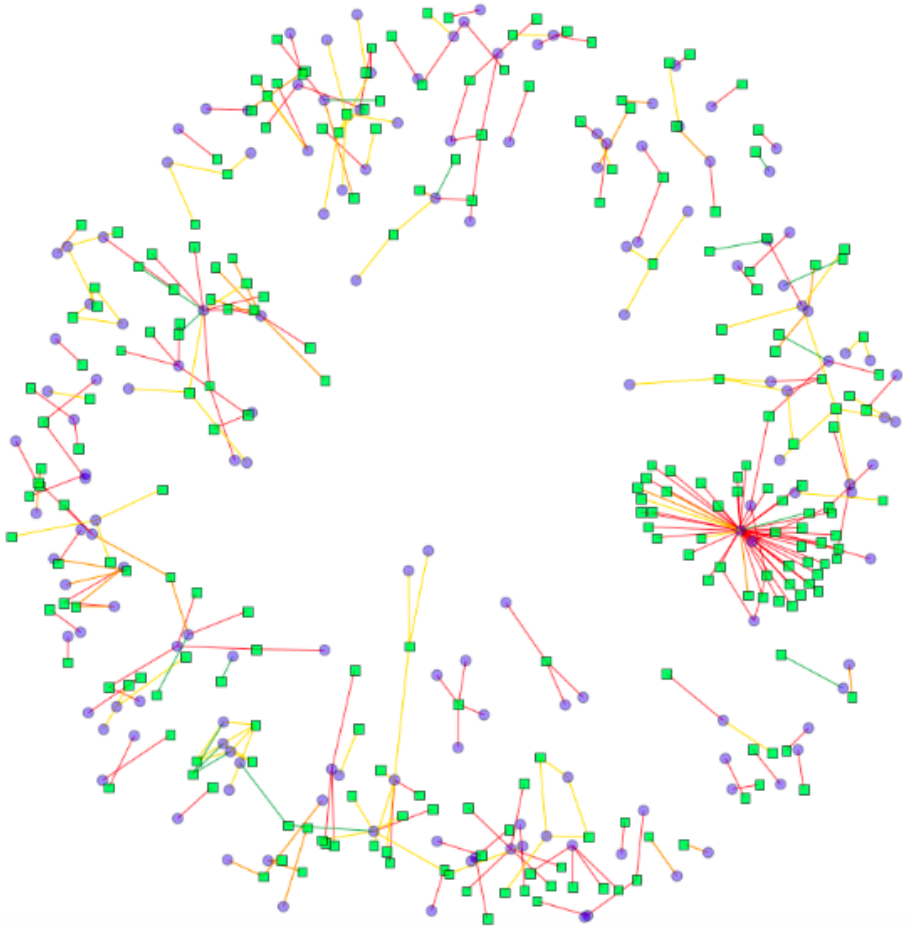



First Time, Last Time, Repeating and One-Off Gold Authors per Year
READY
settings
Stacked
Stream
Expanded
First_Time_Authors
Last_Time_Authors
Repeating_Authors
One_Off_Authors
210
0
2005
2010
2015
2018

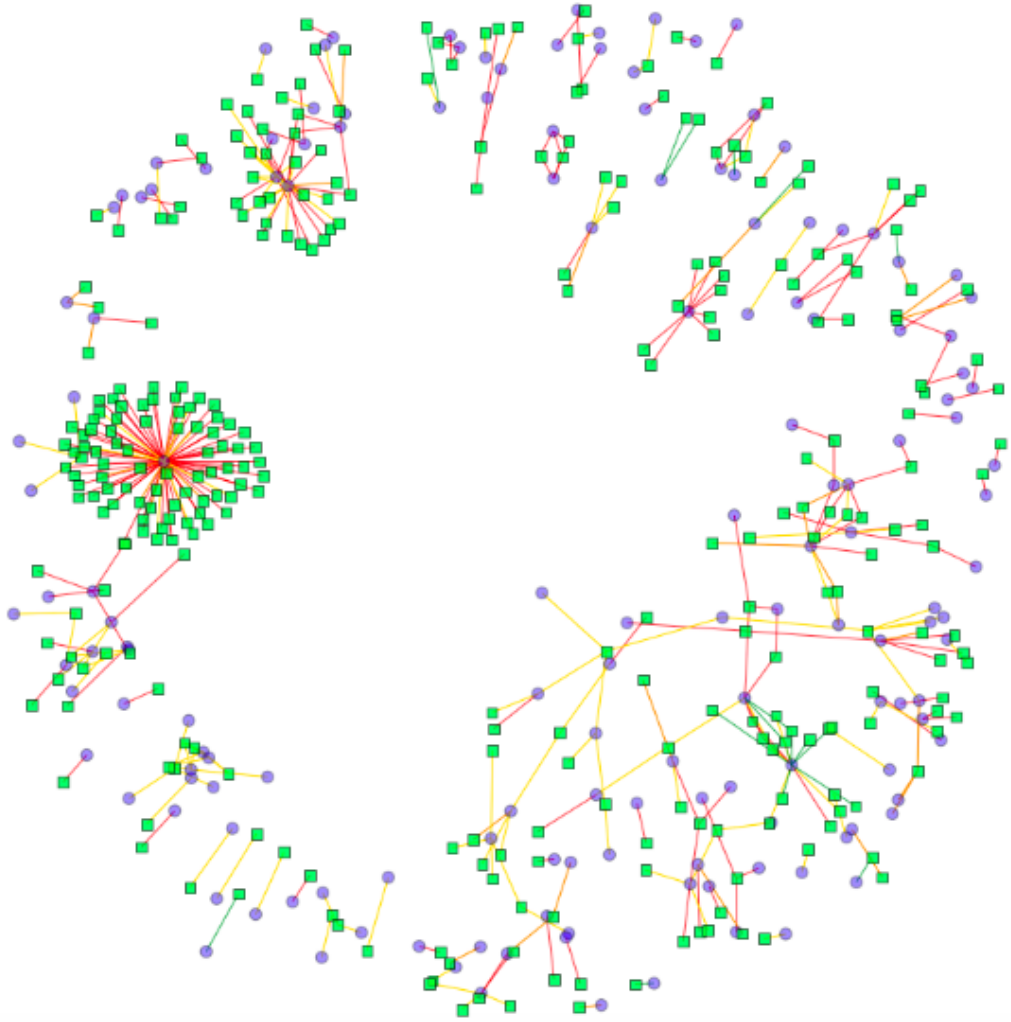

First Time, Last Time, Repeating and One-Off Green Authors per Year
READY
settings
Stacked
Stream
Expanded
First_Time_Authors
Last_Time_Authors
Repeating_Authors
One_Off_Authors
65.825
0
2007
2008
2010
2012
2014
2016
2018

The Bipartite Graph of Authors-Publications for 155 Authors publishing before and after 2011

The bipartite graph of authors-publications in Open Science from 1999 to 2011
(blue circles = 155 authors, lime squares = 231 publications,
red links = 159 paywalled sources, bronze links = 32 bronze sources,
gold links = 80 gold sources, green links = 17 green sources, 110 connected components)

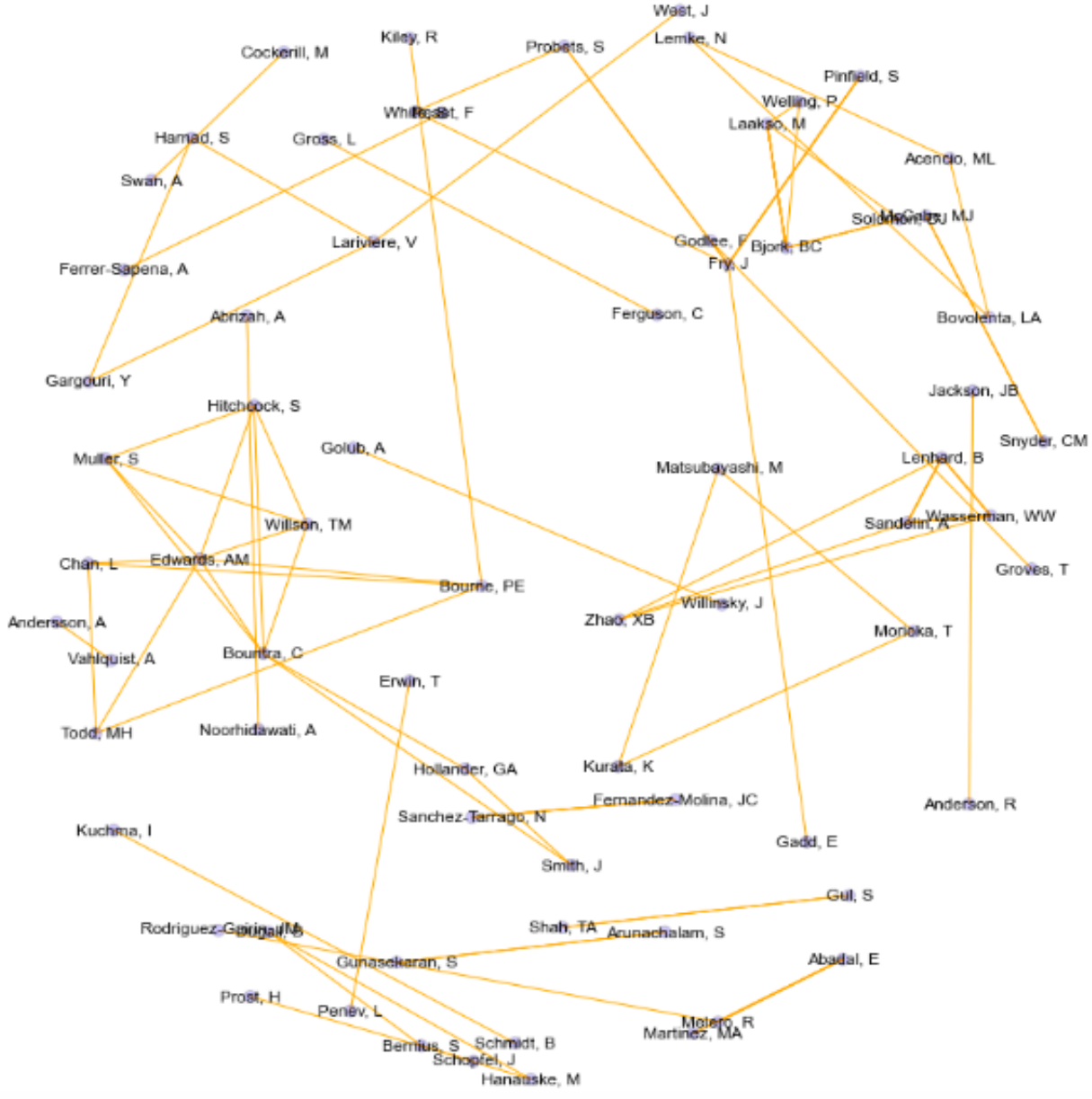


The bipartite graph of authors-publications in Open Science from 2012 to 2018
(blue circles = 155 authors, lime squares = 314 publications,
red links = 209 paywalled sources, bronze links = 34 bronze sources,
gold links = 129 gold sources, green links = 18 green sources, 108 connected components)

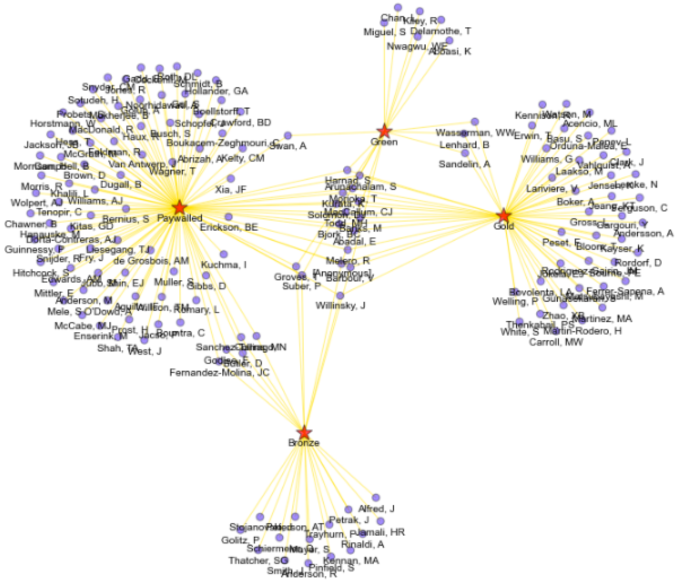


The coauthorship graph of publications in Open Science from 1999 to 2018 (72 authors, 76 coauthorships as orange links, 27 connected components)

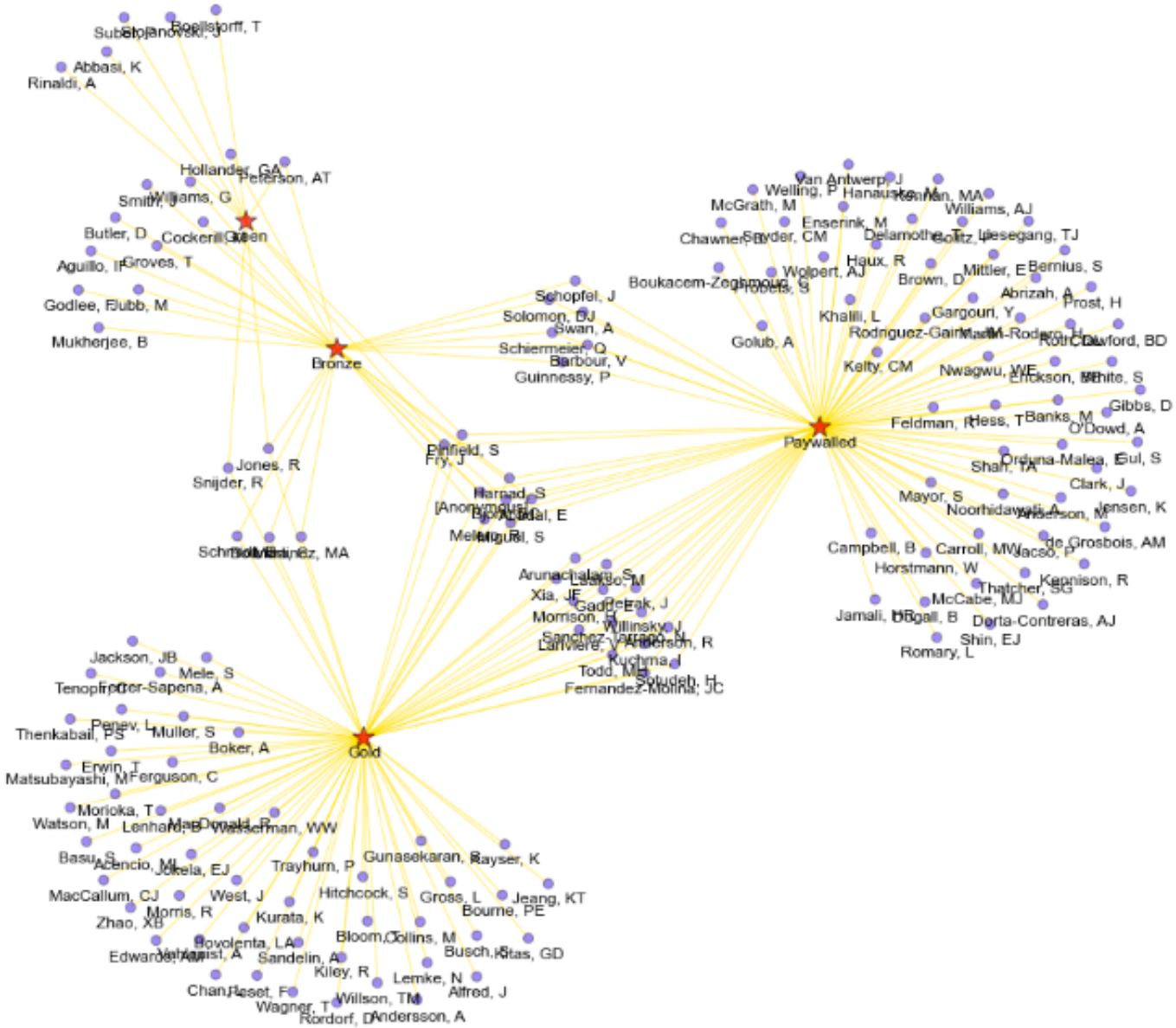
The coauthorship graph of publications in Open Science from 2012 to 2018 (71 authors, 99 coauthorships as orange links, 24 connected components)



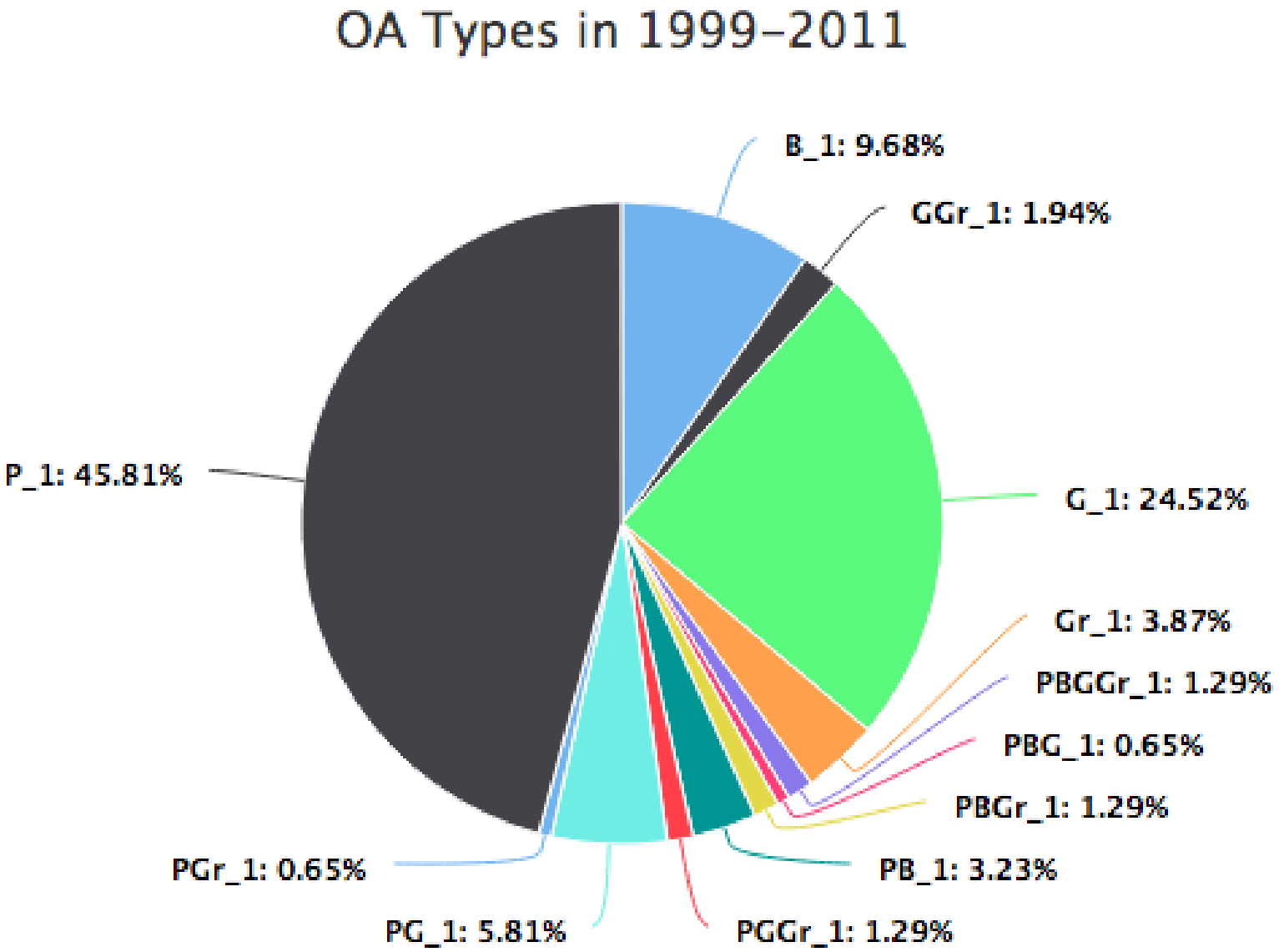
The bipartite graph of authors-OA_types in Open Science from 1999 to 2011 (blue circles = 155 authors, red stars = 4 Open Access types, gold links = 189 authors-OA_types associations)

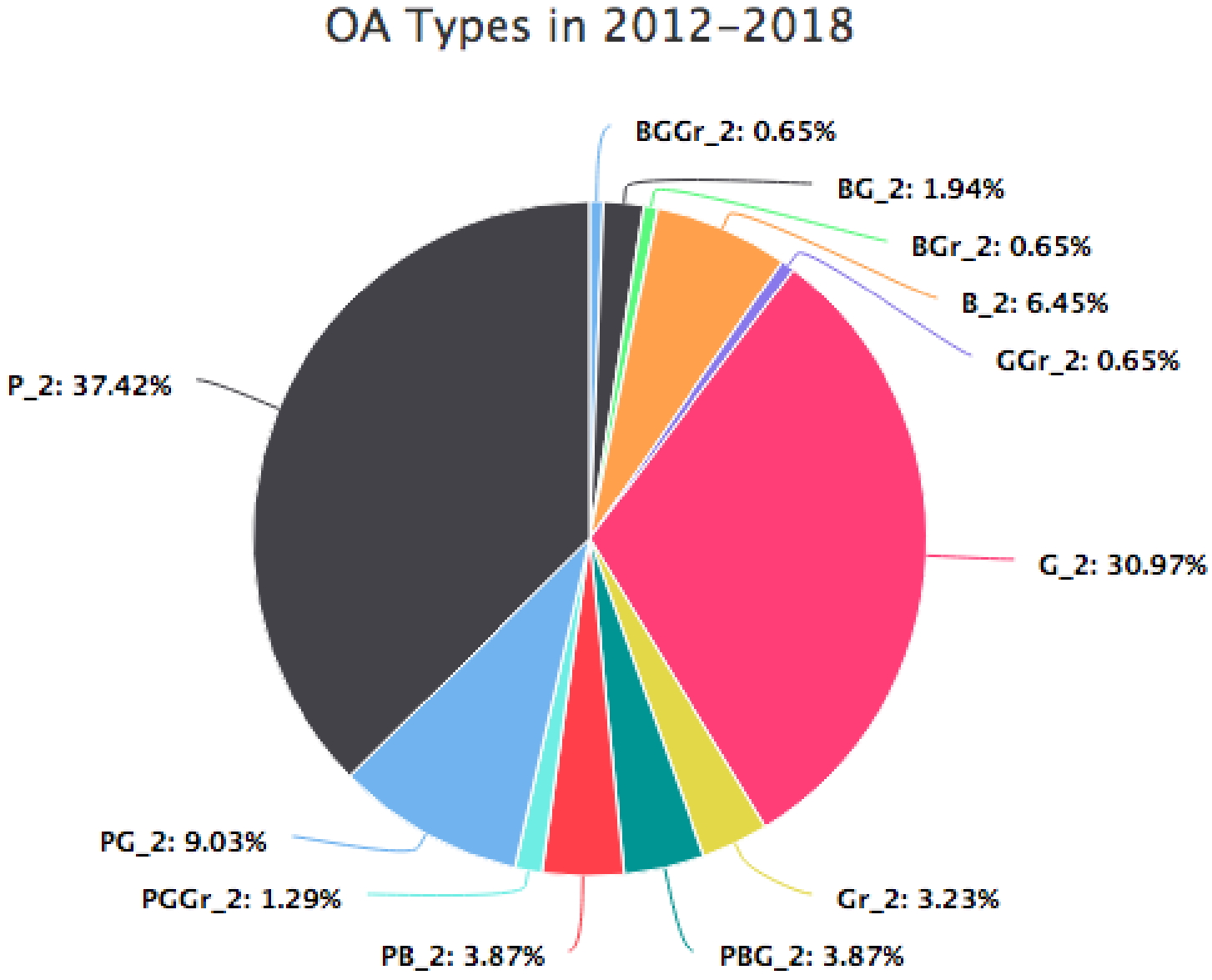


The bipartite graph of authors-OA_types in Open Science from 2012 to 2018 (blue circles = 155 authors, red stars = 4 Open Access types, gold links = 198 authors-OA_types associations)



Mixed OA Types




OA Types in 2012-2018
BGGr_2: 0.65%
BG_2: 1.94%
BGr_2: 0.65%
B_2: 6.45%
GGr_2: 0.65%
P_2: 37.42%
G_2: 30.97%
PG_2: 9.03%
PGGr_2: 1.29%
PB_2: 3.87%
PBG_2: 3.87%
Gr_2: 3.23%

Assortativity of a Partition

- Let $\mathcal{P} = \{P_1, P_2, \ldots, P_p\}$ be a vertex partition of graph G.
- Identifying $\mathcal{P}$ to a p–assignment $\mathcal{A}_{\mathcal{P}}$ of enumerative attributes to the vertices of G , one can define (cf. **Mark Newman**, 2003), the (normalized) **enumerative attribute assortativity** (or **discrete assortativity**) **coefficient of partition** $\mathcal{P}$ as follows:

$$r_{\mathcal{P}} = r_{\mathcal{P}}(\mathcal{A}_{\mathcal{P}}) = \frac{\operatorname{tr} \mathbf{M}_{\mathcal{P}} - ||\mathbf{M}_{\mathcal{P}}^2||}{1 - ||\mathbf{M}_{\mathcal{P}}^2||},$$

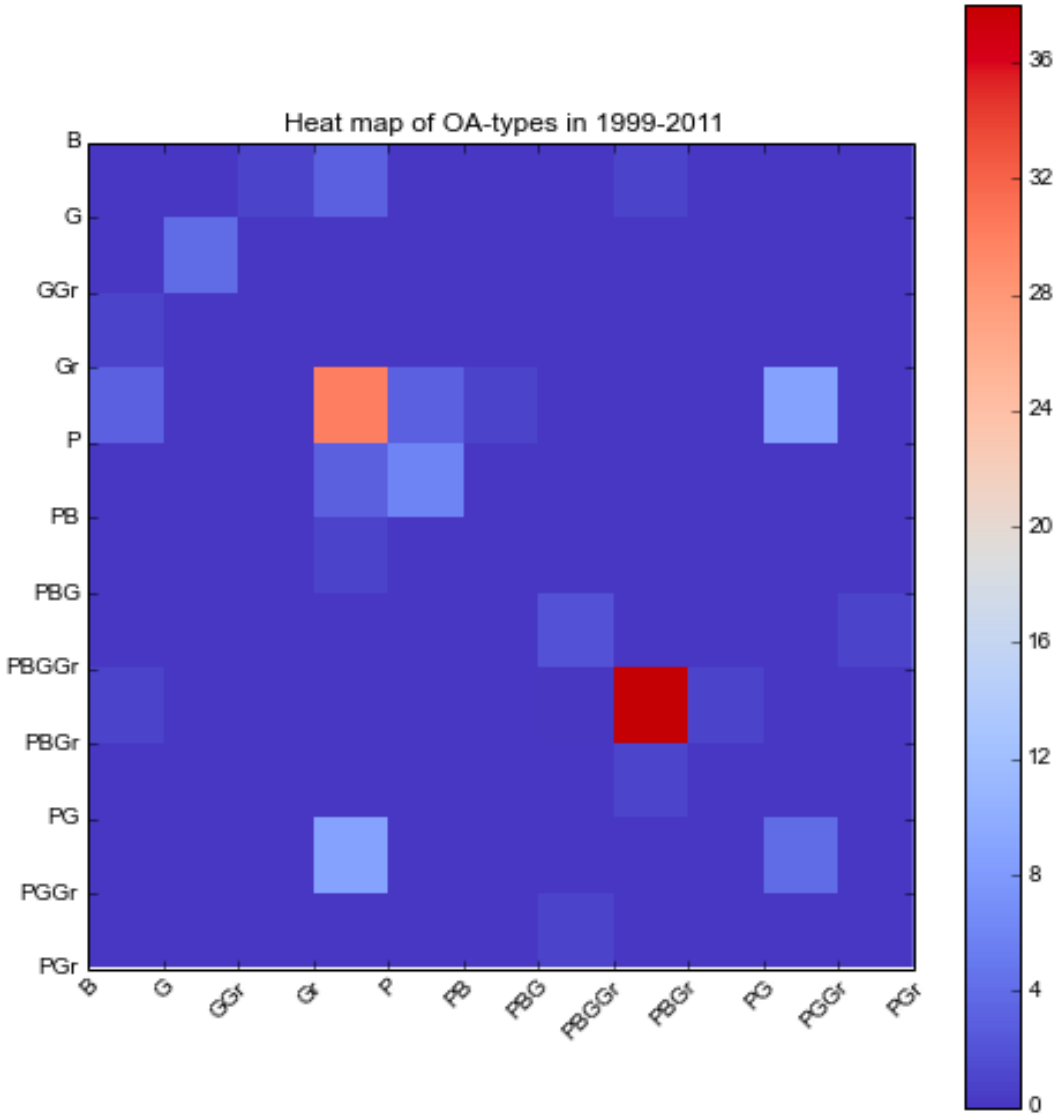
where $\mathbf{M}_{\mathcal{P}}$ is the $p \times p$ (normalized) **mixing matrix of partition** $\mathcal{P}$. Equivalently:

$$r_{\mathcal{P}} = \frac{\sum_{i,j \in V} (A_{ij} - \frac{k_i k_j}{2m}) \delta(\mathcal{A}_{\mathcal{P}}(i), \mathcal{A}_{\mathcal{P}}(j))}{2m - \sum_{i,j \in V} (\frac{k_i k_j}{2m}) \delta(\mathcal{A}_{\mathcal{P}}(i), \mathcal{A}_{\mathcal{P}}(j))},$$

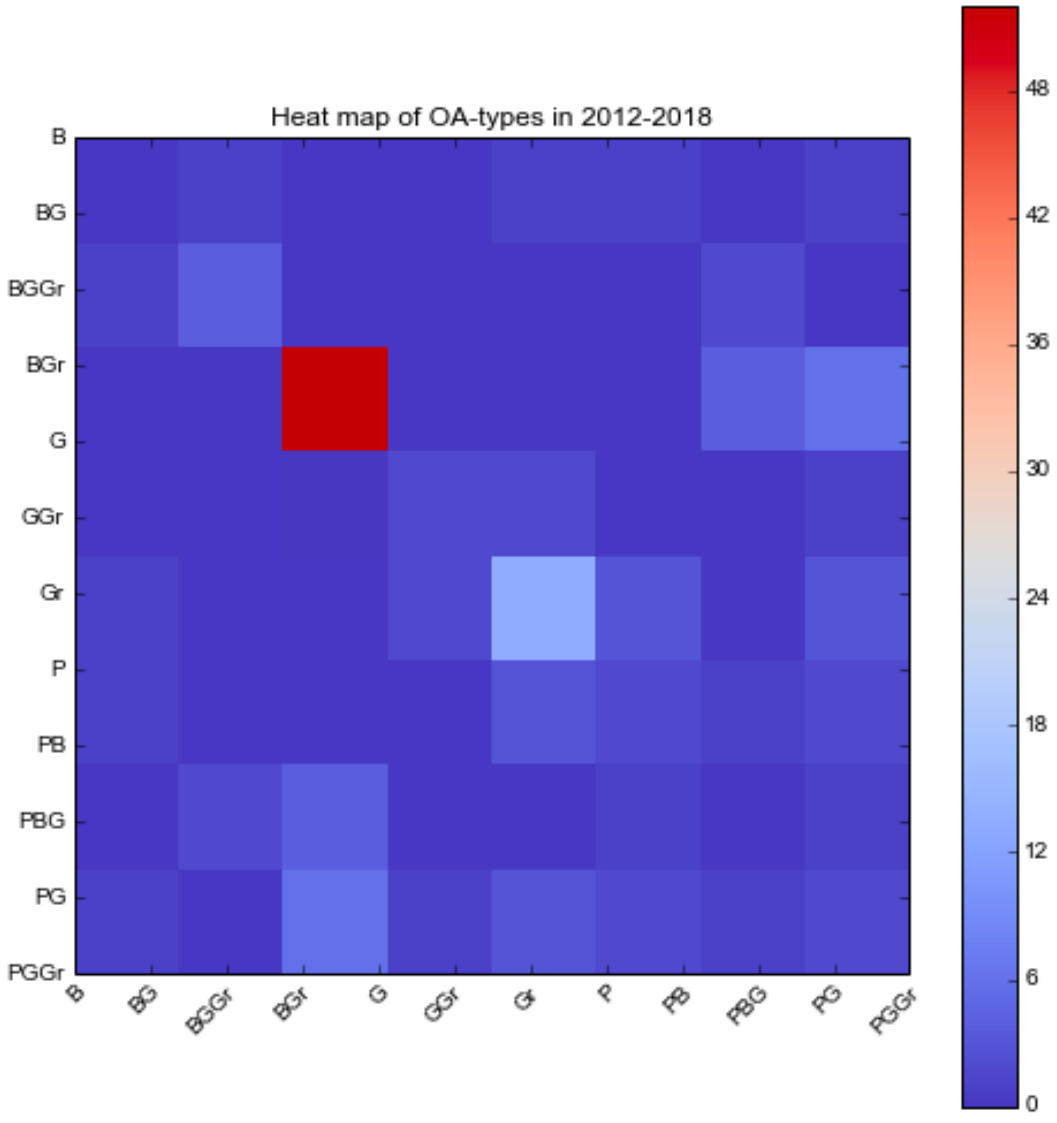
where $\{A_{ij}\}$ is the adjacency matrix of graph G, m is the total number of edges of G, k_i is the degree of vertex i and $\delta(x, y)$ is the Kronecker delta.

Mixing and OA Type Assosartivity Coefficient

The OA-type assortativity coefficient of the co-authorship network in 1999-2011 is $= 0.563$



The OA-type assortativity coefficient of the co-authorship network in 2012-2018 is $= 0.406$



Authors' Swings

The OA-type assortativity coefficient of the graph of authors' swings before and after 2011 is $= 0.001$ (*non-assortative graph)*