

Translating Data into Images

Dario Rodighiero

École polytechnique fédérale de Lausanne (EPFL)

Transforming
Translating
Projecting

Marie Neurath
& Robin Kinross

Le **Transformateur**

B42-35

TRADUIT DE L'ANGLAIS PAR
DAMIEN SUBOTICKI

Principes de création
des diagrammes Isotype



transform (transformer)

verb [*with object*]

1 make a marked change in the form, nature, or appearance of: *lasers have transformed cardiac surgery | he wanted to **transform** himself **into** a successful businessman.*

2 *Mathematics* change (a mathematical entity) by transformation.

translate (traduire)

verb [*with object*]

1 express the sense of (words or text) in another language: *several of his books were **translated into** English.*

2 move from one place or condition to another: *she had been translated from familiar surroundings to a foreign court.*

3 *Physics* cause (a body) to move so that all its parts travel in the same direction, without rotation or change of shape.

Callon, Michel. 1984. "Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St. Briec Bay." *The Sociological Review* 32 (1): 196–233. doi:10.1111/j.1467-954x.1984.tb00113.x.

project (projeter)

verb | prə'jekt | [*with object*]

1 estimate or forecast (something) on the basis of present trends: *spending was **projected** at \$72 million.*

2 [*no object*] extend outward beyond something else; protrude: *I noticed a slip of paper **projecting from** the book* | (as adjective **projecting**) : *a projecting bay window.*

3 throw or cause to move forward or outward: *seeds are projected from the tree.*

4 present or promote (a particular view or image): *he strives to project an image of youth.*

5 *Geometry* draw straight lines from a center of or parallel lines through every point of (a given figure) to produce a corresponding figure on a surface or a line by intersecting the surface.

6 make a projection of (the earth, sky, etc.) on a plane surface.

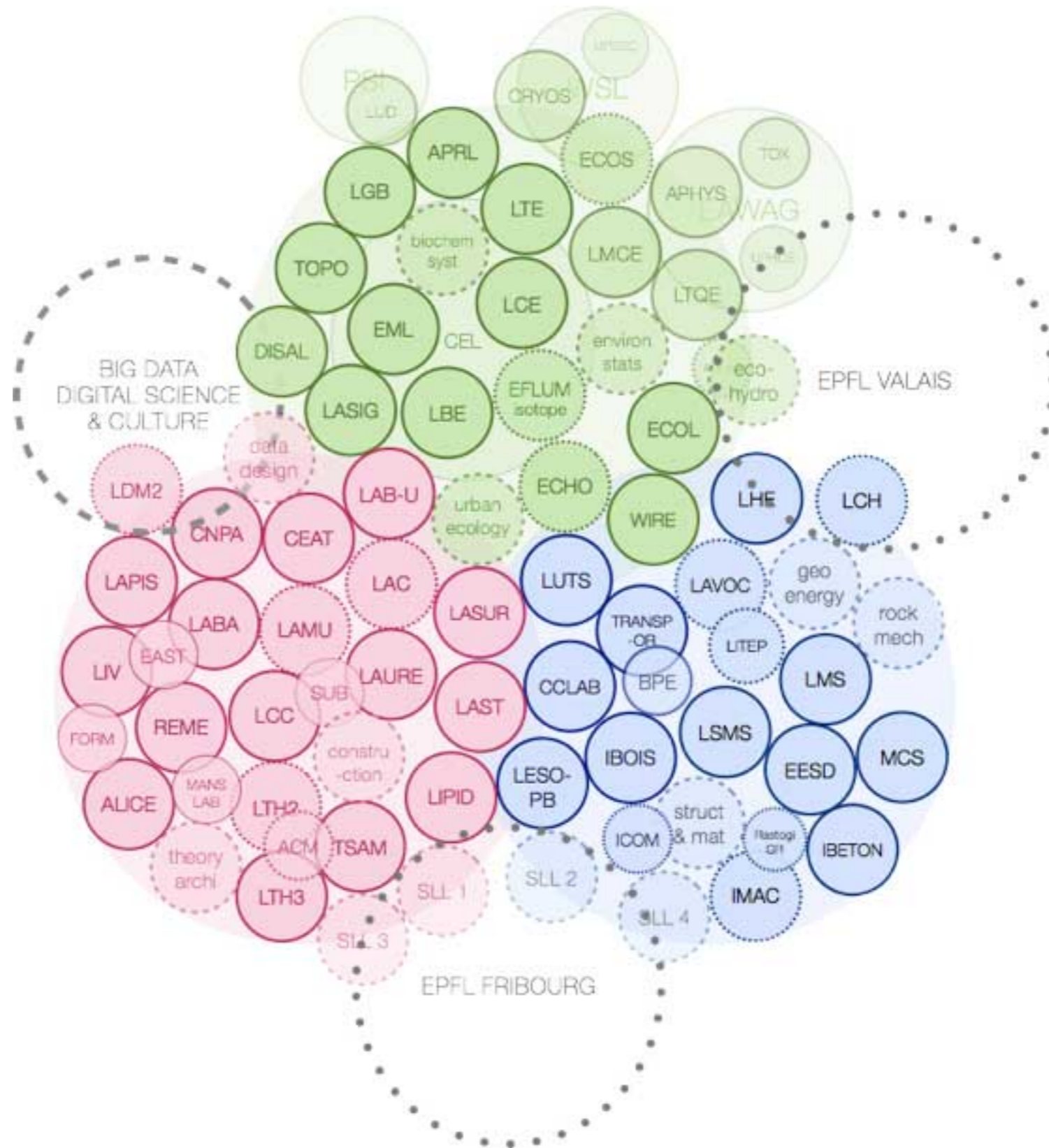
Affinity Map

the case study

The Affinity Map is a visual representation of **ENAC**

ENAC is the school of building constructions that gathers
Architecture, Civil and Environmental Engineering

The ENAC is composed by **three institutes,**
seventy laboratories and a **thousand of scholars**



Personal view of Marilyne Andersen of ENAC

Representing Academic Practice

the exercise, the thesis

Academic Practice

Many activities

Different according to discipline

Not only literature

Collaboration

An academic practice

Multidimensional (writing, teaching, etc.)

Multi-scale (scholars, laboratories, etc.)

Affinity

Intellectual and operational closeness between individuals

Actual and potential

A way to describe the academic practice

Visualization

Mostly hidden

Can be made visible

Can be made visible through affinities

Questions about Representing Academic Practice

Which data describes the academic practice?

How to translate these data using visual grammar?

Is there an ethics concerning scholar representation?

Data Investigation

embrace all of the different practices

manque description !!

Indicators	Primary source	Secondary source	To be specially required in online labs' activity report?
Focus topics (thematics)	Symphony database	Lab's websites (research)	Maybe (would be nice to have the user confirming existing data from Symphony/lab's website for instance)
Keywords	Lab's websites (metadata "keywords", from audit 2011)	Lab's websites (research)	Idem <i>pas possible</i>
Expertise areas	Symphony database	Lab's websites (expertise box)	Idem
Publications keywords and contents/abstract	Infoscience		No
Publications co-authors and their institutions	Infoscience (but institutions may be labelled variously...)	People's publication page	No
Alumni a3 (activity sector, localization)	Alumni database (with probable confidentiality issues?)		No
Co-teaching	IS-Academia	People's teaching page	Maybe (it could be provided by selecting the joint Professor from a list in the online formular?)
Industrial partners	Audit 2011 or lab's annual reports (extract from "valorization, collaboration & network")	Lab's annual reports	Yes (should be structured in an easy way for being extracted)
Main funding organizations	EPFL Grants database (maybe not possible?)		Yes (proposing a selectable list?) <i>gelle infos</i>
Link to flagship projects	Audit 2011 or lab's annual reports		Yes (proposing a selectable list, if possible?)
People & Team	<i>Annuaire sur tout</i> People's pages (Expertise+Biography&Work +Teaching)		No
Lab's activities (events co-organised, guest speaker invitation, ...)	Memento	News flux	Maybe

faire une liste glissant
laisser les gens proposer eux-mêmes
ce qu'ils considèrent comme flagship

2 choses différentes

il n'a pas de sens
du moment qu'il y
a accès aux flux!

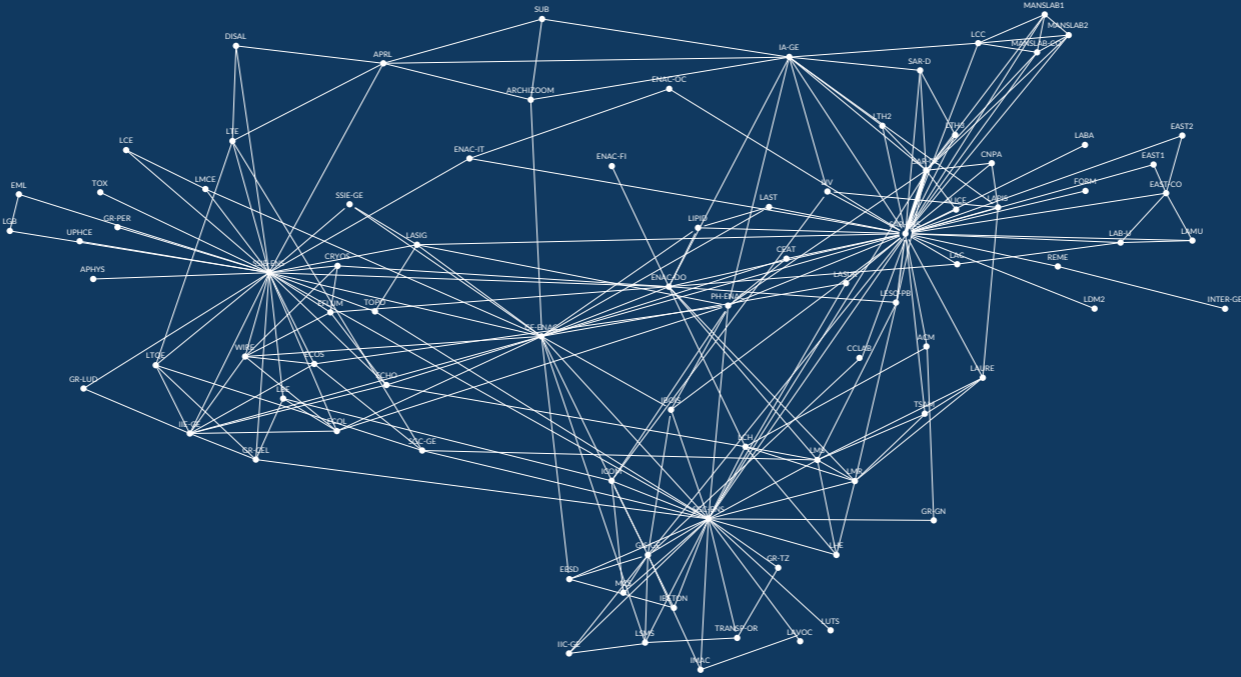
comment
gérer les mouvements?



Information	Affinity type	Source
Lab thematics	Potential	Symphony
Lab thematics	Potential	EPFL website
Individual expertise	Potential	Symphony
Individual expertise	Potential	EPFL website
Keywords	Potential	Audit 2011
Keywords	Potential	Infoscience
Co-authoring	Actual	Infoscience
Co-teaching	Actual	IS-Academia
Co-advising	Actual	IS-Academia
Grants	Actual	Grant database
Industrial partners	Actual	Audit 2011

Table of digital traces, the strikethrough identifies not usable data.

GROUPES DE L'ENAC QUI PARTAGENT DES COLLABORATEURS



A detailed list of ENAC groups, their descriptions, and associated personnel. The list includes groups like ACM, ALICE, APPHS, ARCHIZOOM, CEAR, CF ENAC, CDM, CRYOS, EAST1, EAST2, ECHO, ECOL, ECOL, EFLIM, ENL, ENAC, ENAC-DO, ENAC-GE, ENAC-IT, ENAC-OC, ENAC-ON, ENAC-SAR, ENAC-SG, ENAC-SSE, FONG, GR-CE, GR-DN, GR-LAD, GR-PER, GR-TZ, IA-CE, IE-SON, BOEN, IC-CE, IC-GE, IE-CE, IMAC, INTER-GE, LAB-UT, LAC, LANSU, LAPRS, LASIG, LAST, LSIUS, LAURE, LAMOC, LBE, LCC, LCH, LCHN, LESQ-FB, LGE, LISE, LIV, LMCE, LMR, LMR, LTR, LTR, LTR, LUTS, MANSLAB1, MANSLAB2, MANSLAB3, MANSLAB4, MANSLAB5, MANSLAB6, MANSLAB7, MANSLAB8, MANSLAB9, MANSLAB10, MANSLAB11, MANSLAB12, MANSLAB13, MANSLAB14, MANSLAB15, MANSLAB16, MANSLAB17, MANSLAB18, MANSLAB19, MANSLAB20, MANSLAB21, MANSLAB22, MANSLAB23, MANSLAB24, MANSLAB25, MANSLAB26, MANSLAB27, MANSLAB28, MANSLAB29, MANSLAB30, MANSLAB31, MANSLAB32, MANSLAB33, MANSLAB34, MANSLAB35, MANSLAB36, MANSLAB37, MANSLAB38, MANSLAB39, MANSLAB40, MANSLAB41, MANSLAB42, MANSLAB43, MANSLAB44, MANSLAB45, MANSLAB46, MANSLAB47, MANSLAB48, MANSLAB49, MANSLAB50, MANSLAB51, MANSLAB52, MANSLAB53, MANSLAB54, MANSLAB55, MANSLAB56, MANSLAB57, MANSLAB58, MANSLAB59, MANSLAB60, MANSLAB61, MANSLAB62, MANSLAB63, MANSLAB64, MANSLAB65, MANSLAB66, MANSLAB67, MANSLAB68, MANSLAB69, MANSLAB70, MANSLAB71, MANSLAB72, MANSLAB73, MANSLAB74, MANSLAB75, MANSLAB76, MANSLAB77, MANSLAB78, MANSLAB79, MANSLAB80, MANSLAB81, MANSLAB82, MANSLAB83, MANSLAB84, MANSLAB85, MANSLAB86, MANSLAB87, MANSLAB88, MANSLAB89, MANSLAB90, MANSLAB91, MANSLAB92, MANSLAB93, MANSLAB94, MANSLAB95, MANSLAB96, MANSLAB97, MANSLAB98, MANSLAB99, MANSLAB100.

ENSEIGNEMENTS DE L'ENAC QUI PARTAGENT DES COLLABORATEURS

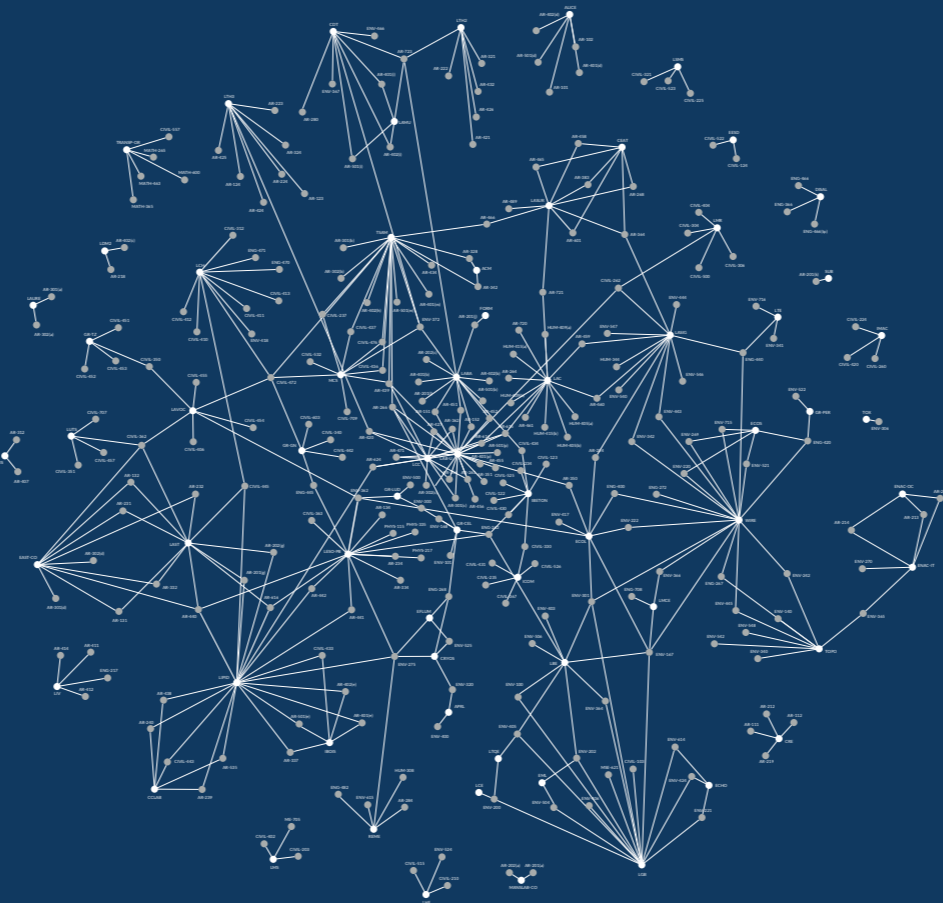
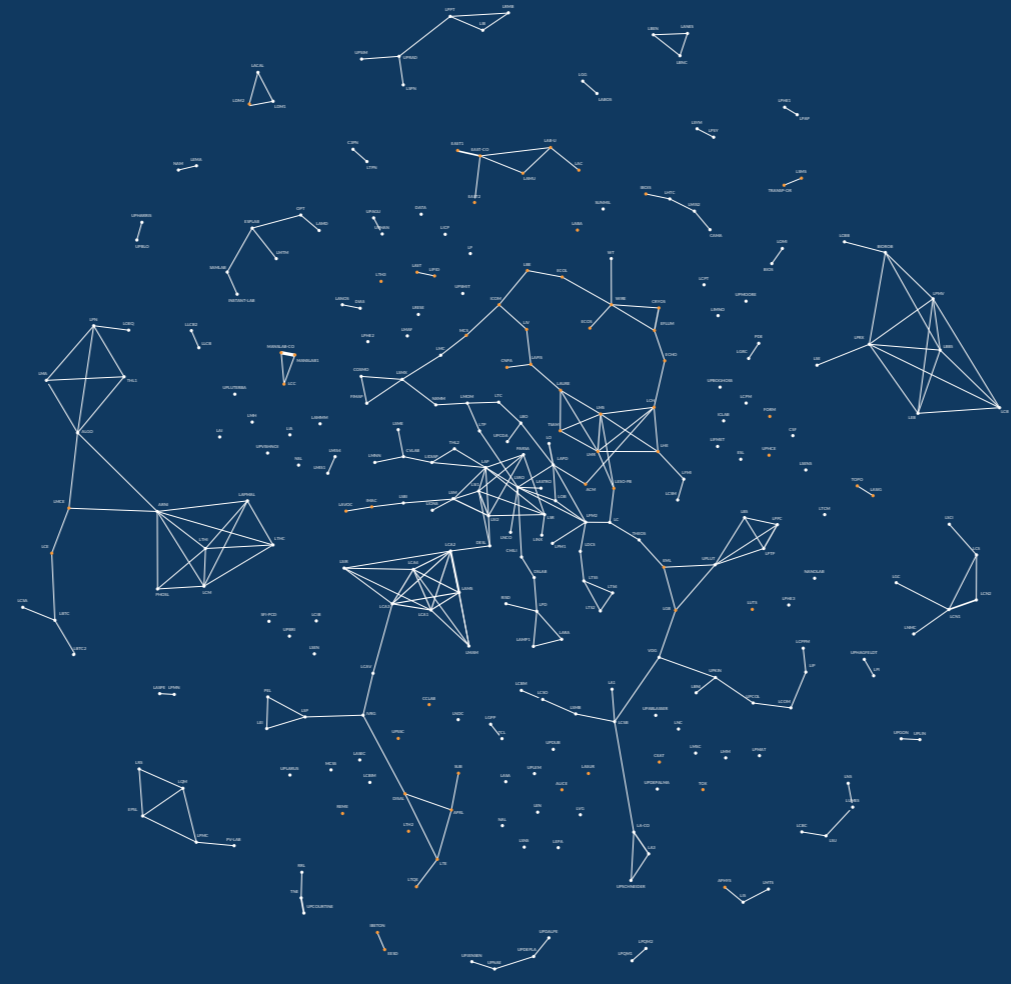


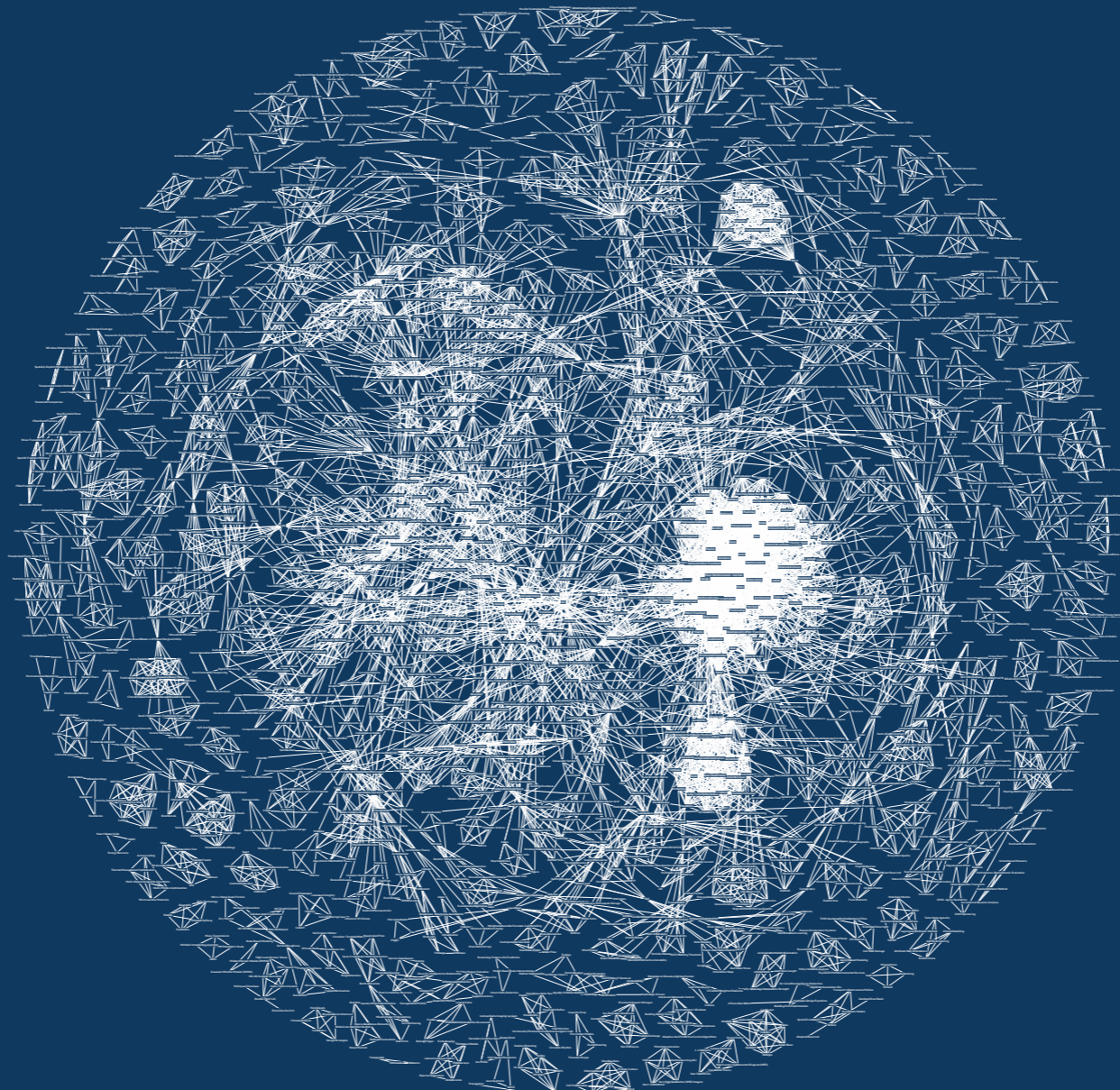
Table listing ENAC courses and their shared collaborators. The table is organized into three columns. Each row contains a course code and name, followed by a list of collaborator names and their associated course codes. The courses listed include various subjects such as 'Théorie et pratique de la gestion', 'Marketing', 'Finance', 'Management', etc.

LABORATOIRES DE L'EPFL QUI PARTAGENT DES COLLABORATEURS



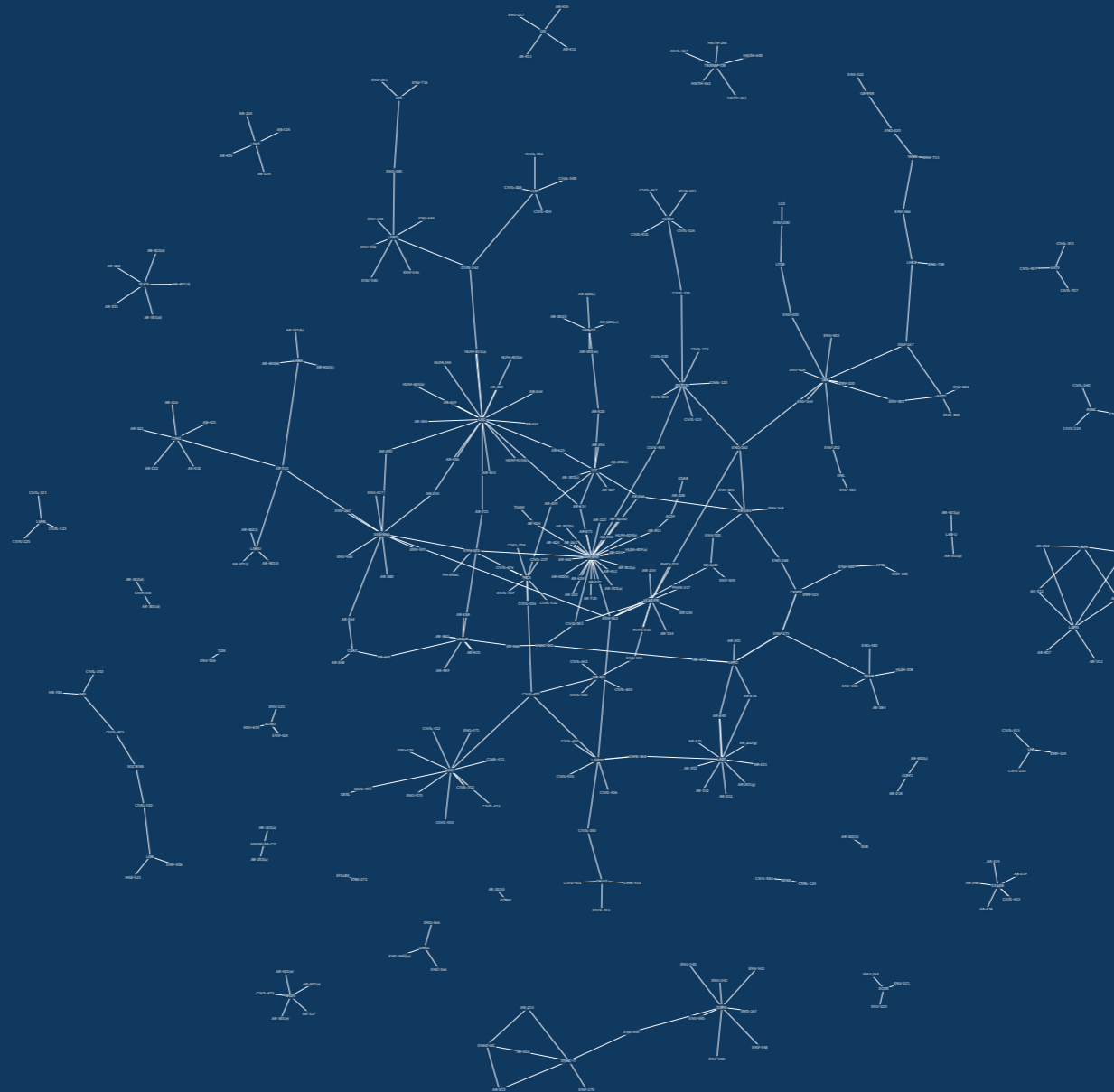
Lab ID	Lab Name	Collaborator	Lab ID	Lab Name	Collaborator
001	001	001	001	001	001
002	002	002	002	002	002
003	003	003	003	003	003
004	004	004	004	004	004
005	005	005	005	005	005
006	006	006	006	006	006
007	007	007	007	007	007
008	008	008	008	008	008
009	009	009	009	009	009
010	010	010	010	010	010
011	011	011	011	011	011
012	012	012	012	012	012
013	013	013	013	013	013
014	014	014	014	014	014
015	015	015	015	015	015
016	016	016	016	016	016
017	017	017	017	017	017
018	018	018	018	018	018
019	019	019	019	019	019
020	020	020	020	020	020
021	021	021	021	021	021
022	022	022	022	022	022
023	023	023	023	023	023
024	024	024	024	024	024
025	025	025	025	025	025
026	026	026	026	026	026
027	027	027	027	027	027
028	028	028	028	028	028
029	029	029	029	029	029
030	030	030	030	030	030
031	031	031	031	031	031
032	032	032	032	032	032
033	033	033	033	033	033
034	034	034	034	034	034
035	035	035	035	035	035
036	036	036	036	036	036
037	037	037	037	037	037
038	038	038	038	038	038
039	039	039	039	039	039
040	040	040	040	040	040
041	041	041	041	041	041
042	042	042	042	042	042
043	043	043	043	043	043
044	044	044	044	044	044
045	045	045	045	045	045
046	046	046	046	046	046
047	047	047	047	047	047
048	048	048	048	048	048
049	049	049	049	049	049
050	050	050	050	050	050
051	051	051	051	051	051
052	052	052	052	052	052
053	053	053	053	053	053
054	054	054	054	054	054
055	055	055	055	055	055
056	056	056	056	056	056
057	057	057	057	057	057
058	058	058	058	058	058
059	059	059	059	059	059
060	060	060	060	060	060
061	061	061	061	061	061
062	062	062	062	062	062
063	063	063	063	063	063
064	064	064	064	064	064
065	065	065	065	065	065
066	066	066	066	066	066
067	067	067	067	067	067
068	068	068	068	068	068
069	069	069	069	069	069
070	070	070	070	070	070
071	071	071	071	071	071
072	072	072	072	072	072
073	073	073	073	073	073
074	074	074	074	074	074
075	075	075	075	075	075
076	076	076	076	076	076
077	077	077	077	077	077
078	078	078	078	078	078
079	079	079	079	079	079
080	080	080	080	080	080
081	081	081	081	081	081
082	082	082	082	082	082
083	083	083	083	083	083
084	084	084	084	084	084
085	085	085	085	085	085
086	086	086	086	086	086
087	087	087	087	087	087
088	088	088	088	088	088
089	089	089	089	089	089
090	090	090	090	090	090
091	091	091	091	091	091
092	092	092	092	092	092
093	093	093	093	093	093
094	094	094	094	094	094
095	095	095	095	095	095
096	096	096	096	096	096
097	097	097	097	097	097
098	098	098	098	098	098
099	099	099	099	099	099
100	100	100	100	100	100

MOTS CLÉS PARTAGÉS ENTRE LES PUBLICATIONS



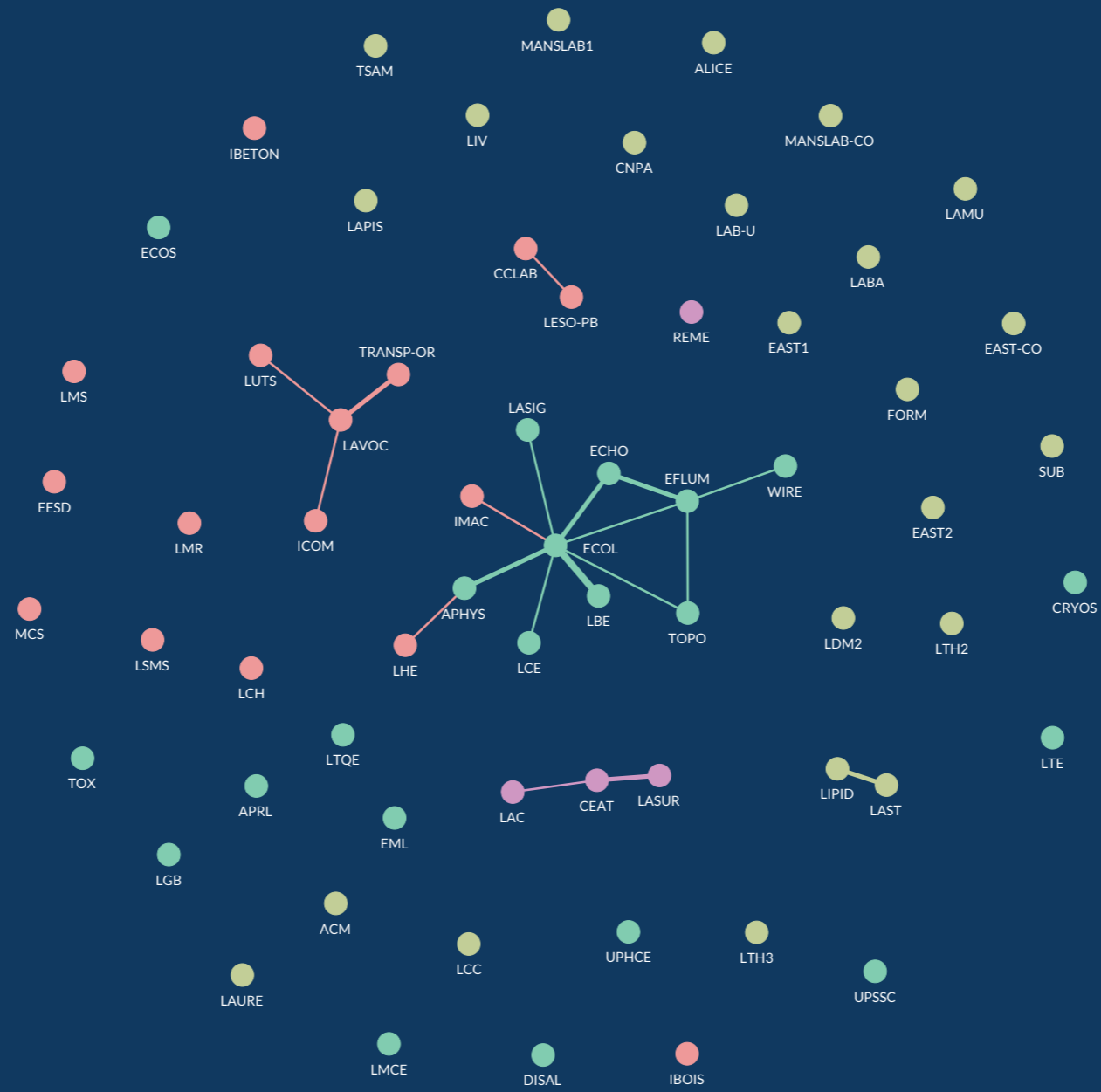
[The following text is extremely small and illegible due to the high resolution of the image. It appears to be a list of keywords or publication titles.]

ENSEIGNEMENTS DE L'ENAC QUI PARTAGENT DES COLLABORATEURS

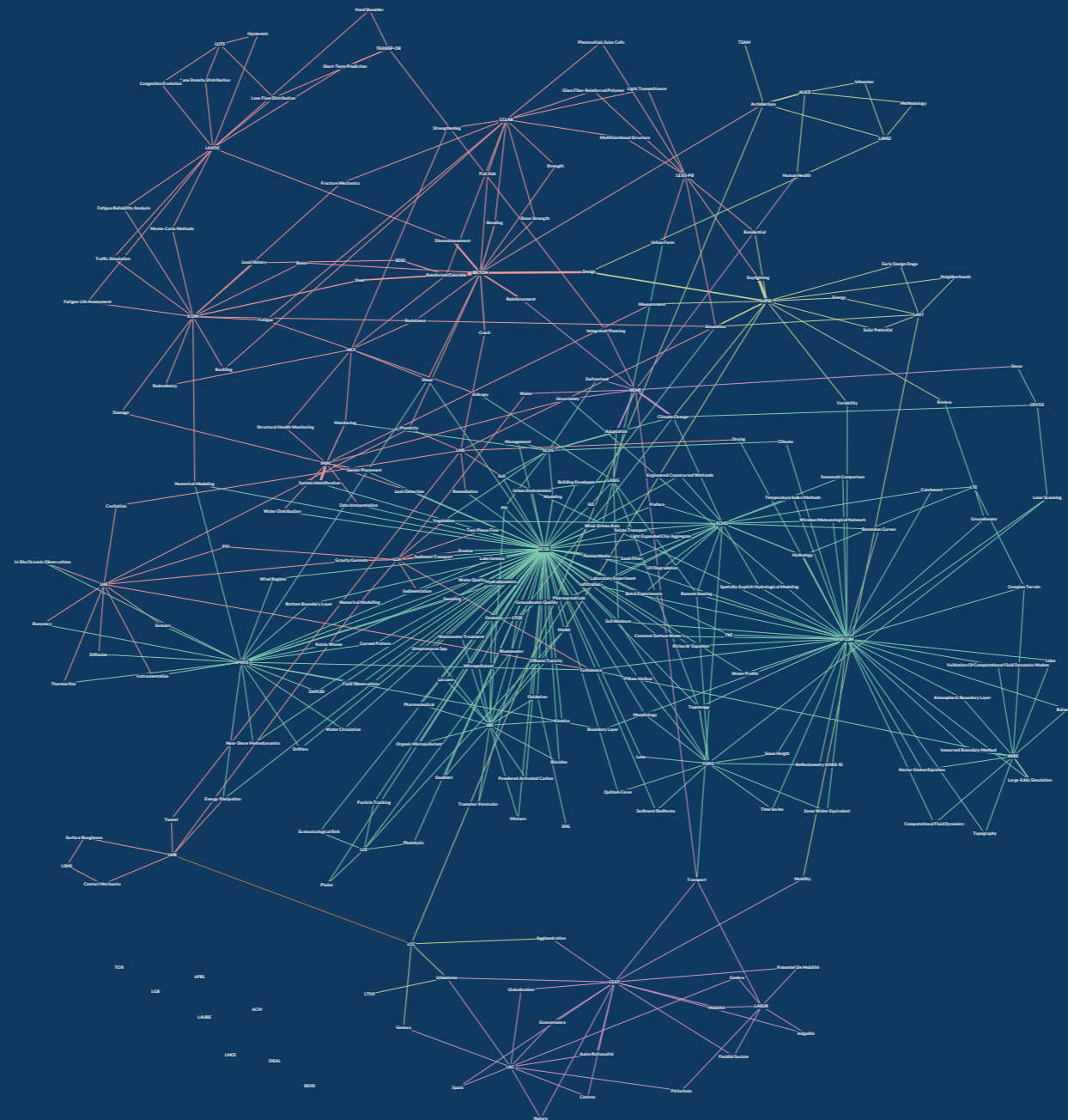


Cours	Collaborateurs	Page
AB 101	AB 101	1
AB 102	AB 102	1
AB 103	AB 103	1
AB 104	AB 104	1
AB 105	AB 105	1
AB 106	AB 106	1
AB 107	AB 107	1
AB 108	AB 108	1
AB 109	AB 109	1
AB 110	AB 110	1
AB 111	AB 111	1
AB 112	AB 112	1
AB 113	AB 113	1
AB 114	AB 114	1
AB 115	AB 115	1
AB 116	AB 116	1
AB 117	AB 117	1
AB 118	AB 118	1
AB 119	AB 119	1
AB 120	AB 120	1
AB 121	AB 121	1
AB 122	AB 122	1
AB 123	AB 123	1
AB 124	AB 124	1
AB 125	AB 125	1
AB 126	AB 126	1
AB 127	AB 127	1
AB 128	AB 128	1
AB 129	AB 129	1
AB 130	AB 130	1
AB 131	AB 131	1
AB 132	AB 132	1
AB 133	AB 133	1
AB 134	AB 134	1
AB 135	AB 135	1
AB 136	AB 136	1
AB 137	AB 137	1
AB 138	AB 138	1
AB 139	AB 139	1
AB 140	AB 140	1
AB 141	AB 141	1
AB 142	AB 142	1
AB 143	AB 143	1
AB 144	AB 144	1
AB 145	AB 145	1
AB 146	AB 146	1
AB 147	AB 147	1
AB 148	AB 148	1
AB 149	AB 149	1
AB 150	AB 150	1
AB 151	AB 151	1
AB 152	AB 152	1
AB 153	AB 153	1
AB 154	AB 154	1
AB 155	AB 155	1
AB 156	AB 156	1
AB 157	AB 157	1
AB 158	AB 158	1
AB 159	AB 159	1
AB 160	AB 160	1
AB 161	AB 161	1
AB 162	AB 162	1
AB 163	AB 163	1
AB 164	AB 164	1
AB 165	AB 165	1
AB 166	AB 166	1
AB 167	AB 167	1
AB 168	AB 168	1
AB 169	AB 169	1
AB 170	AB 170	1
AB 171	AB 171	1
AB 172	AB 172	1
AB 173	AB 173	1
AB 174	AB 174	1
AB 175	AB 175	1
AB 176	AB 176	1
AB 177	AB 177	1
AB 178	AB 178	1
AB 179	AB 179	1
AB 180	AB 180	1
AB 181	AB 181	1
AB 182	AB 182	1
AB 183	AB 183	1
AB 184	AB 184	1
AB 185	AB 185	1
AB 186	AB 186	1
AB 187	AB 187	1
AB 188	AB 188	1
AB 189	AB 189	1
AB 190	AB 190	1
AB 191	AB 191	1
AB 192	AB 192	1
AB 193	AB 193	1
AB 194	AB 194	1
AB 195	AB 195	1
AB 196	AB 196	1
AB 197	AB 197	1
AB 198	AB 198	1
AB 199	AB 199	1
AB 200	AB 200	1

LABORATOIRES AVEC LES PUBLICATIONS PARTAGÉES



RÉSEAU DE LABORATOIRES AVEC DES MOTS CLÉS EN COMMUN



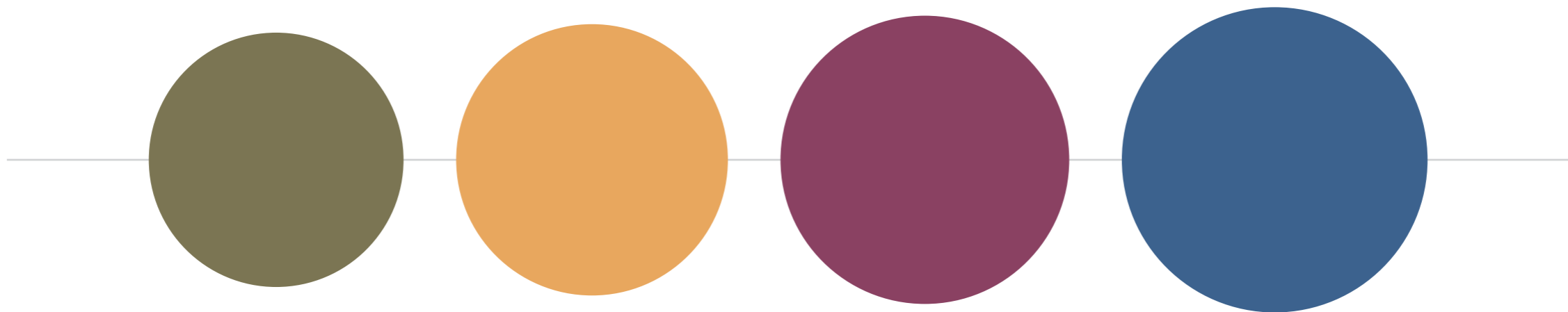
Potential affinities were generated as **keywords** through an algorithm of text mining working on the publication abstracts of the ENAC laboratories.

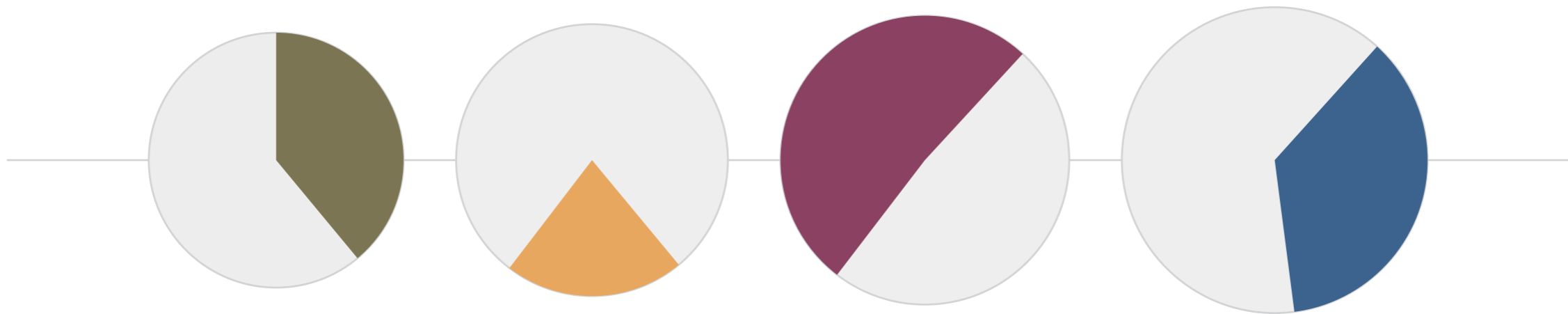
We identifies three types of *actual affinities*: the **publications** stored in the *Infoscience system*, the **courses** and the **supervision** recorded in *IS-Academia*.

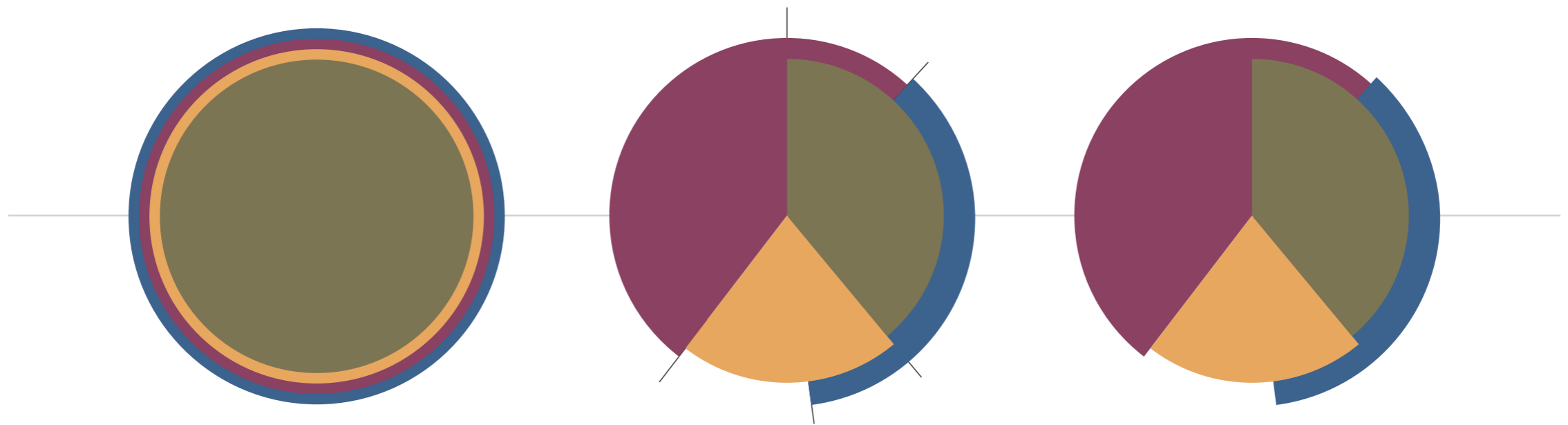
The *structure of the school* was used to reassemble laboratories and institutes. In particular, the **personal ID** (SCIPER), the **affiliations** of the staff and the **hierarchical structure** of the EPFL.

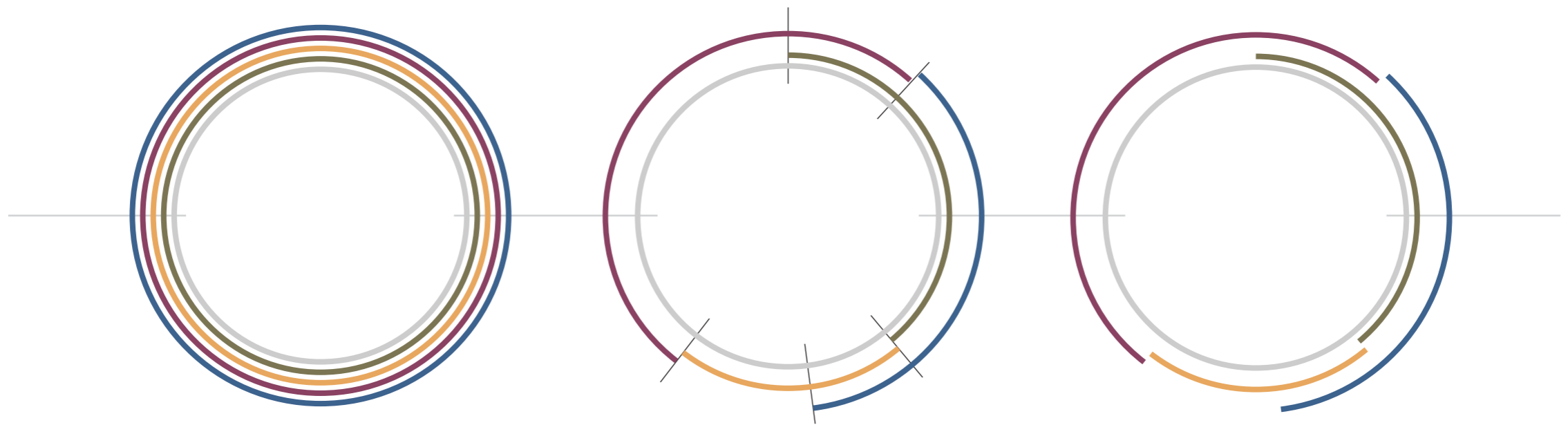
Visual Investigation

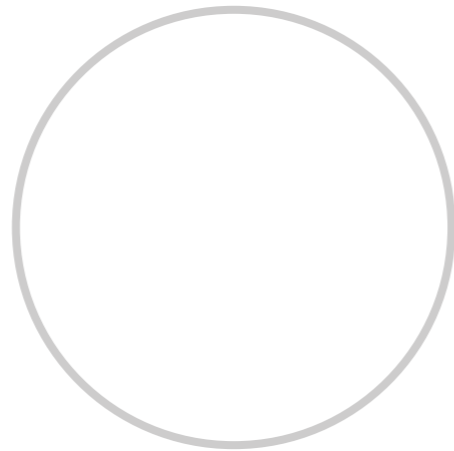
drawing laboratories

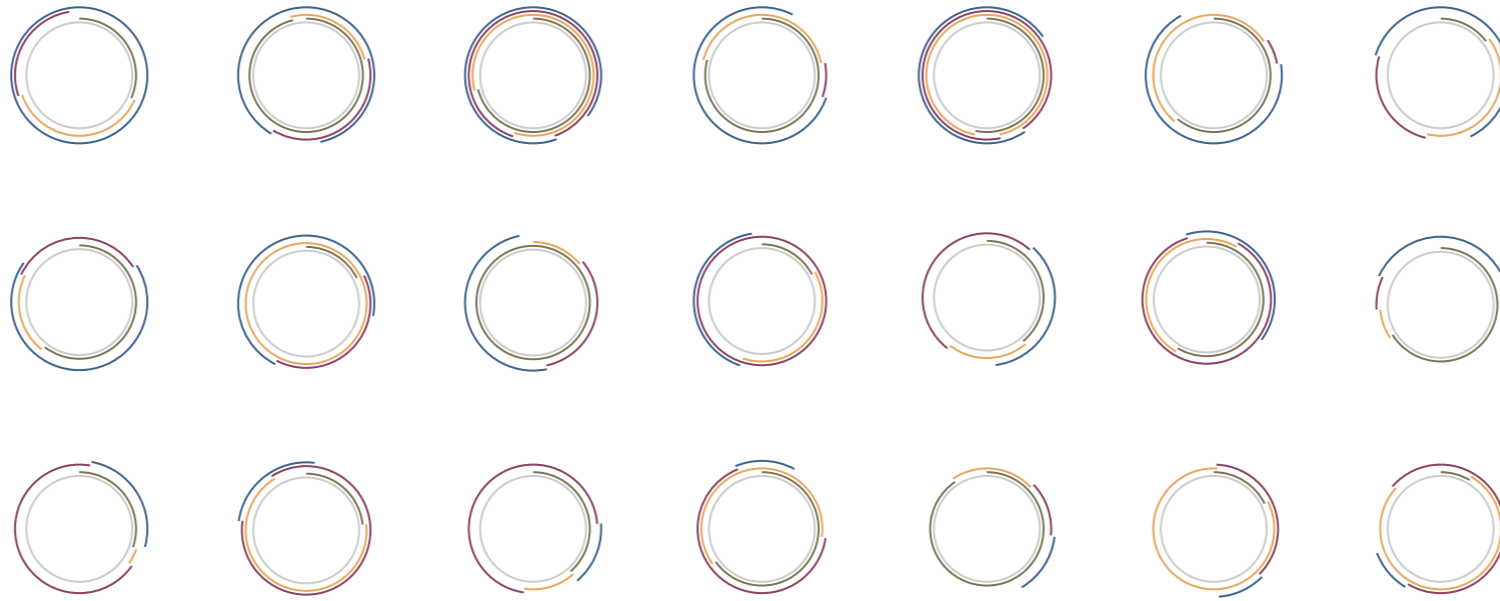


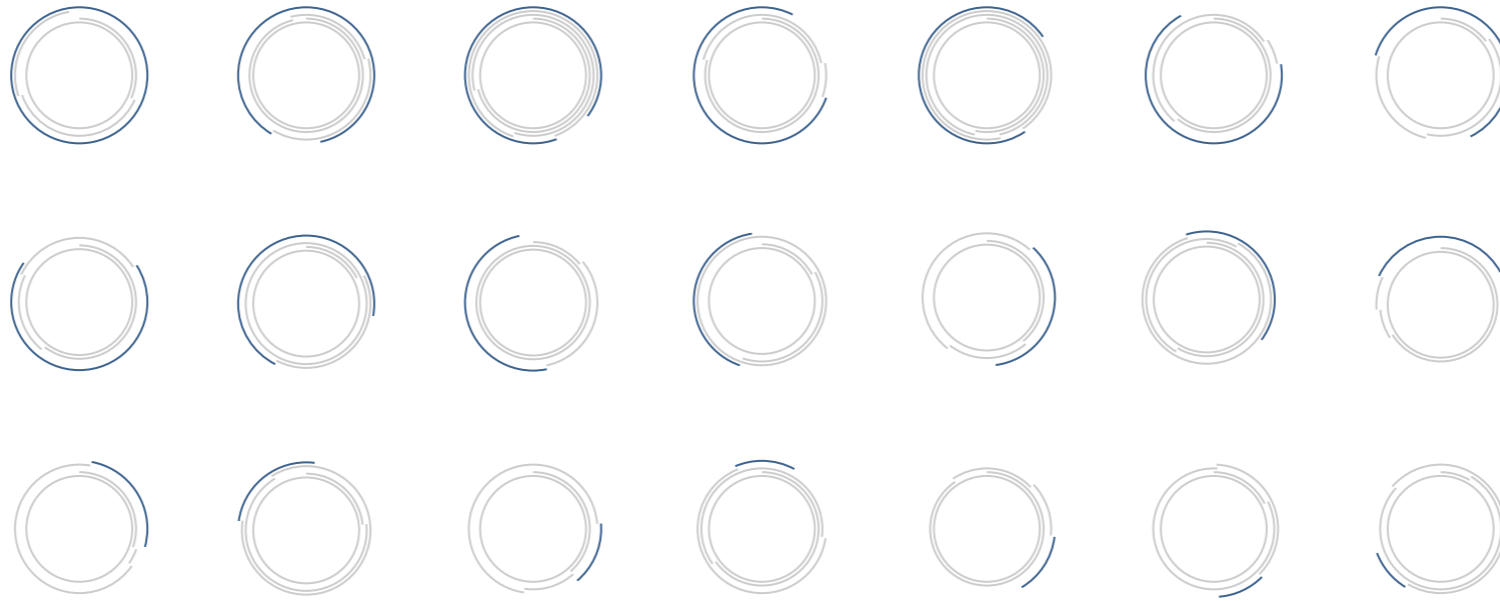


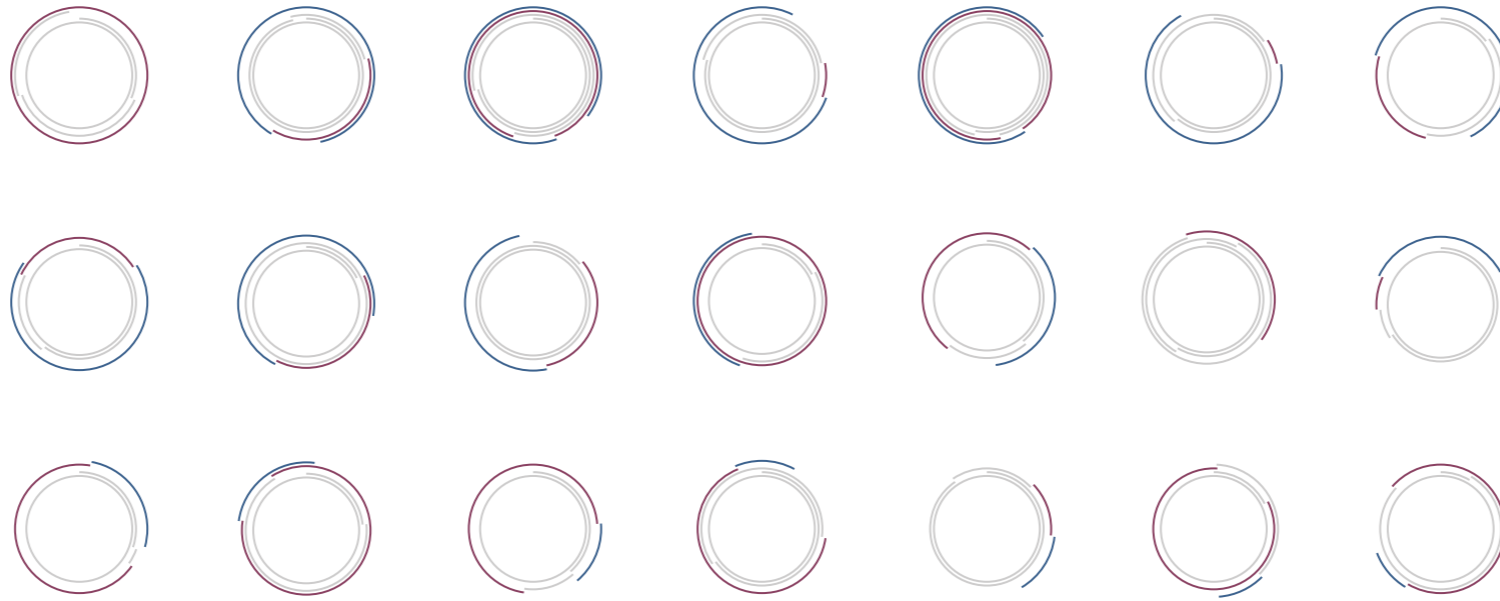


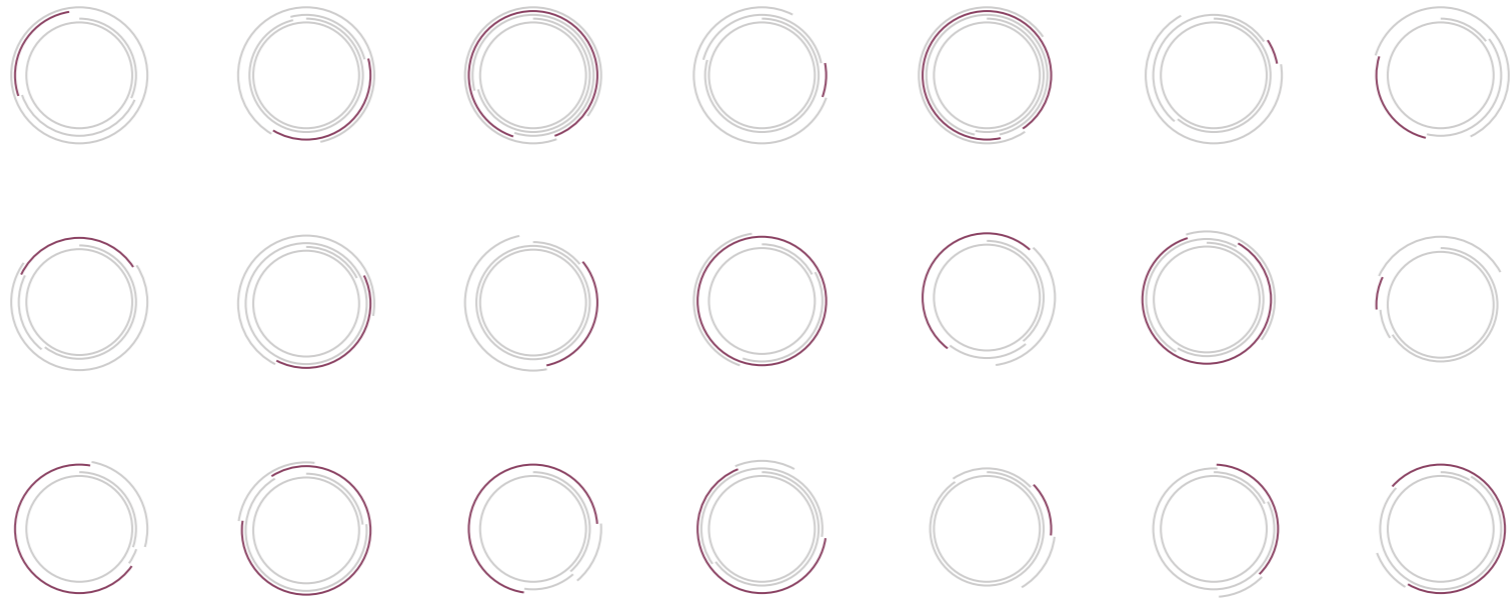


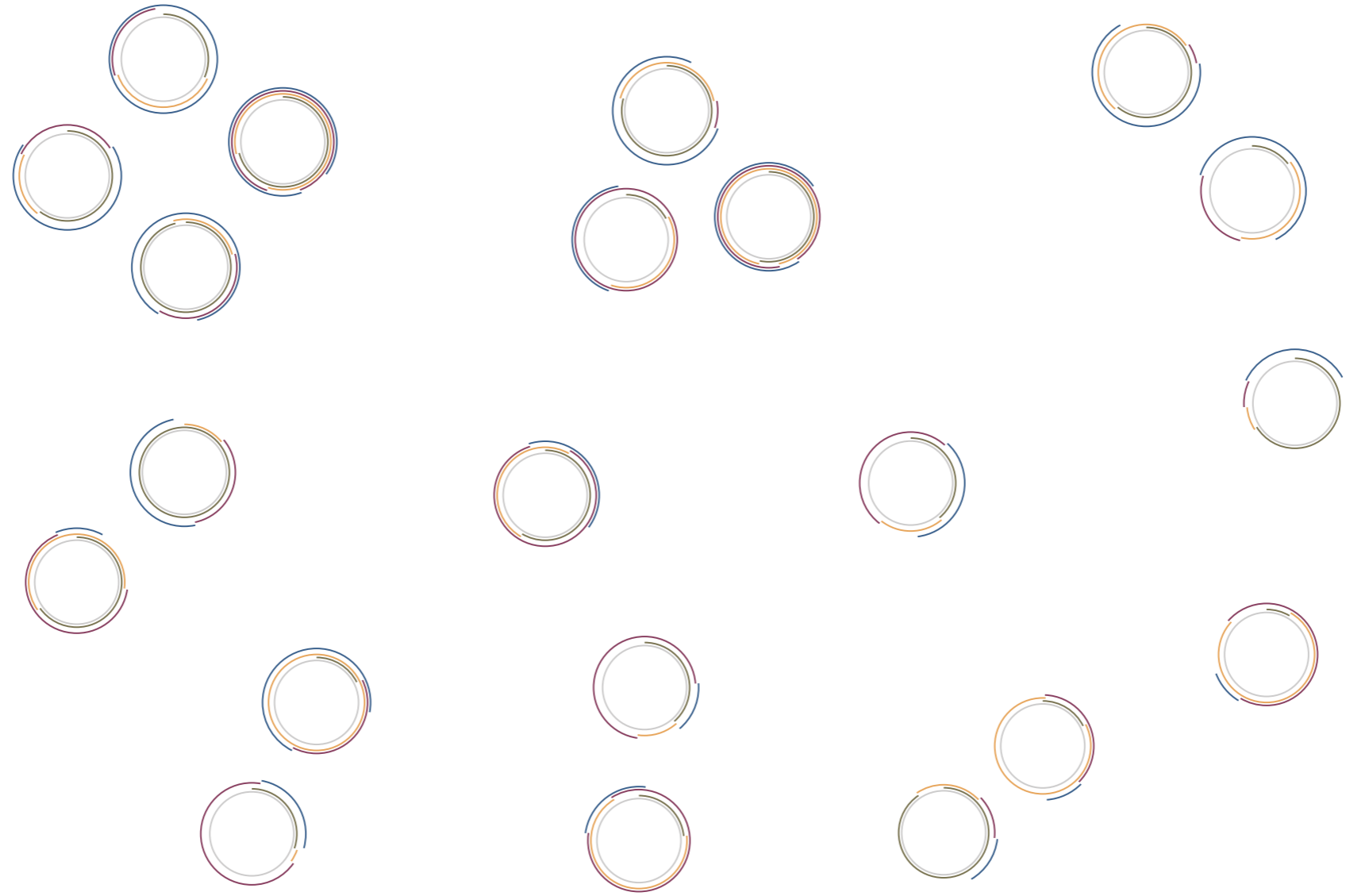


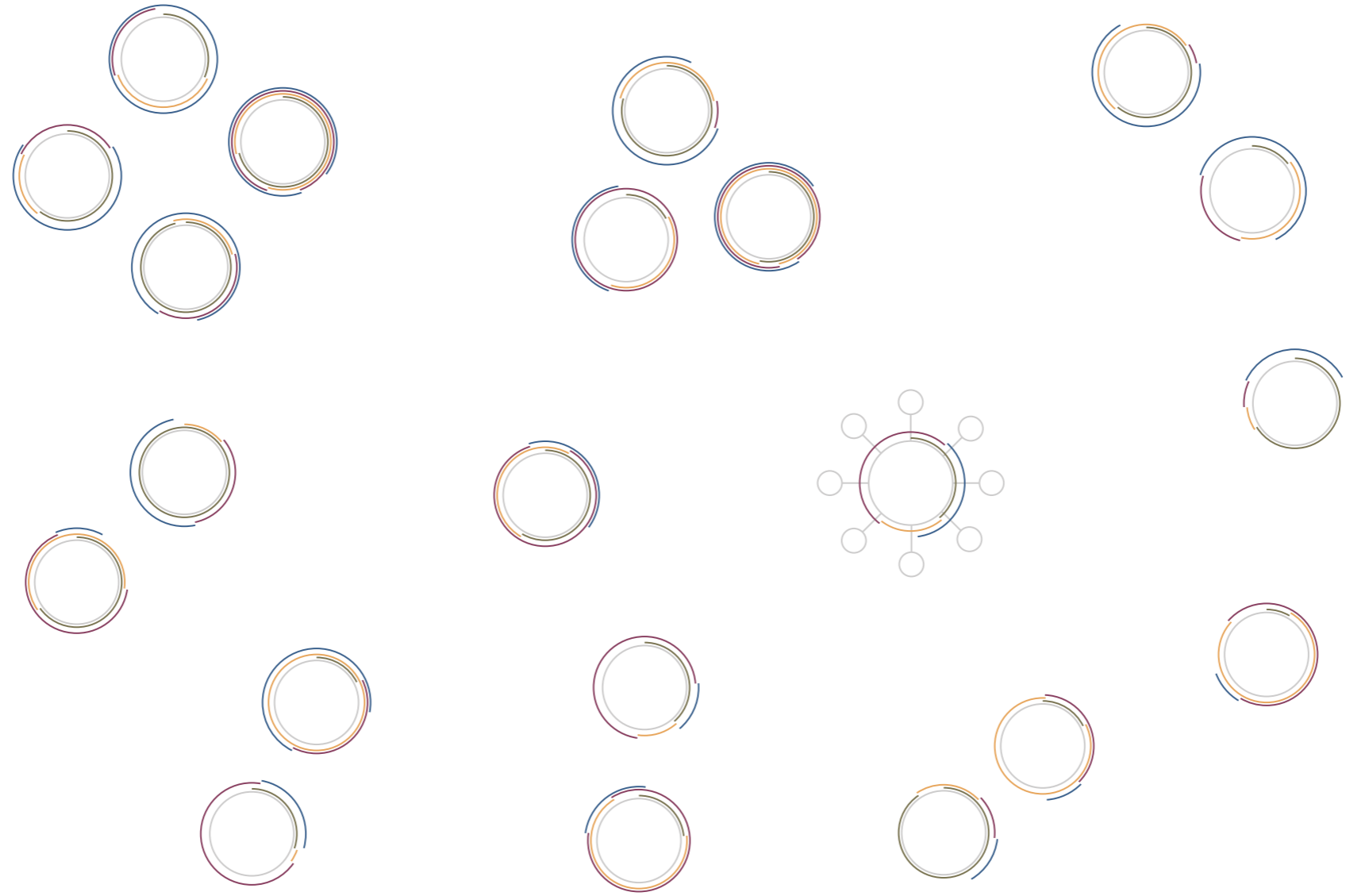


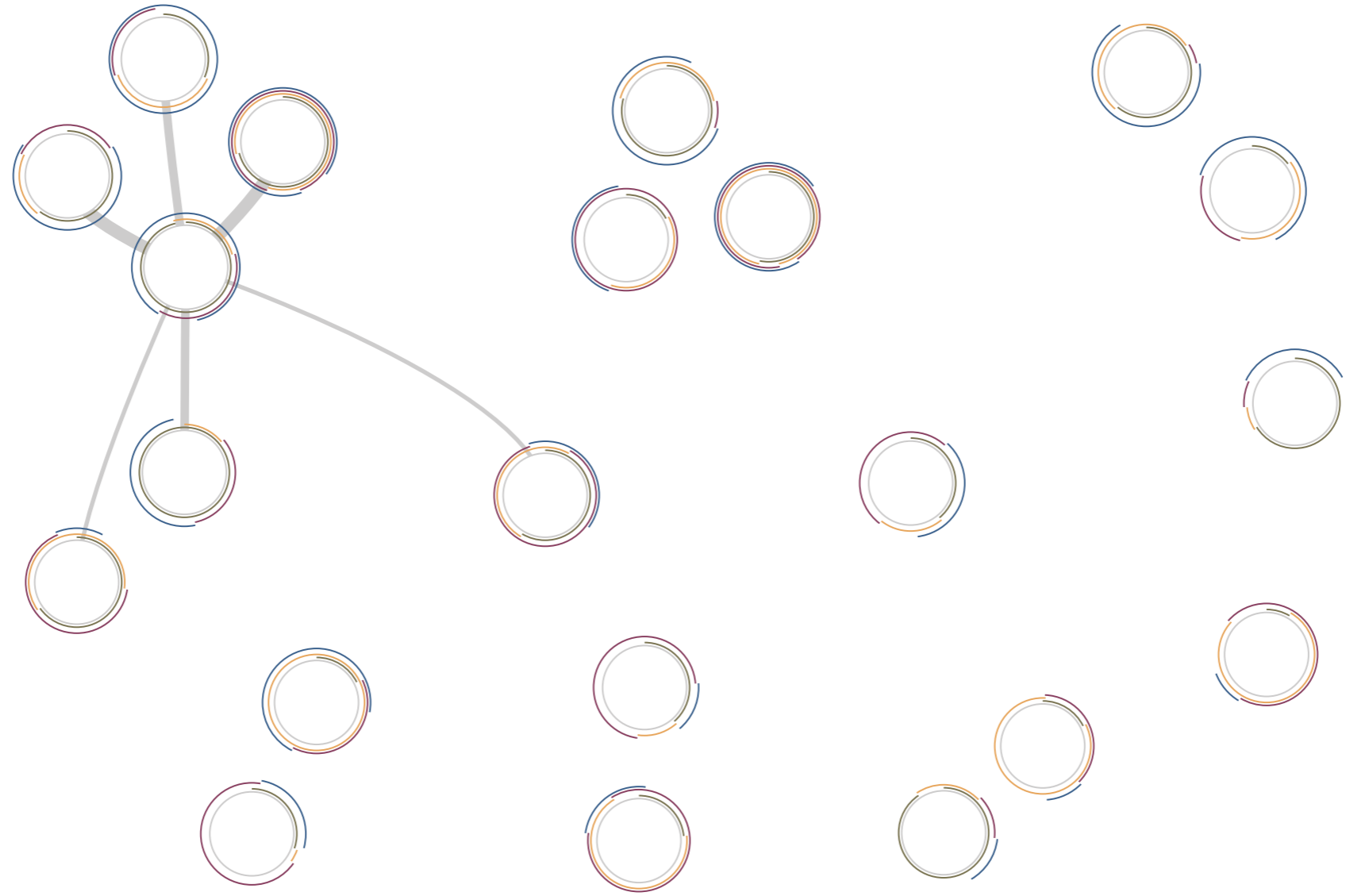


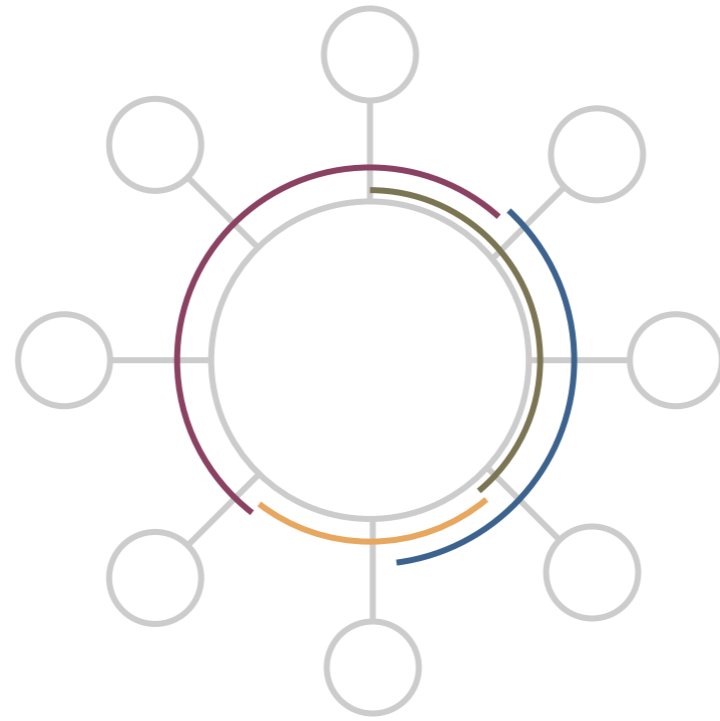


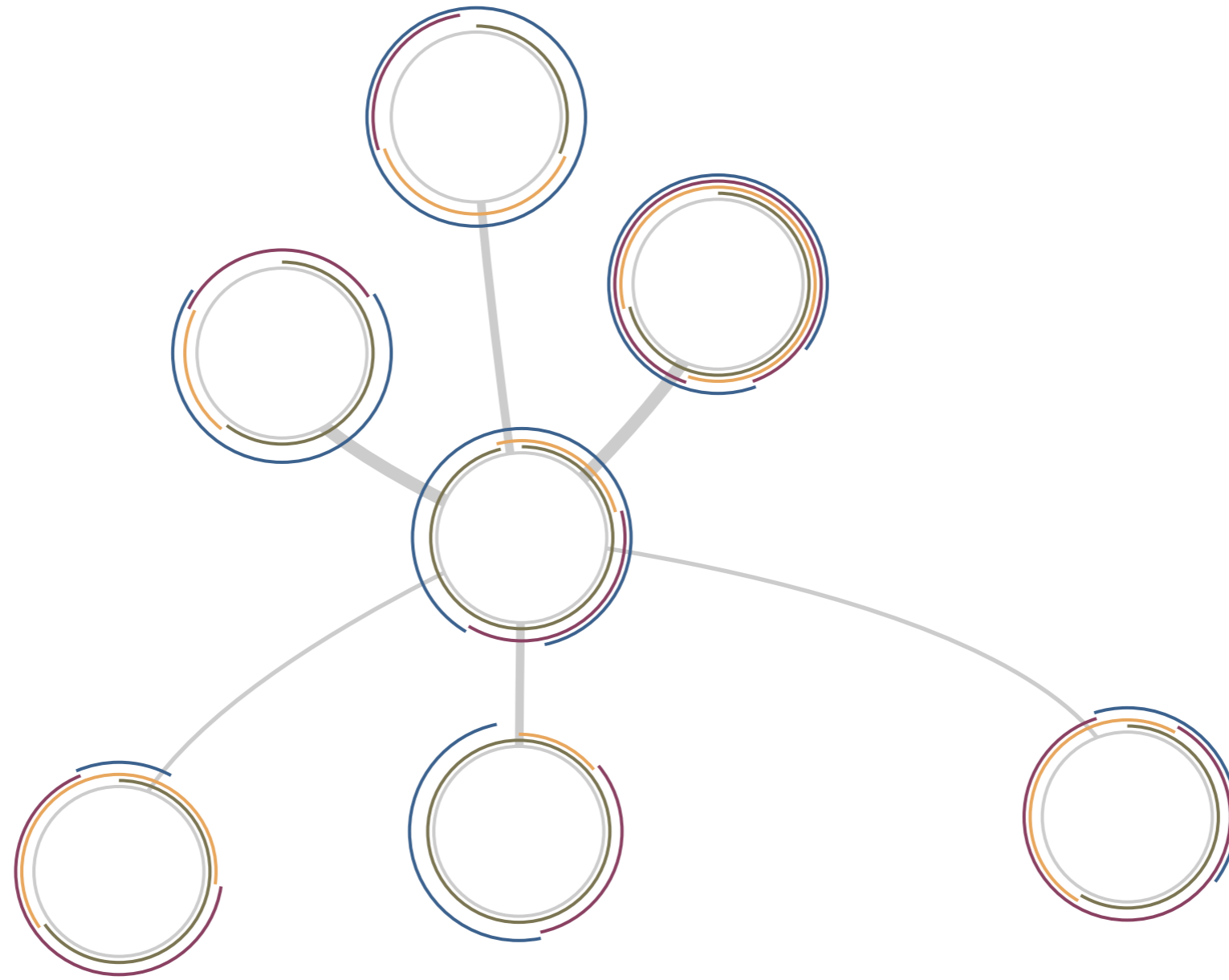




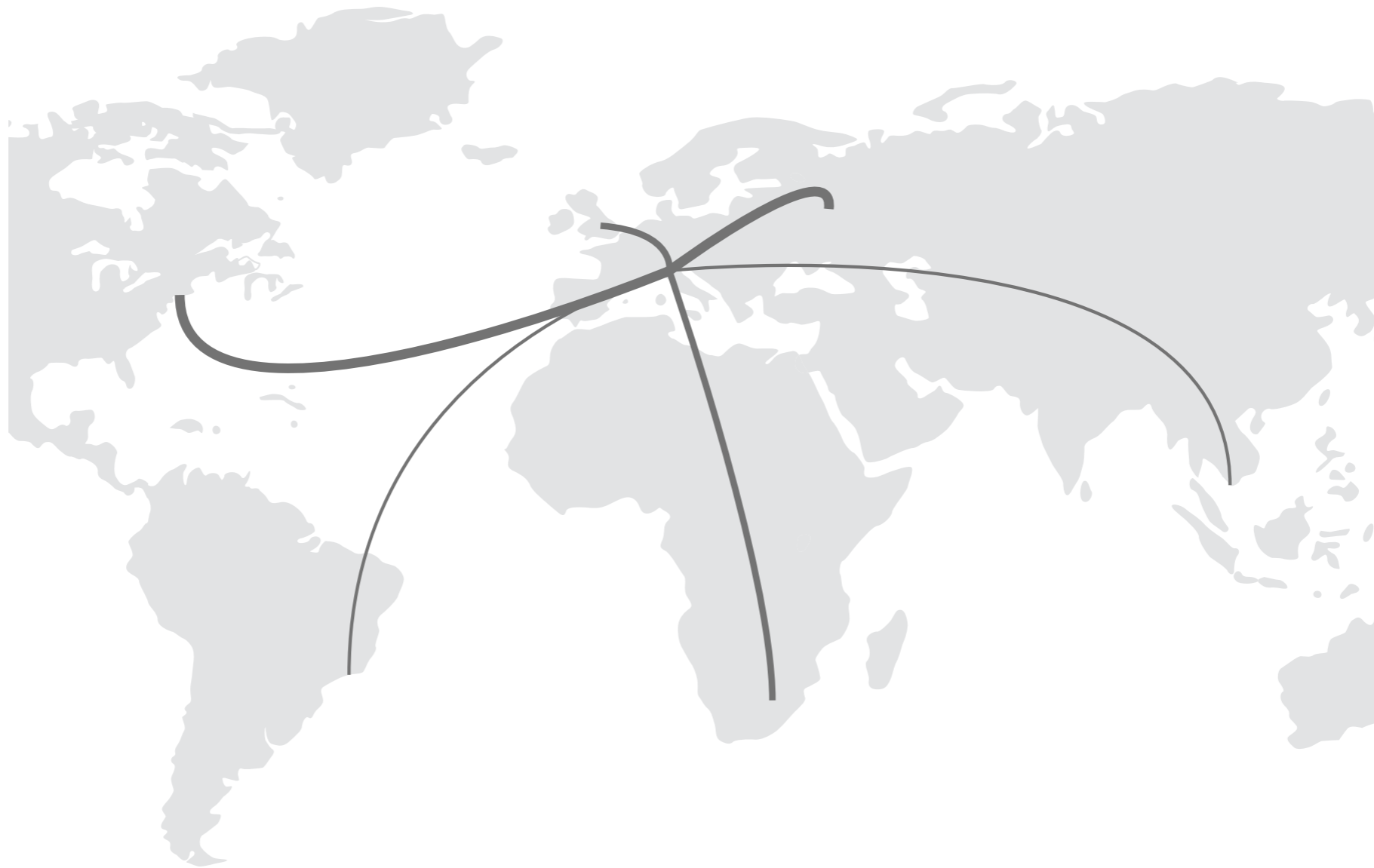






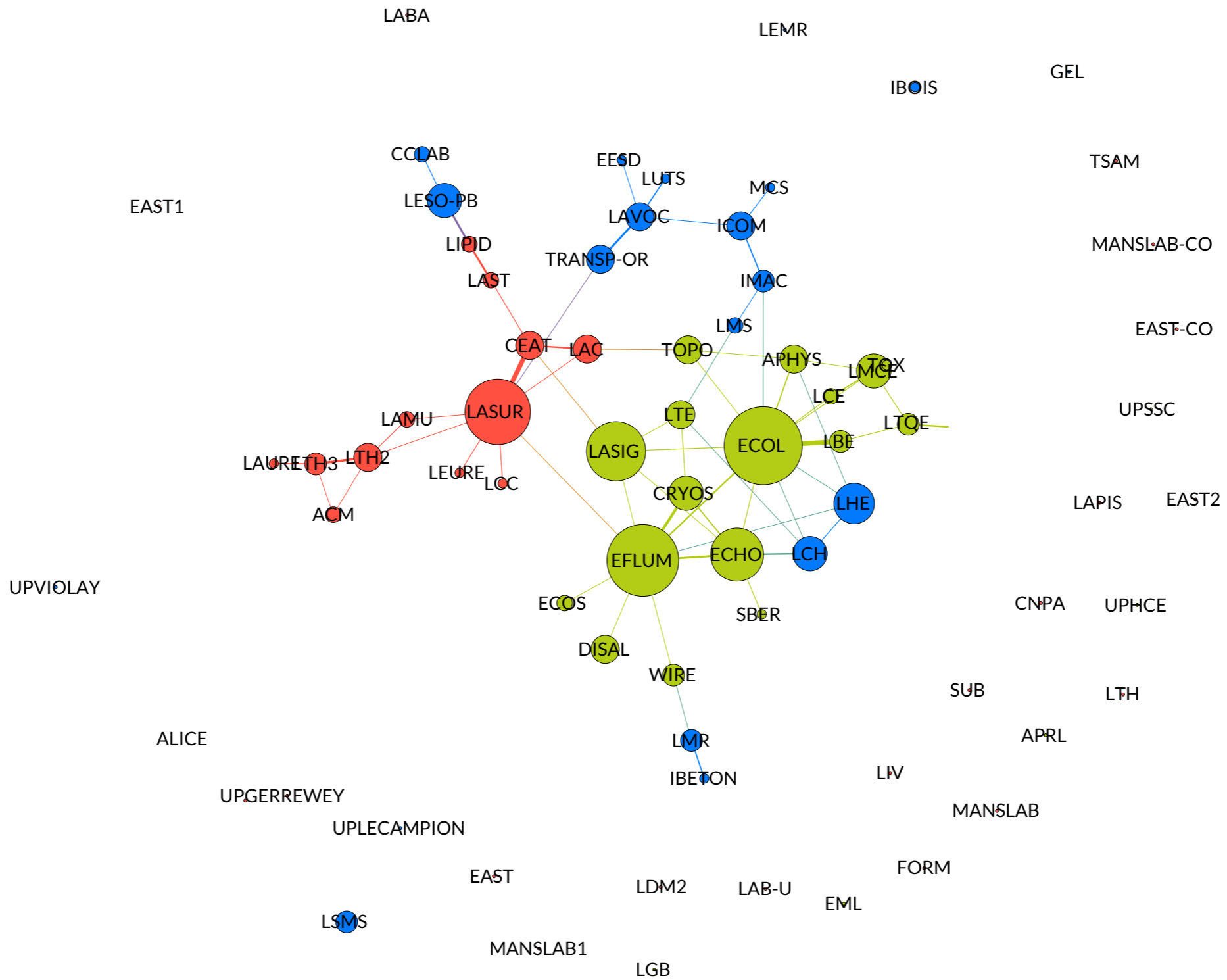




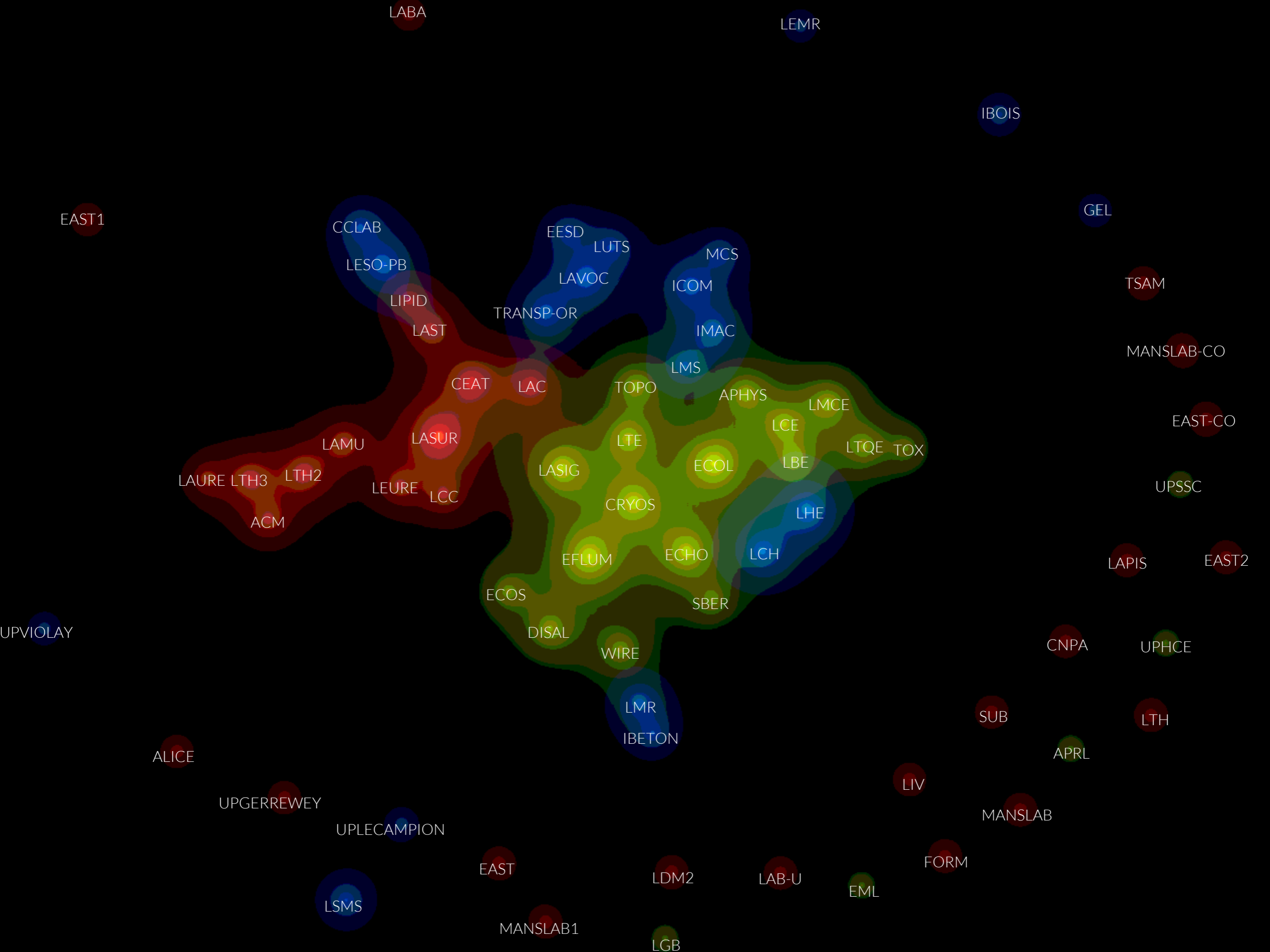


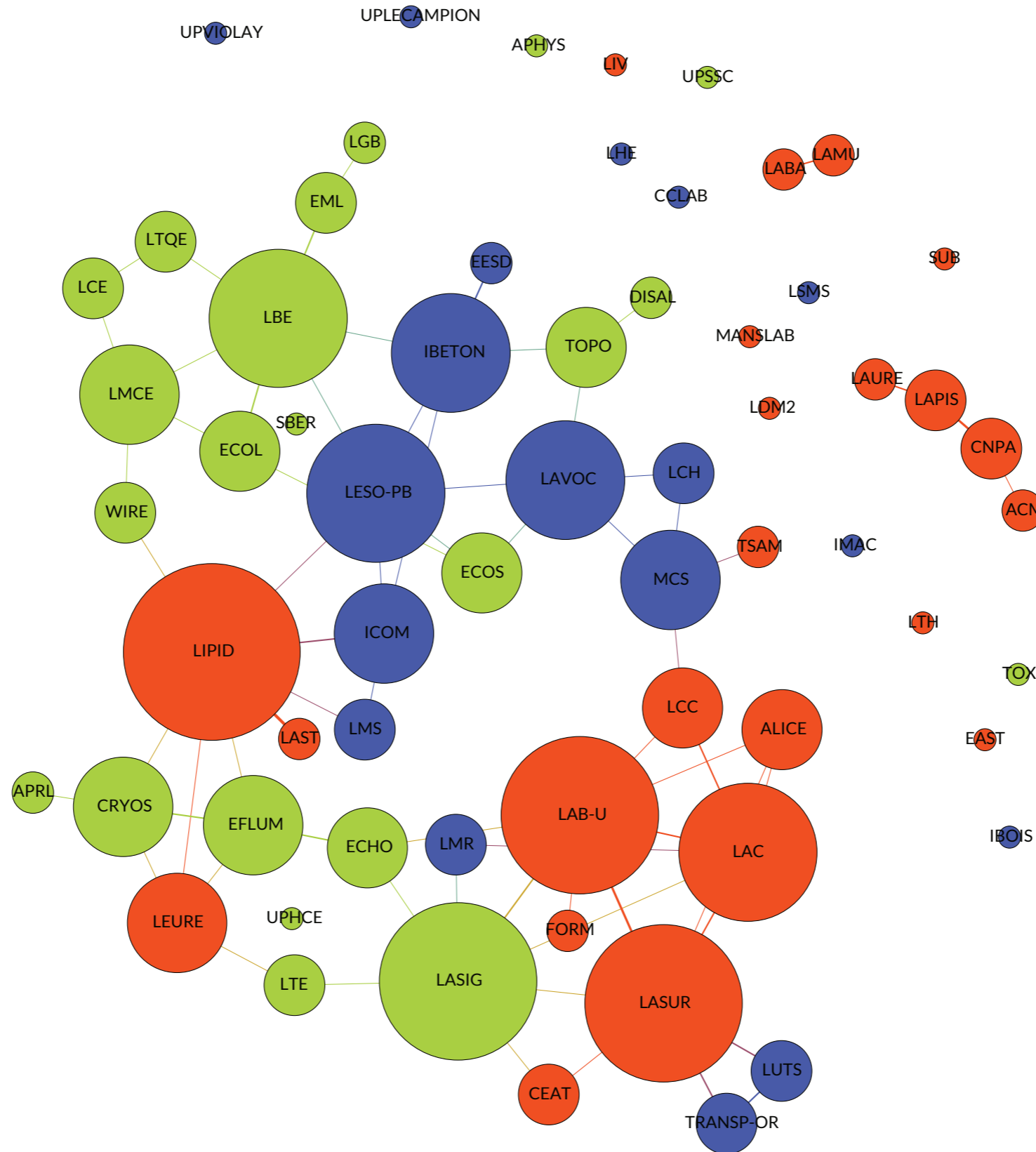
Network Visualization

size and isolement

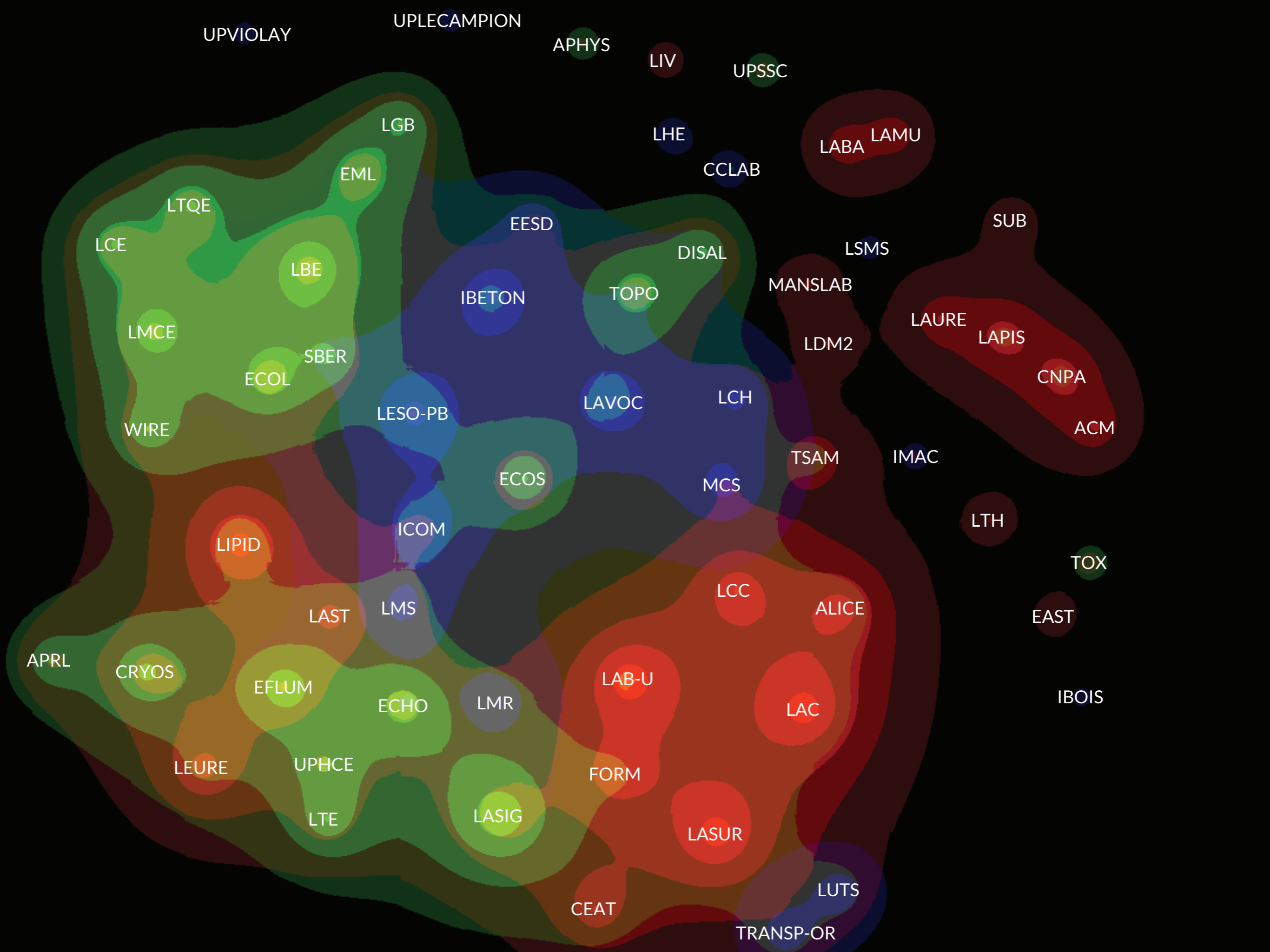


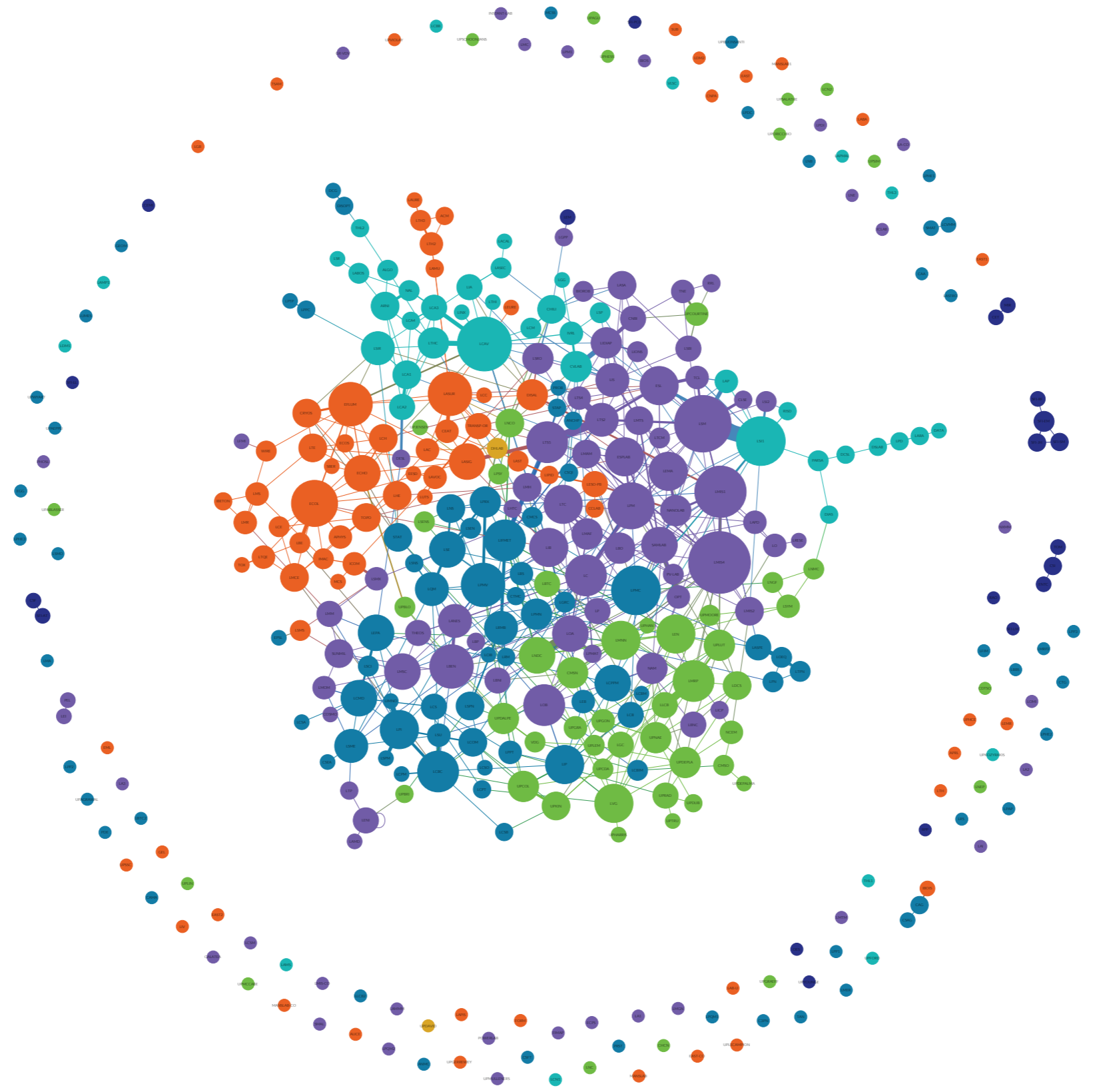
Publications

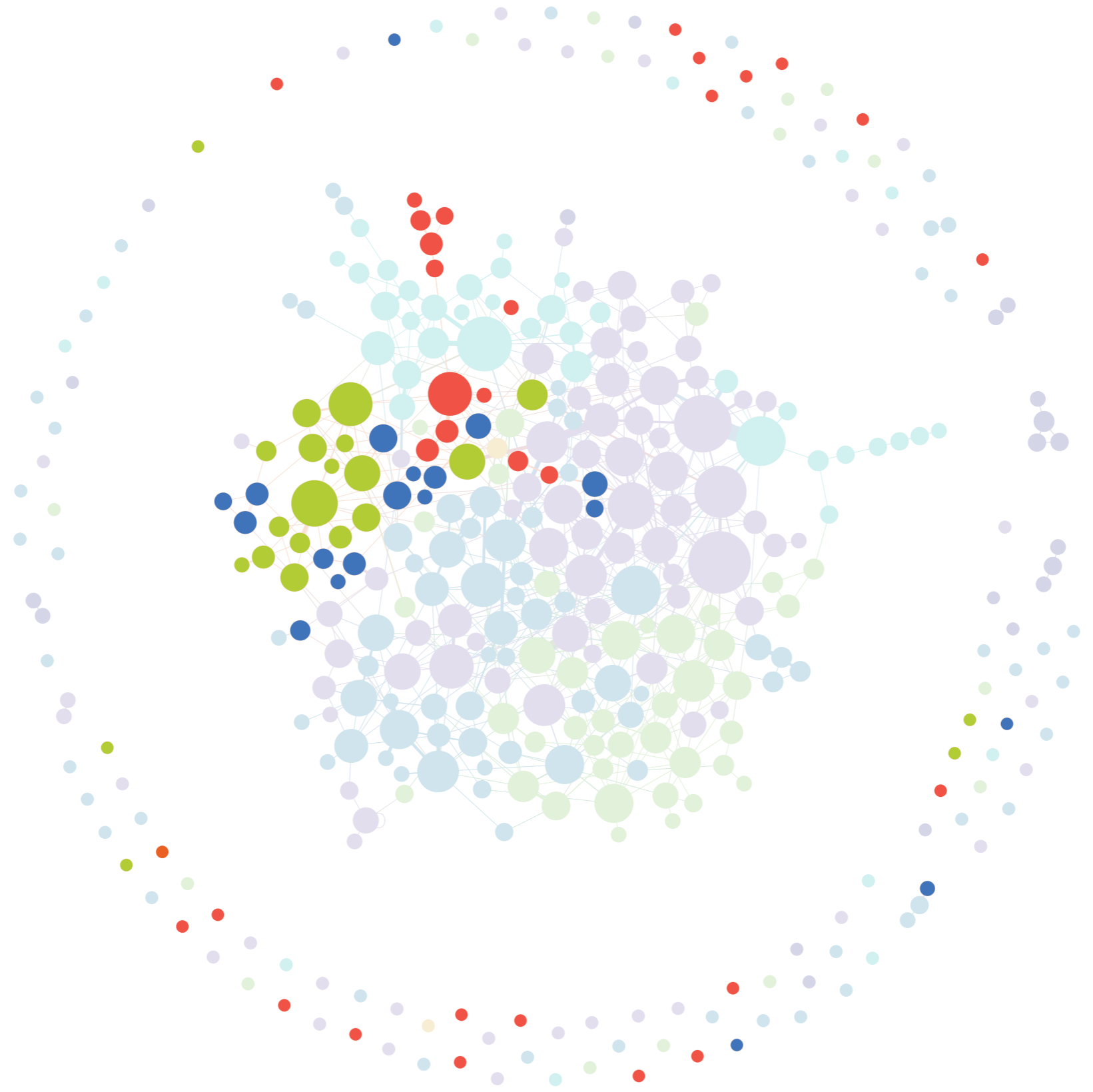




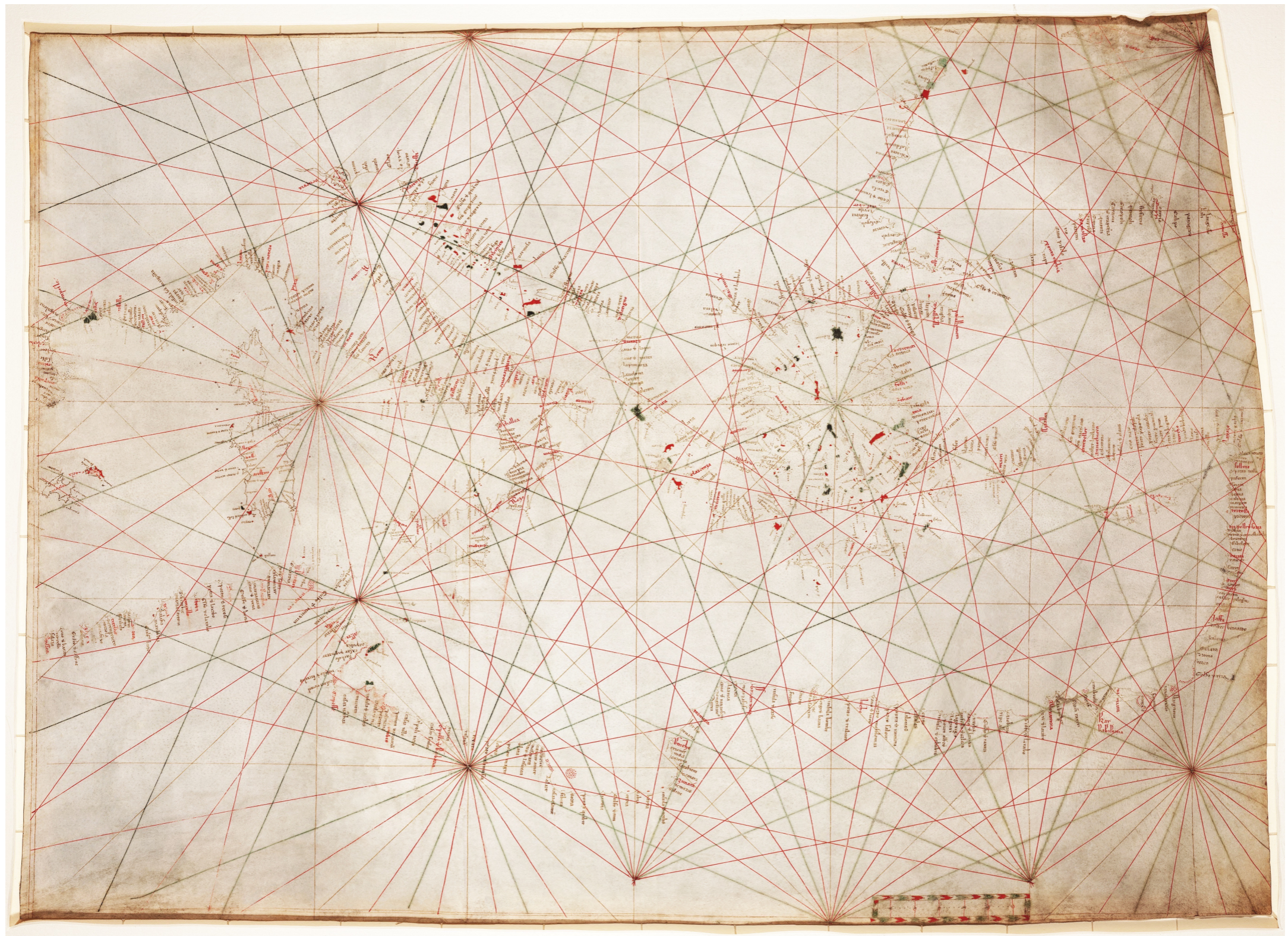
Education (Supervision and Courses)



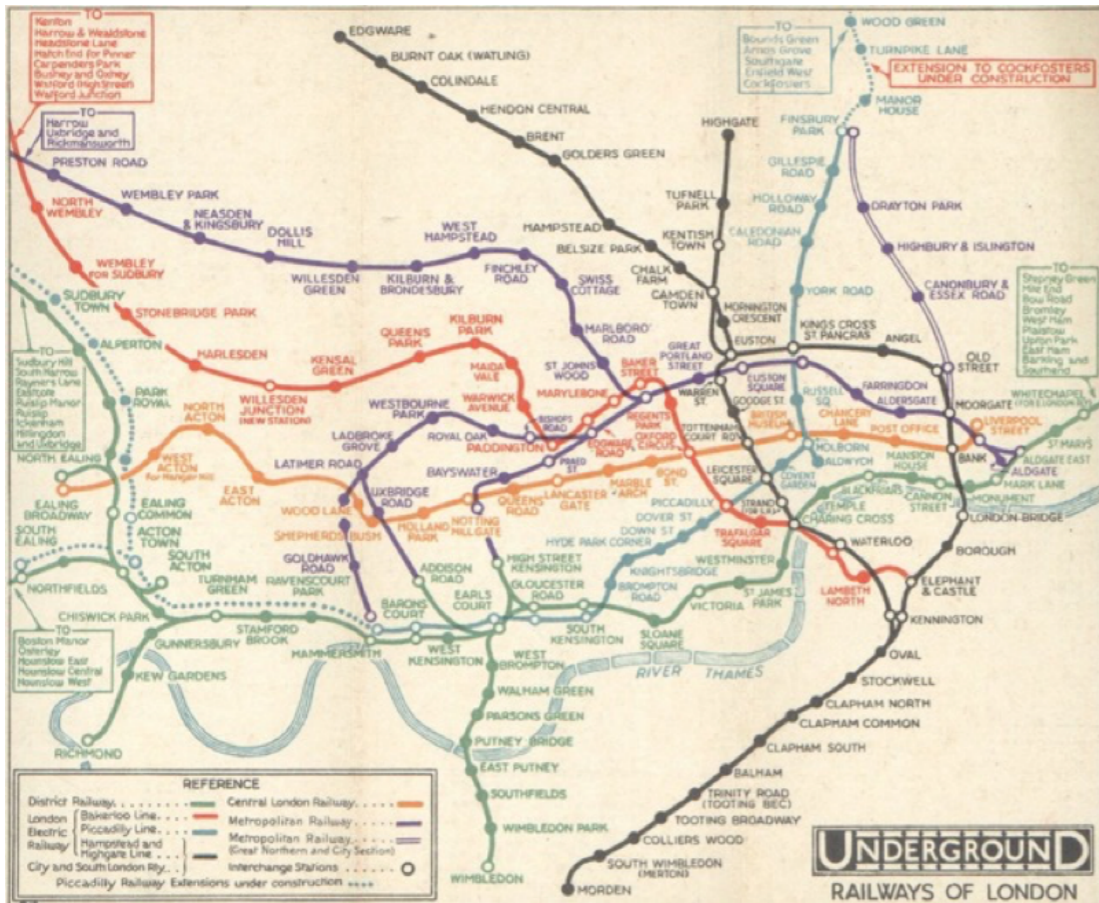




*“Design is the conscious and intuitive effort to impose **meaningful order**. [...] Our delight in the order we find in frost flowers on a window pane, in the hexagonal perfection of a honeycomb, in leaves, or in the architecture of a rose, reflects man’s preoccupation with pattern.”*

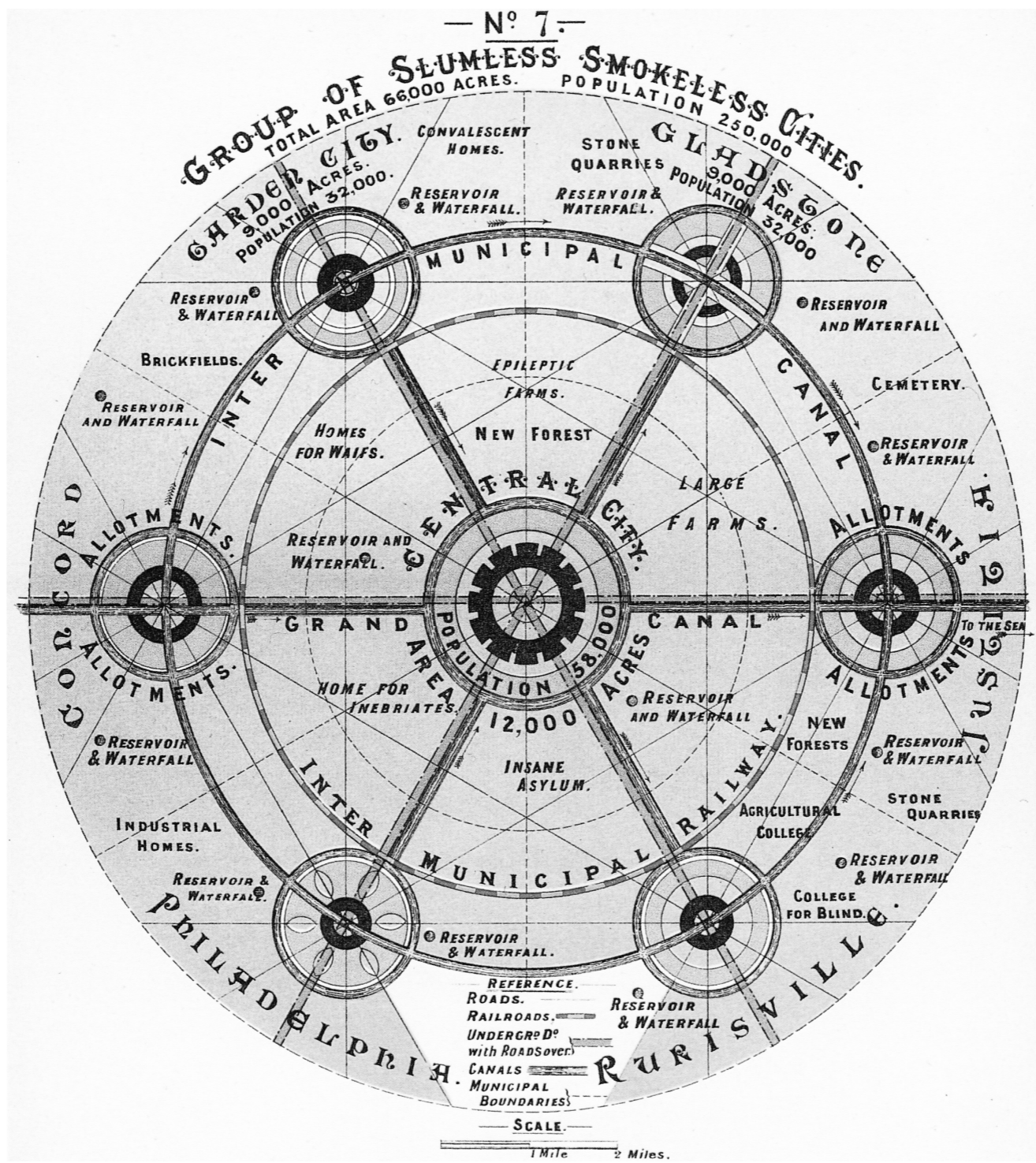


A Portolan chart that represents the Mediterranean Sea and its winds during the second quarter of the 14th century. © Library of Congress



Pre and post Harry Beck's London underground map.

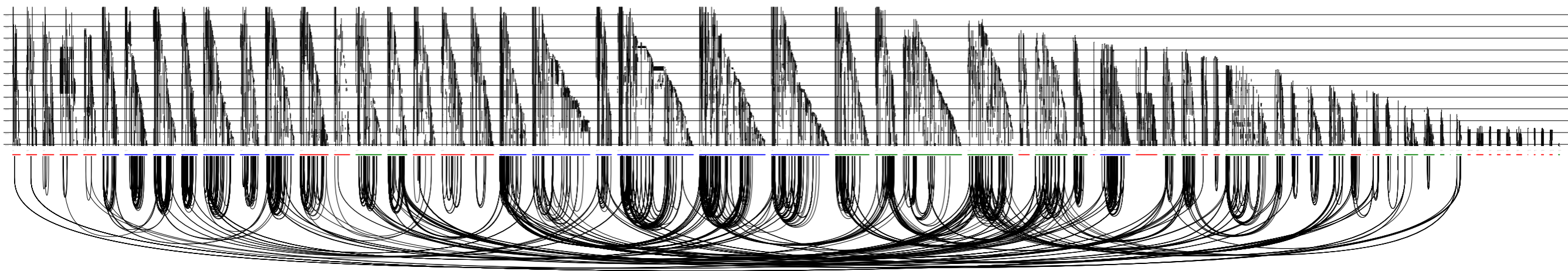
*“Regular graphs are unique in that each node has exactly the same number of links. Indeed, in a two-dimensional mesh of perpendicular lines forming a simple square lattice each node has exactly four links, or in a **hexagonal lattice of a beehive** each node is connected to exactly three others [links].”*



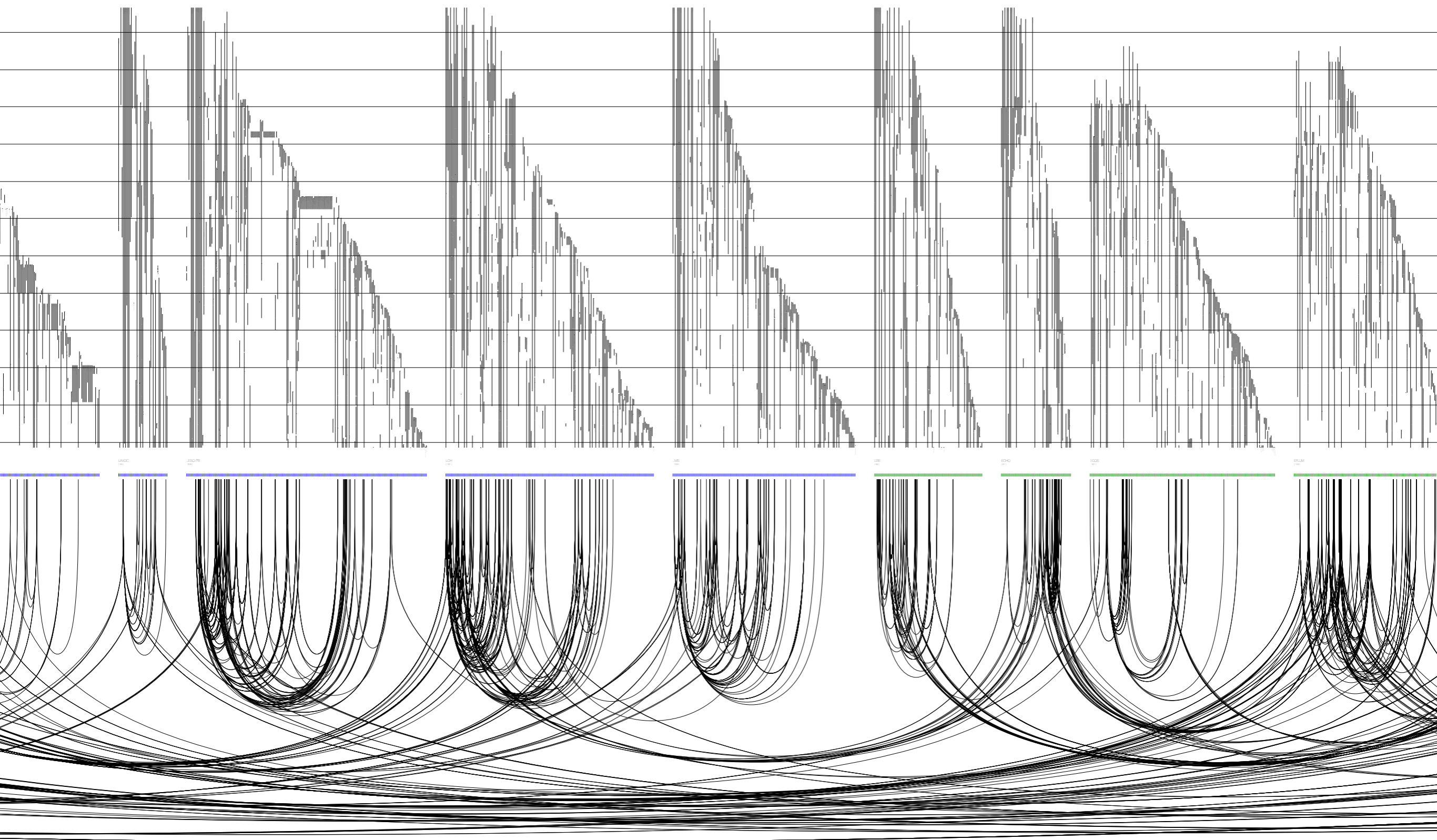
Beevers, Robert. 1988. The Garden City Utopia: a Critical Biography of Ebenezer Howard.

Back to Individual

the whole is different than the sum of its parts

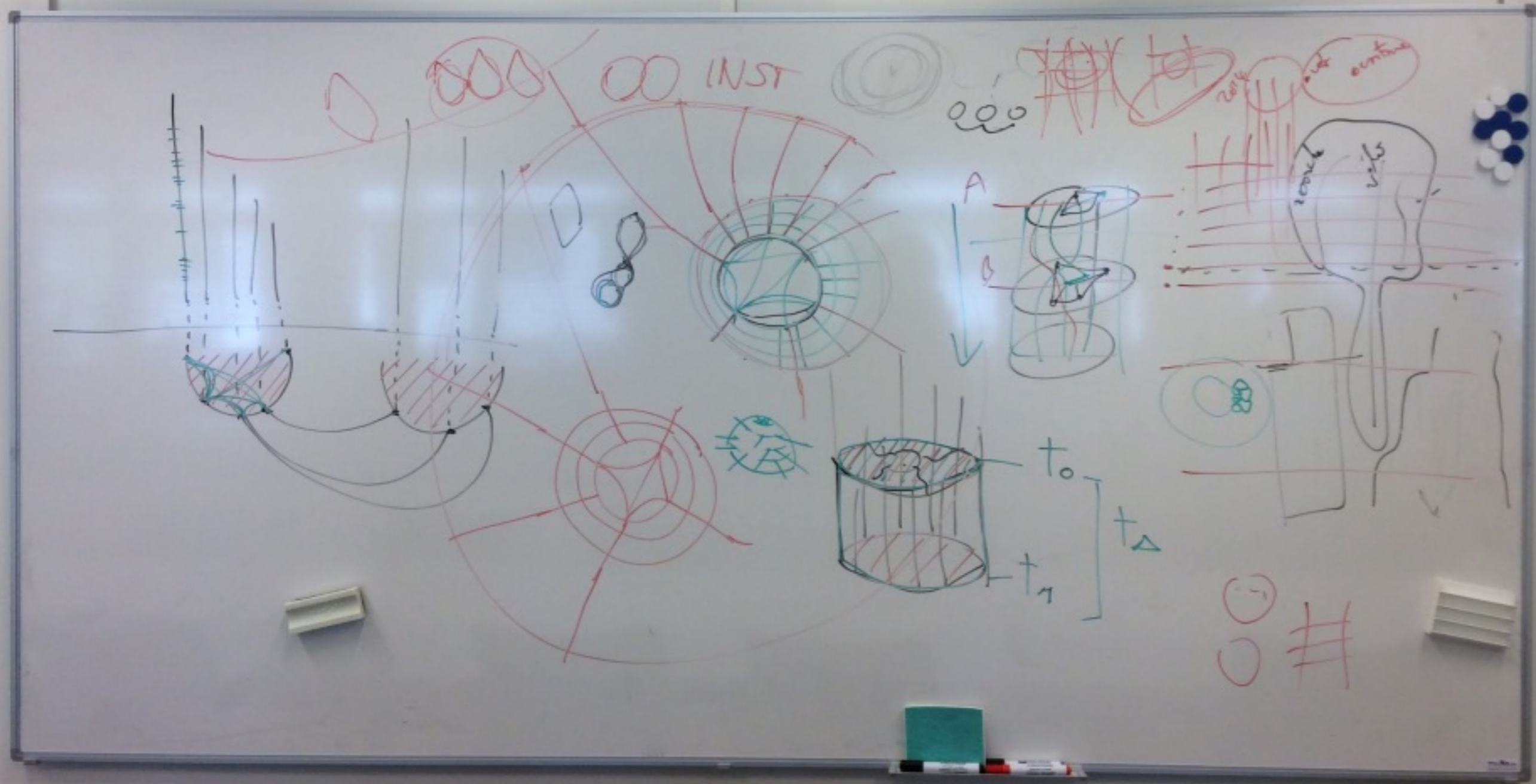


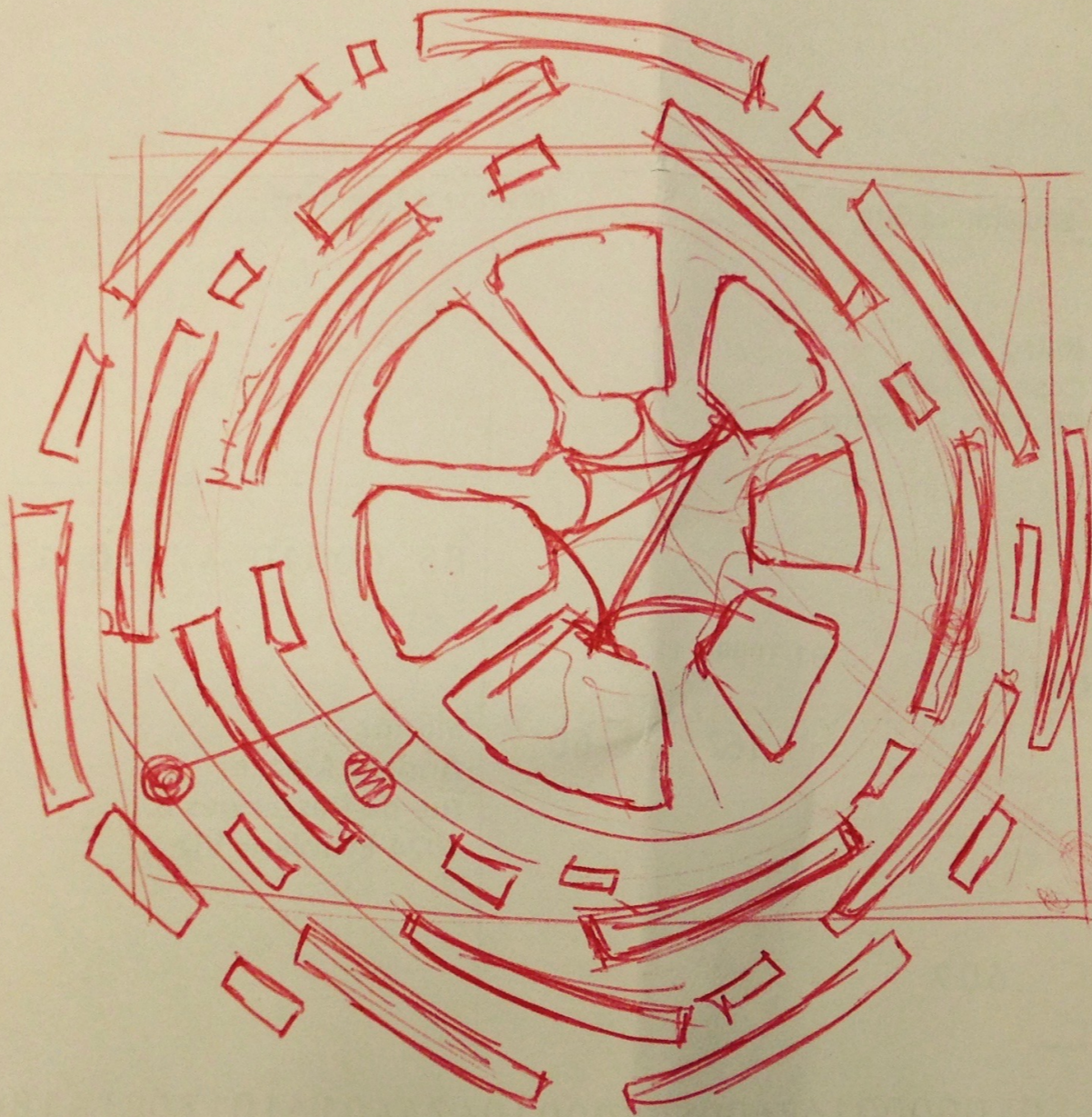
Making individuals and affinities visible together.



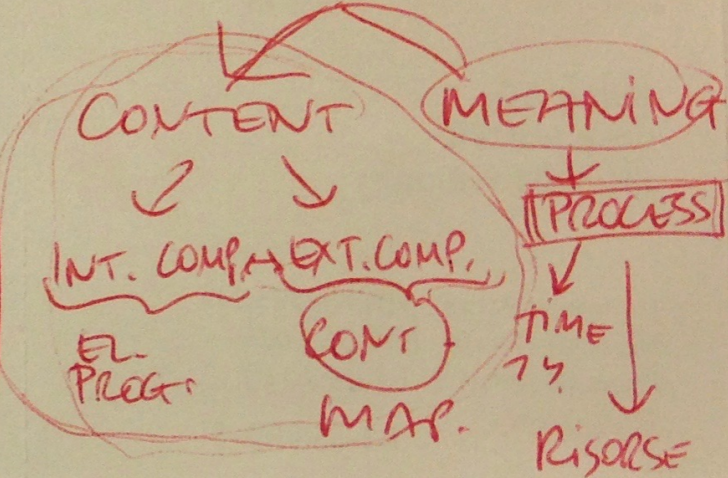
Making individuals and affinities visible together.



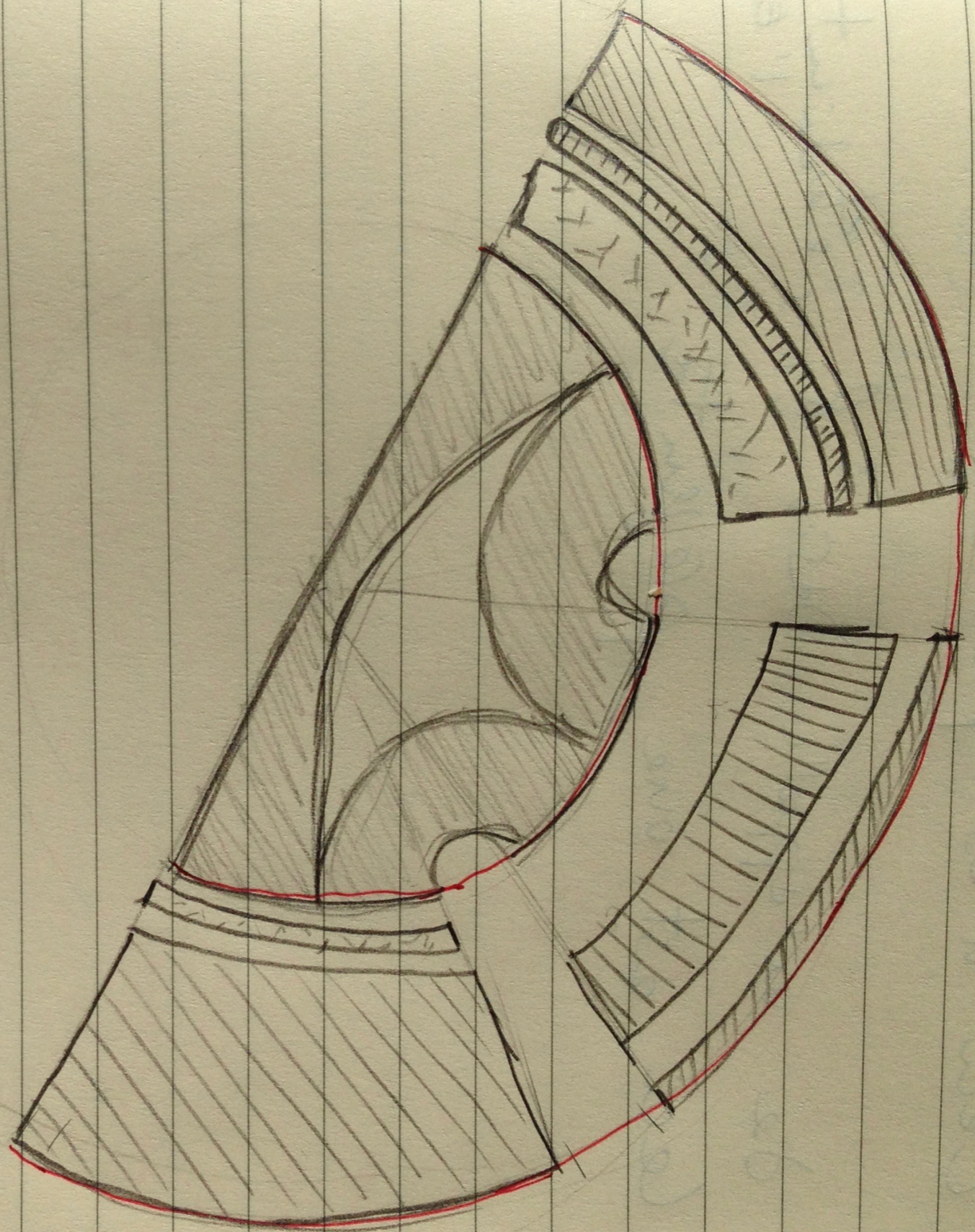
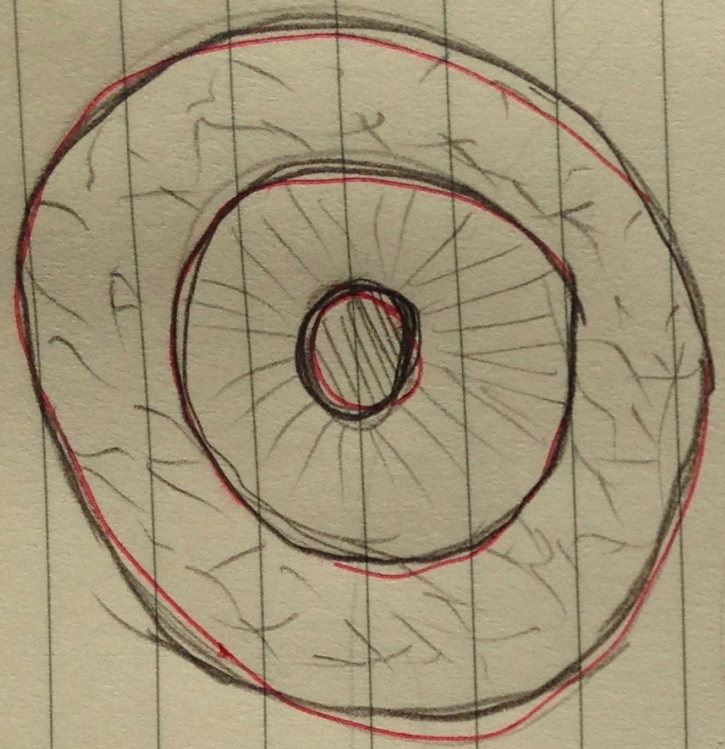
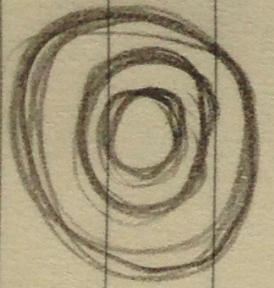




ONTOLOGIA



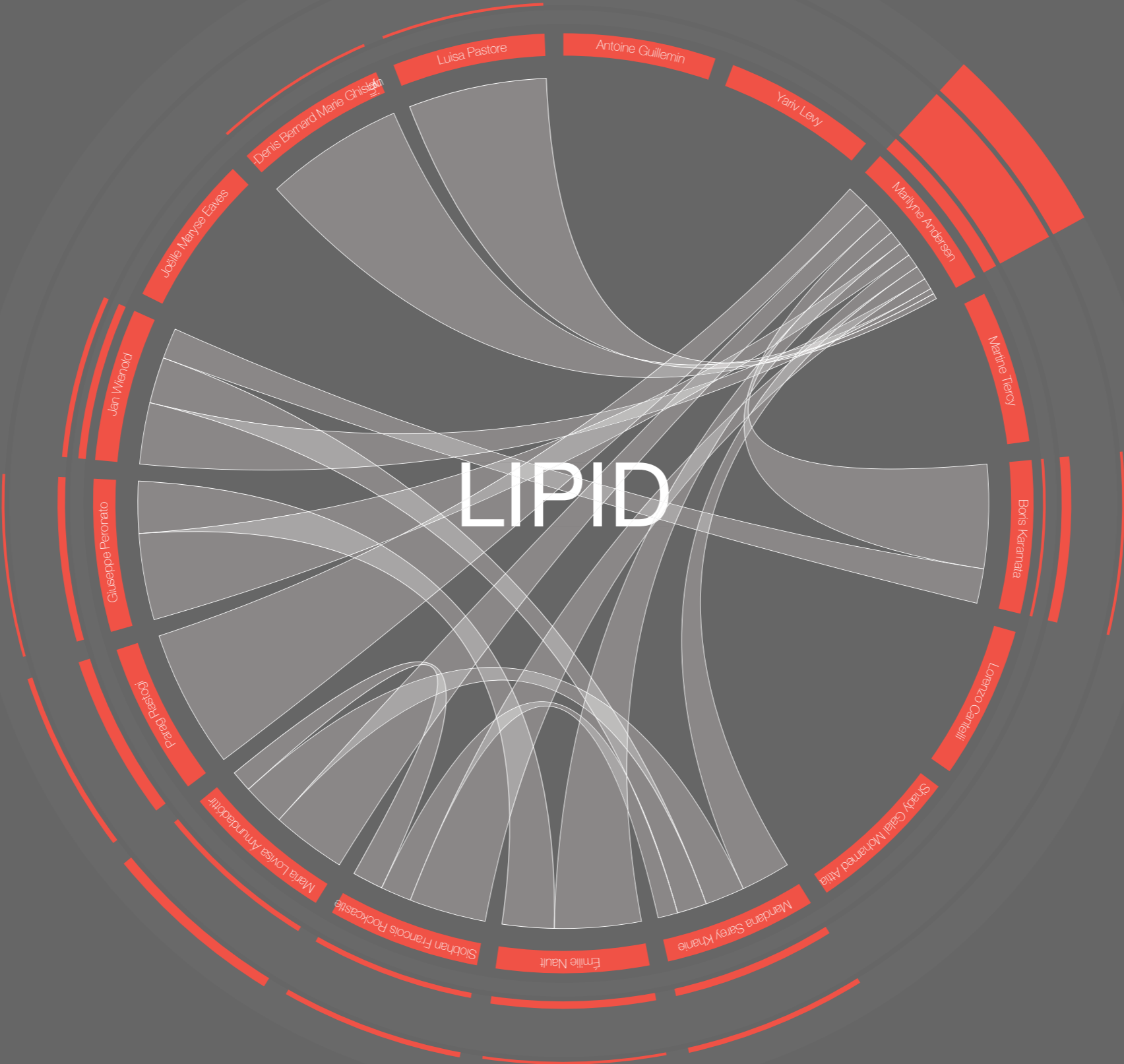
DORM & GRICK (1994)



LIPID



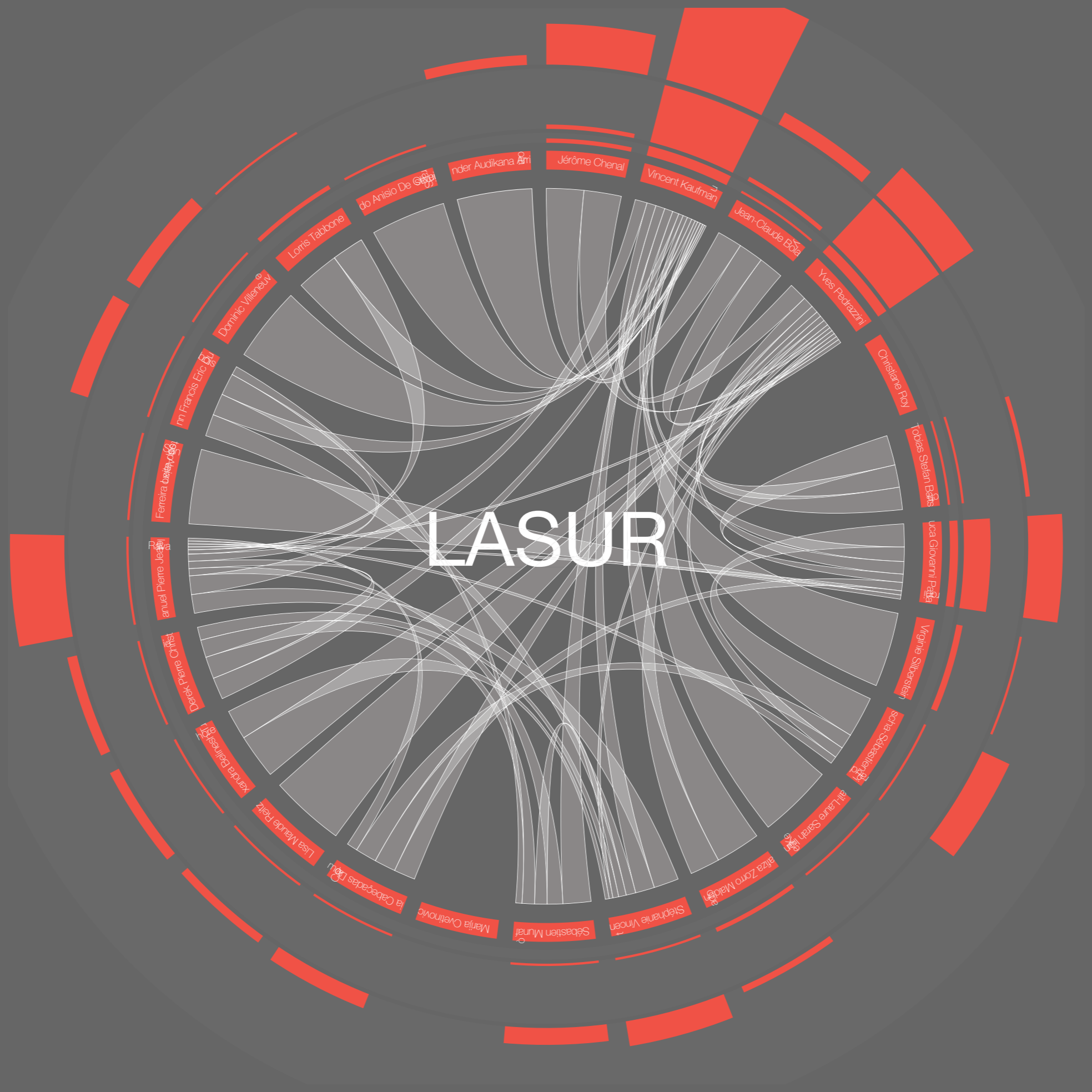
LIPID

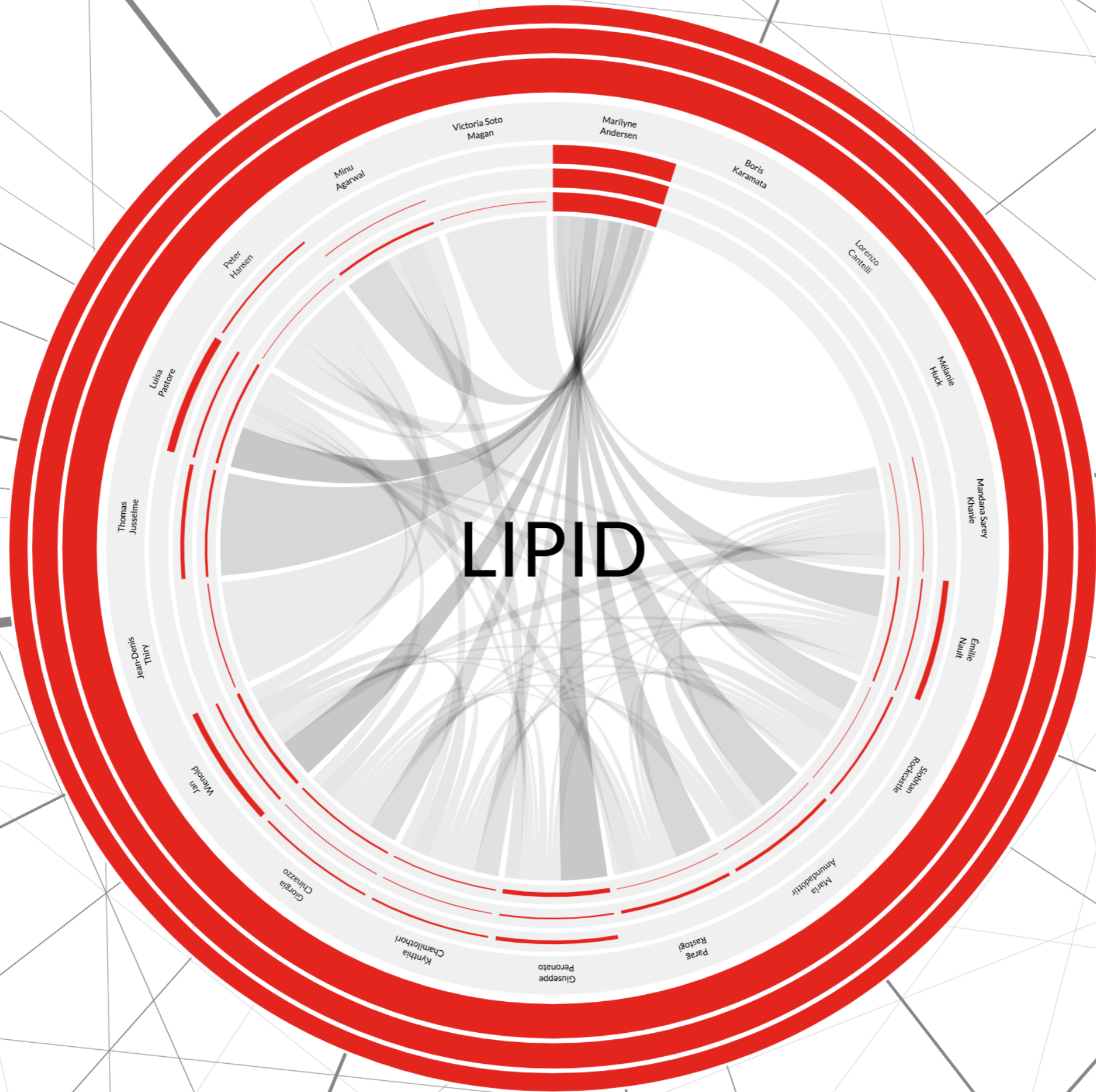


LASIG



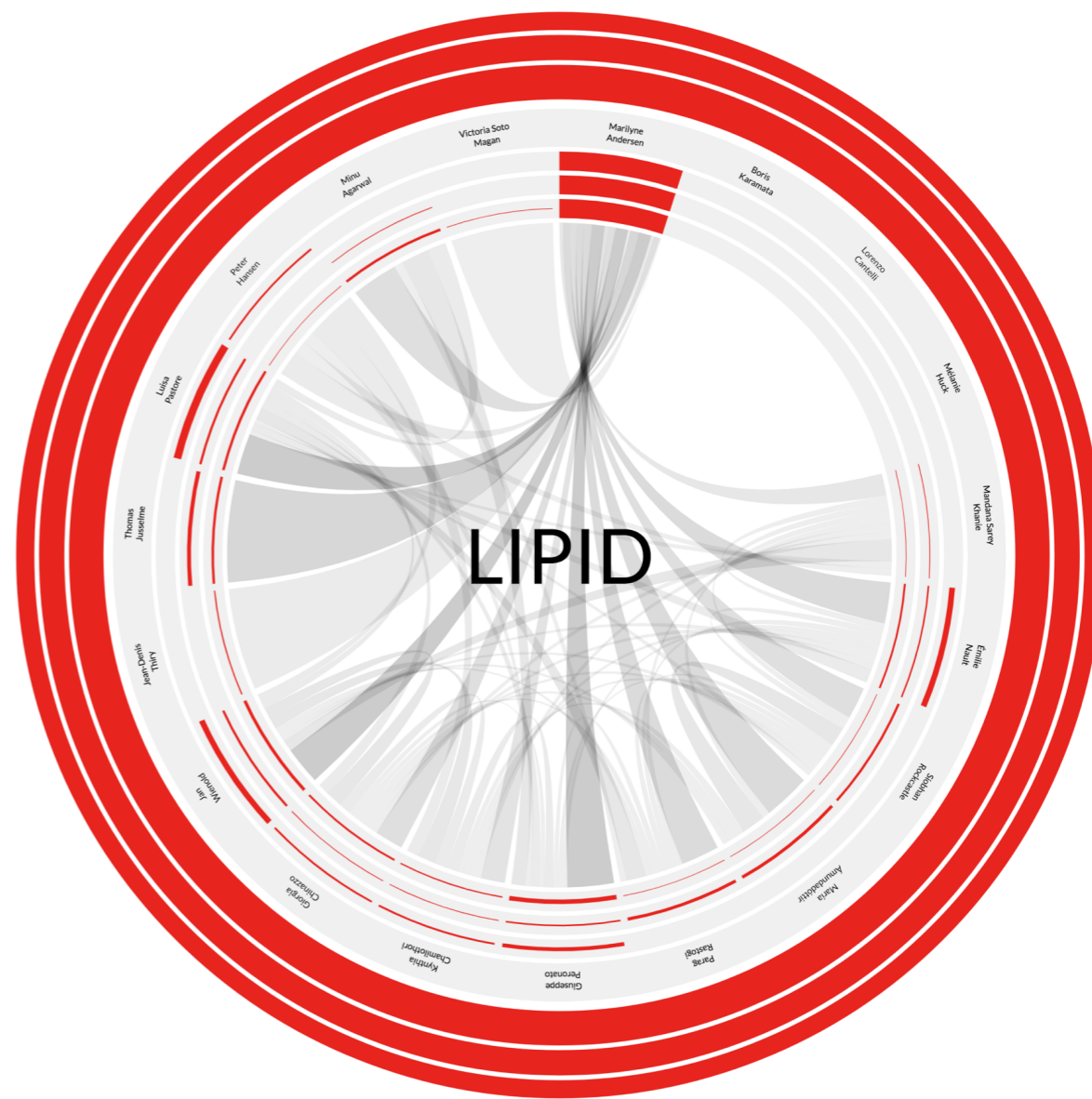
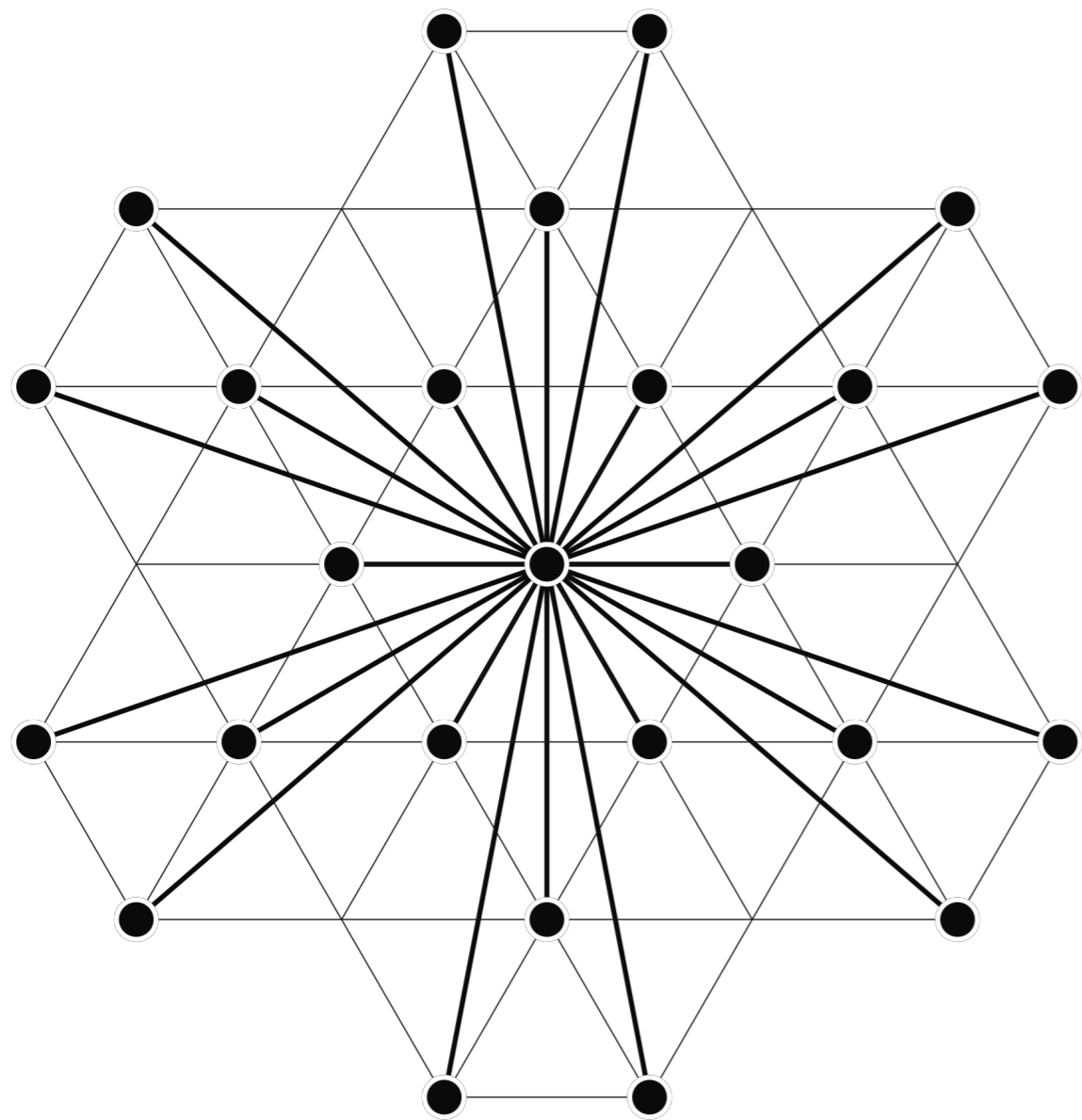
LASUR





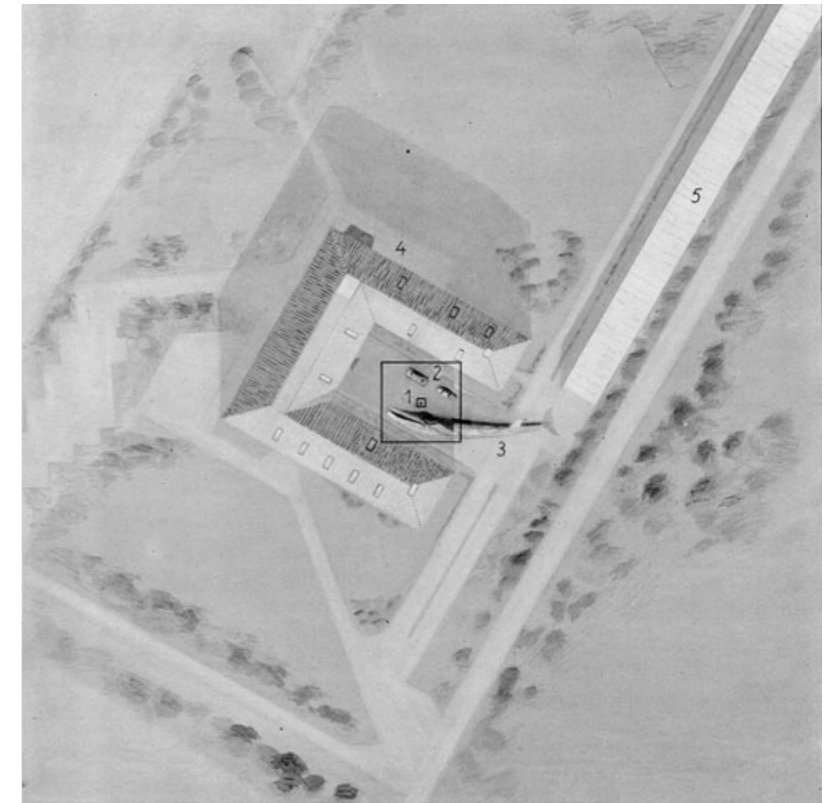
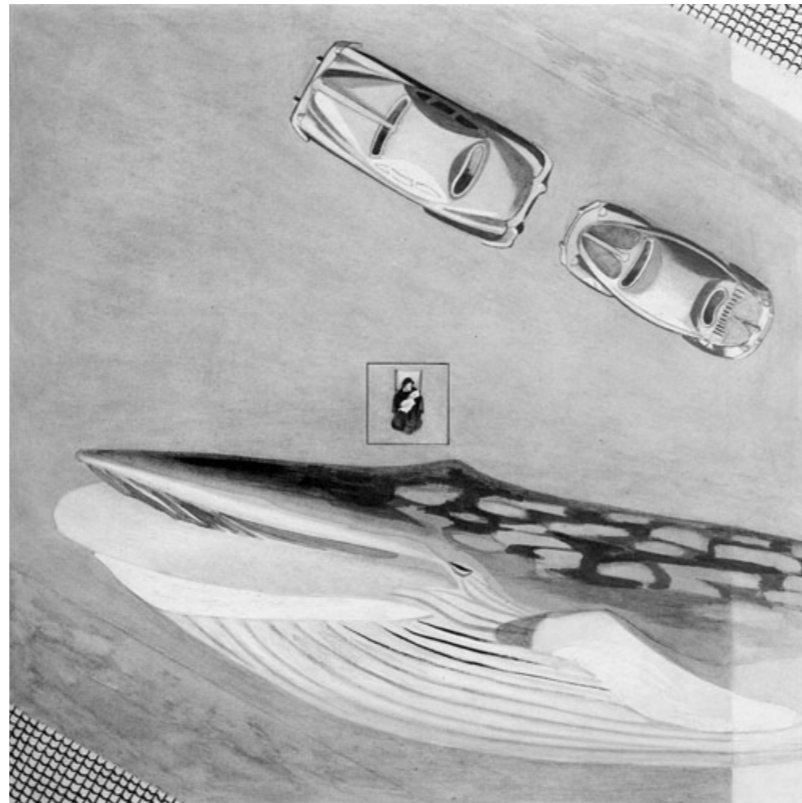
Satellites

intermediary connectivity level



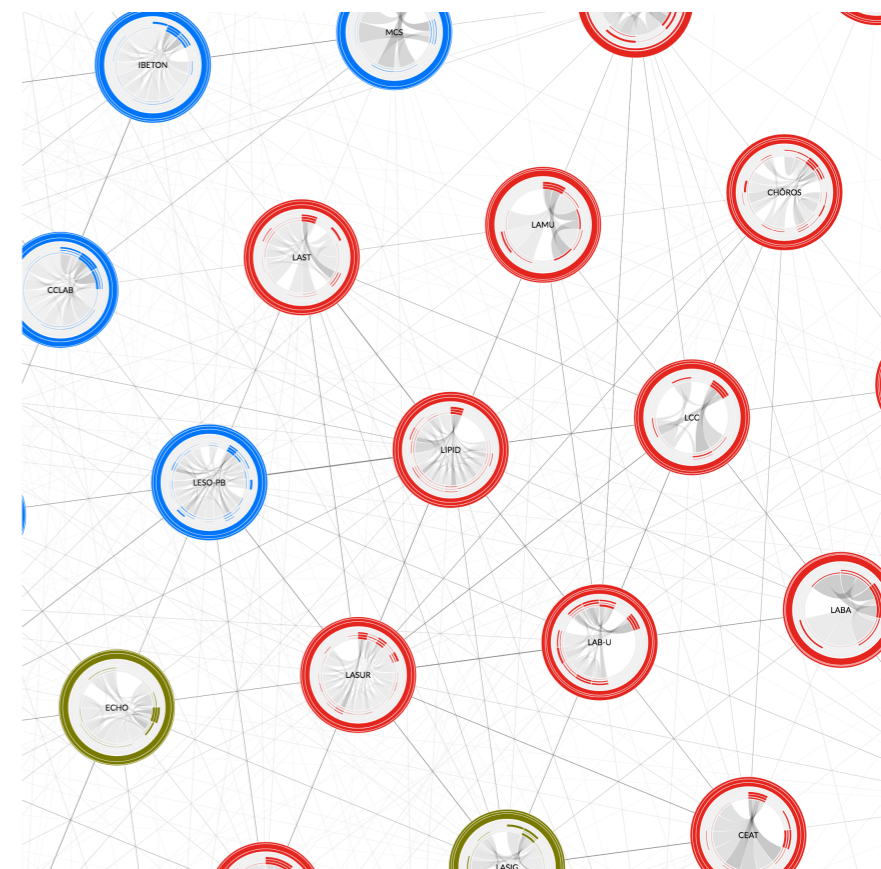
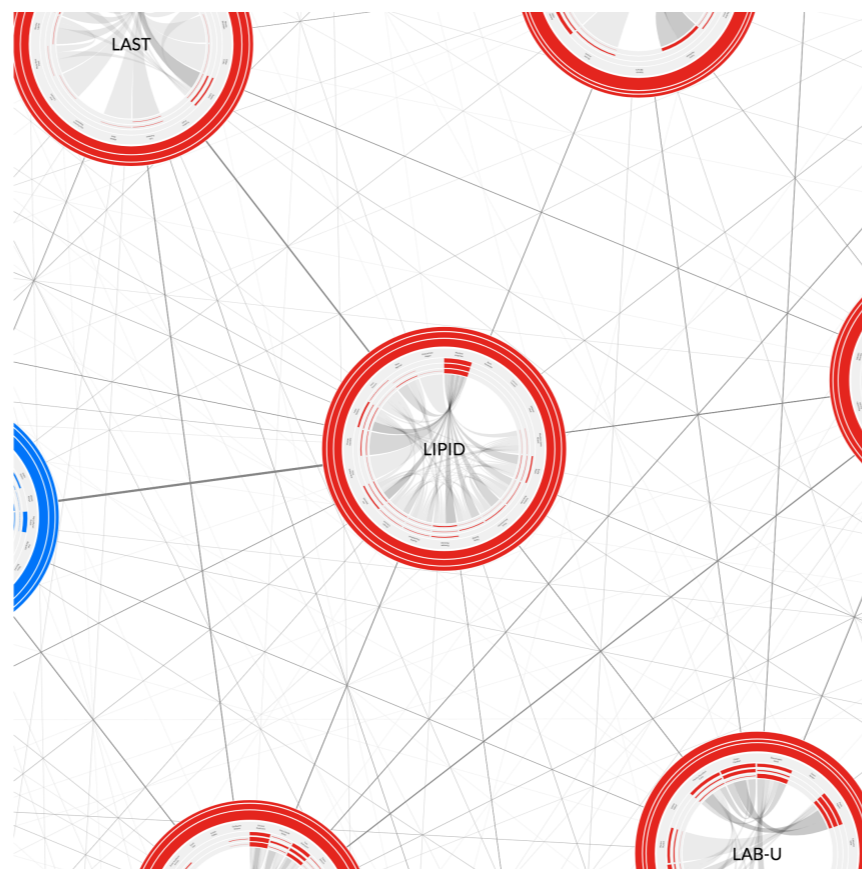
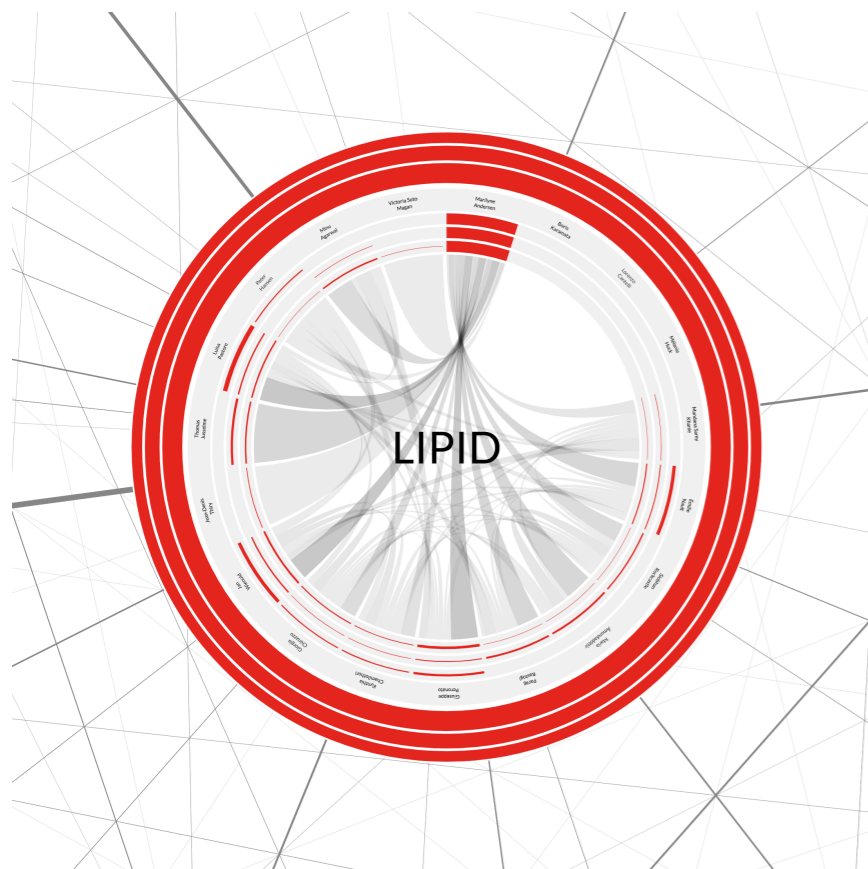
Intermediary level: Meso

“Visual Information-Seeking Mantra: overview first, zoom and filter, then details on demand.”



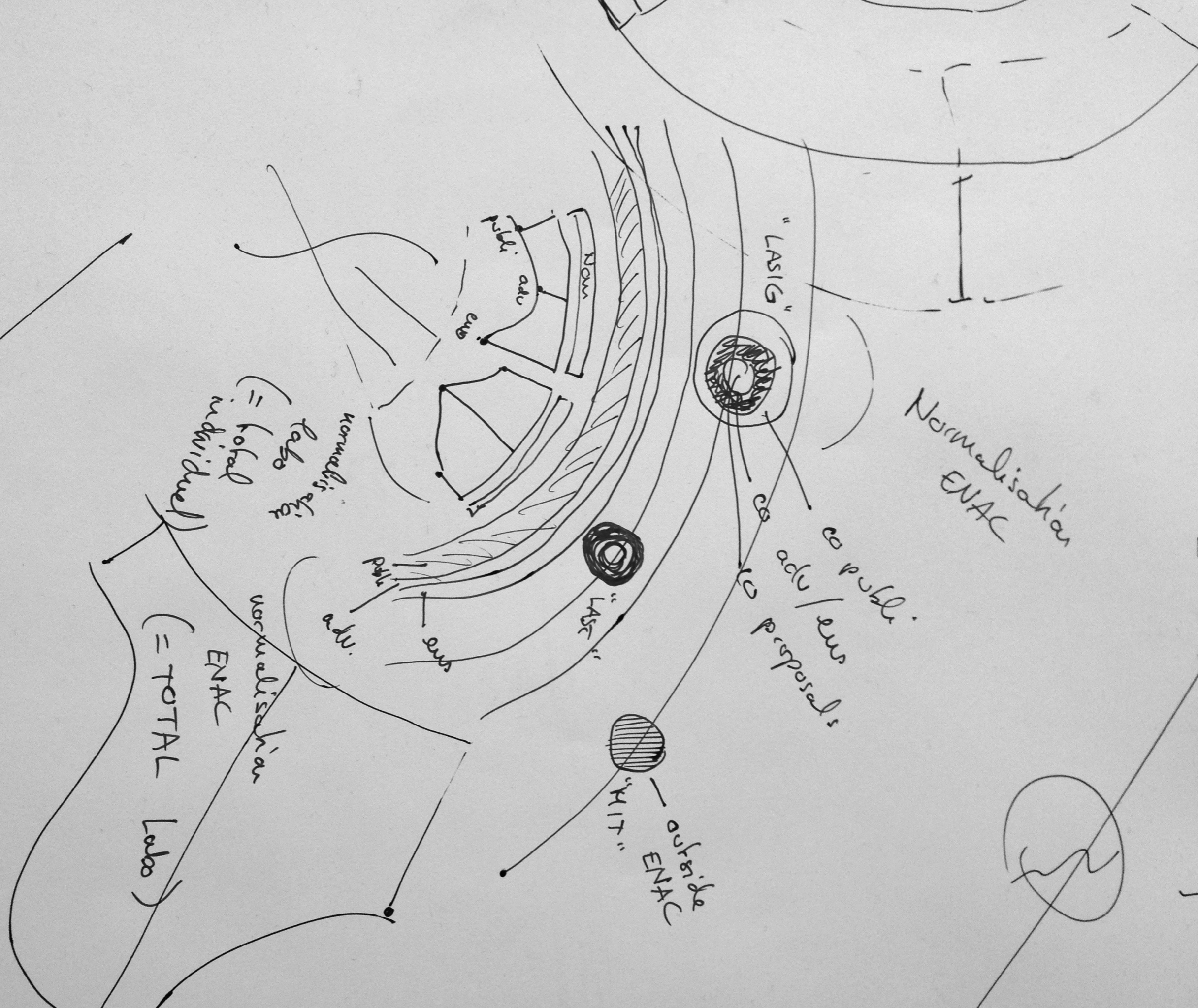
Boeke, Kees. 1957. Cosmic View.

*“In this awesome journey to the ends of the universe, you have learned an immense amount **about its structure and the beings and things** that occupy it, and above all **about the relationships of things** to each other, in their various scales of dimension, with a vividness that words cannot express.”*

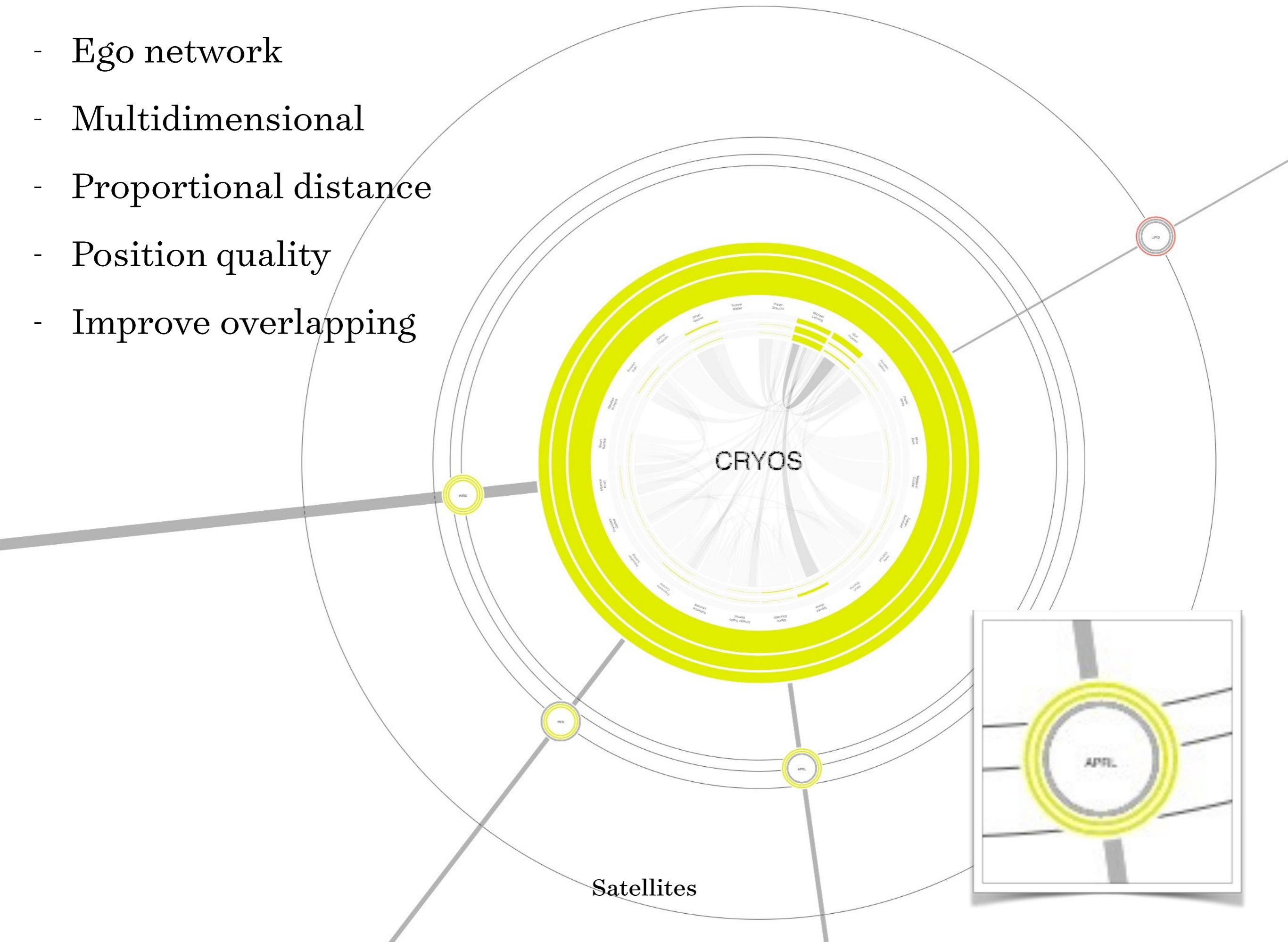


Hexagonal network is unified with the visualizations of the nodes.

*It is incorrect [...] to think that maps [...] prove the reality of the zoom effect: when one shifts from a map on a scale of 1 cm to 1 km to one on 1 cm to 10 km, **the latter does not contain the same information as the former: it contains other information that might (or might not) coincide with what appears in the former.***



- Ego network
- Multidimensional
- Proportional distance
- Position quality
- Improve overlapping



“Micro and macro [...] are really two faces of the same thing”

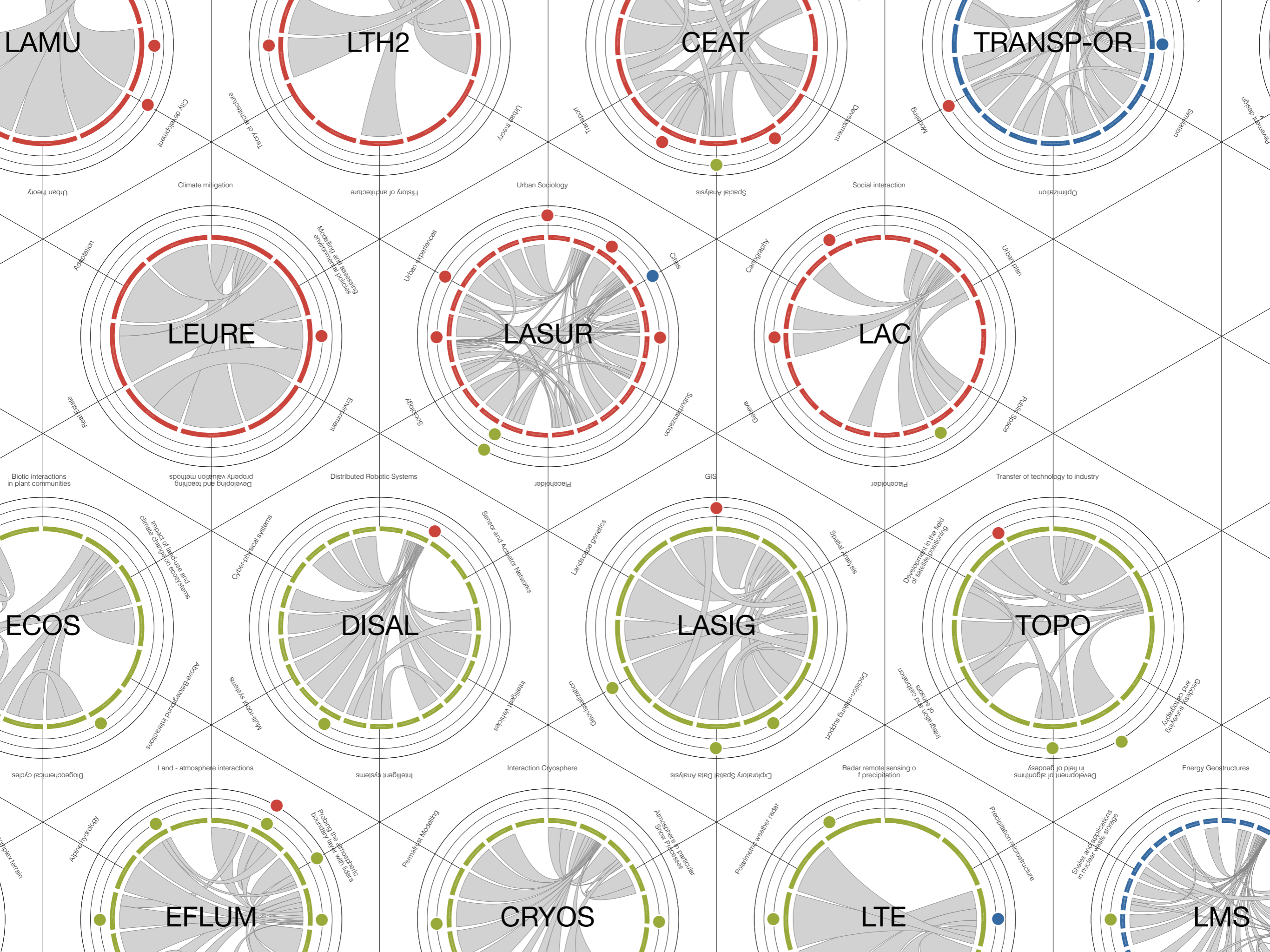
Semantic Background

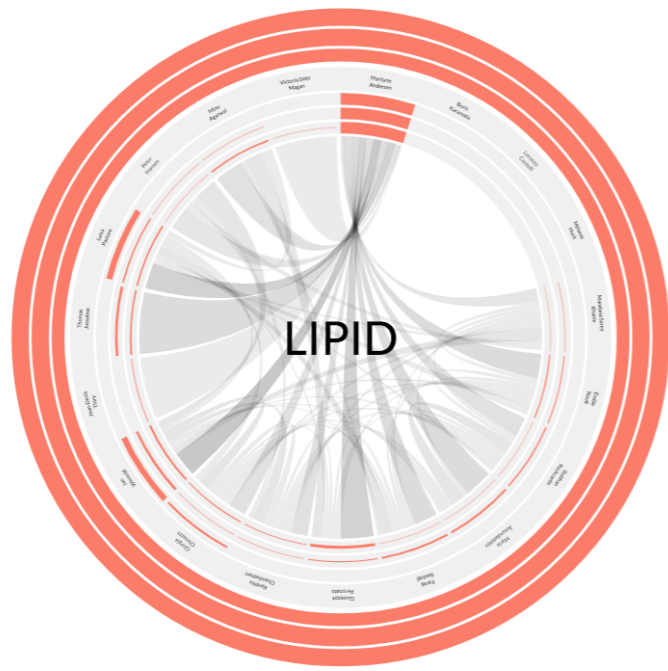
defining potential affinities

“In information retrieval, tf - idf or $TFIDF$, short for term frequency–inverse document frequency, is a numerical statistic that is intended to reflect how important a word is to a document in a collection or corpus.”

— Wikipedia 2018

```
1  [{
2    "id": 53310,
3    "authors": ["Bradley, Joseph", "Loucks, Jeff", "Macaulay, James", "Noronha, Andy", "Wade, Mi
4    "title": "Digital vortex: How digital disruption is redefining industries",
5    "description": "Digital business transformation is a journey to adopt and deploy digital tec
6    "keywords": ["DIGITAL DISRUPTION", "DIGITAL BUSINESS TRANSFORMATION", "DIGITAL VORTEX"],
7    "terms": {
8      "digital": 13.493059996310013,
9      "disruption": 12.672948161851869,
10     "journey": 8.842000017916671,
11     "models": 7.666426688112432,
12     "technologies": 7.558292245571881,
13     "inevitability": 6.030437921392435,
14     "quantifiably": 6.030437921392435,
15     "grasp": 6.030437921392435,
16     "business": 5.884233501463874,
17     "redefining": 5.624972813284271,
18     "overturn": 5.624972813284271,
19     "reshape": 5.624972813284271,
20     "resulting": 5.624972813284271,
21     "step": 5.624972813284271,
22     "deploy": 5.624972813284271,
23     "position": 5.33729074083249,
24     "proposition": 5.33729074083249,
25     "effect": 5.11414718951828,
26     "force": 5.11414718951828
27   }
28 }, {
29   "id": 54016,
```



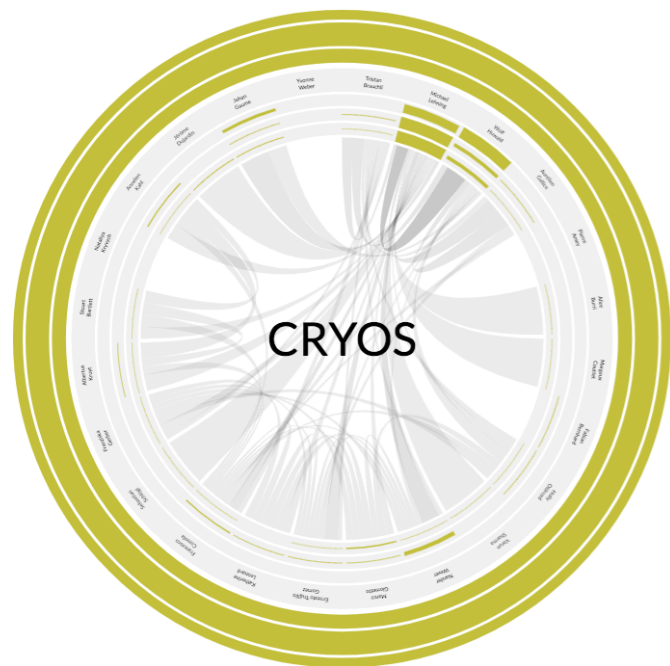


solar
thermal
climate
energy

bipv
solar
energy
buildings
assessment
neighborhood
architectural
irradiation
prototype
workflow
design
urban

Characteristics

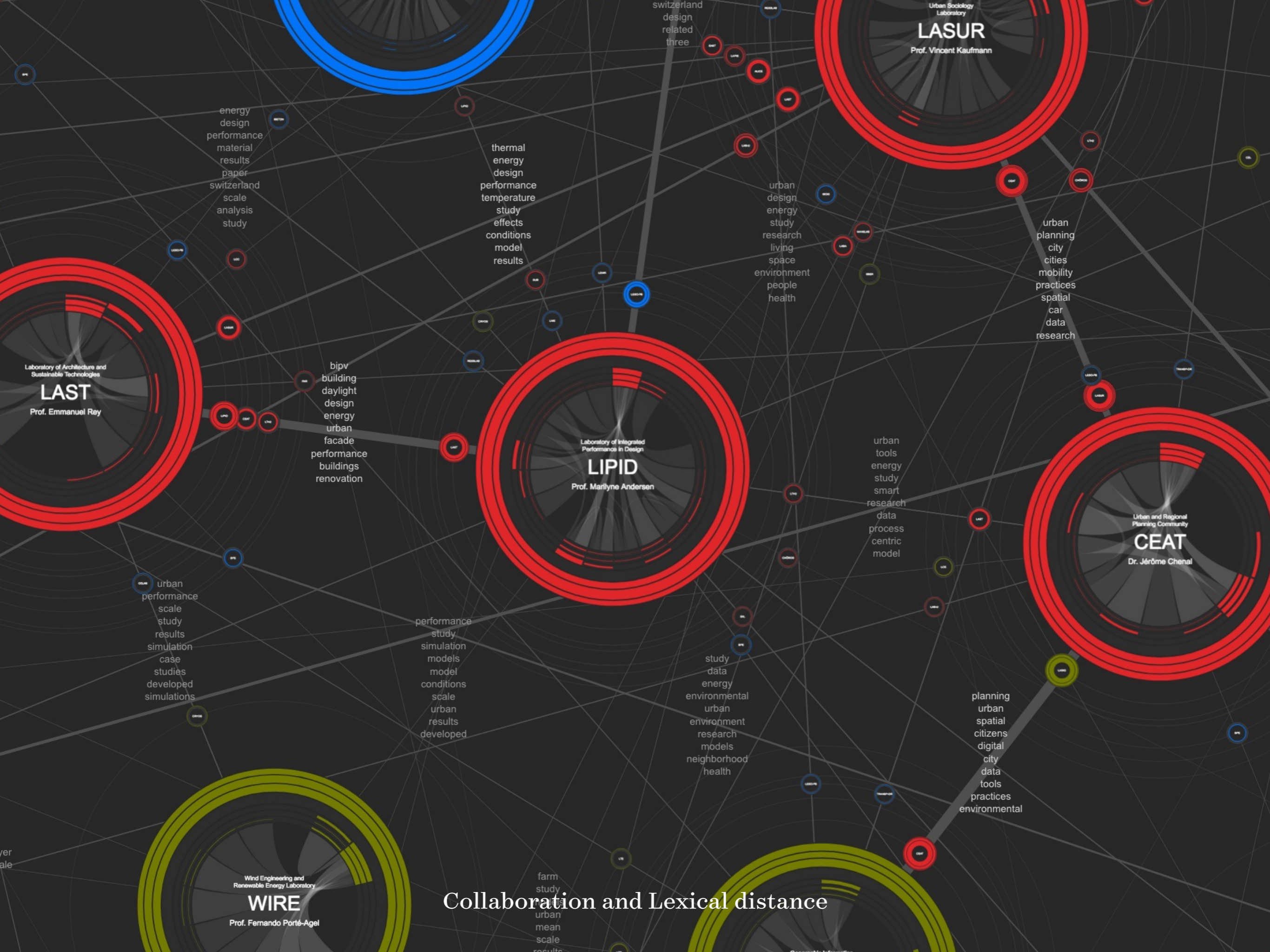
- Use of hexagonal grid
- Justification of closeness
- Semantic layer on links
- Color meaning



solar
energy



Keywords as potential affinities.



Urban Sociology Laboratory
LASUR
 Prof. Vincent Kaufmann

Laboratory of Architecture and Sustainable Technologies
LAST
 Prof. Emmanuel Rey

Laboratory of Integrated Performance in Design
LIPID
 Prof. Marilyne Andersen

Urban and Regional Planning Community
CEAT
 Dr. Jérôme Chenal

Wind Engineering and Renewable Energy Laboratory
WIRE
 Prof. Fernando Porté-Agel

energy design performance material results paper switzerland scale analysis study

thermal energy design performance temperature study effects conditions model results

switzerland design related three

urban design energy study research living space environment people health

urban planning city cities mobility practices spatial car data research

bipv building daylight design energy urban facade performance buildings renovation

urban tools energy study smart research data process centric model

urban performance scale study results simulation case studies developed simulations

performance study simulation models model conditions scale urban results developed

study data energy environmental urban environment research models neighborhood health

planning urban spatial citizens digital city data tools practices environmental

Collaboration and Lexical distance

farm study urban mean scale results

Walkable Visualization











Conclusions

Translation is a process of design

It is reduction and amplification at the same time

It is a collage (remix)

Graphical grammar has to be developed

Readers are curious to see their representation

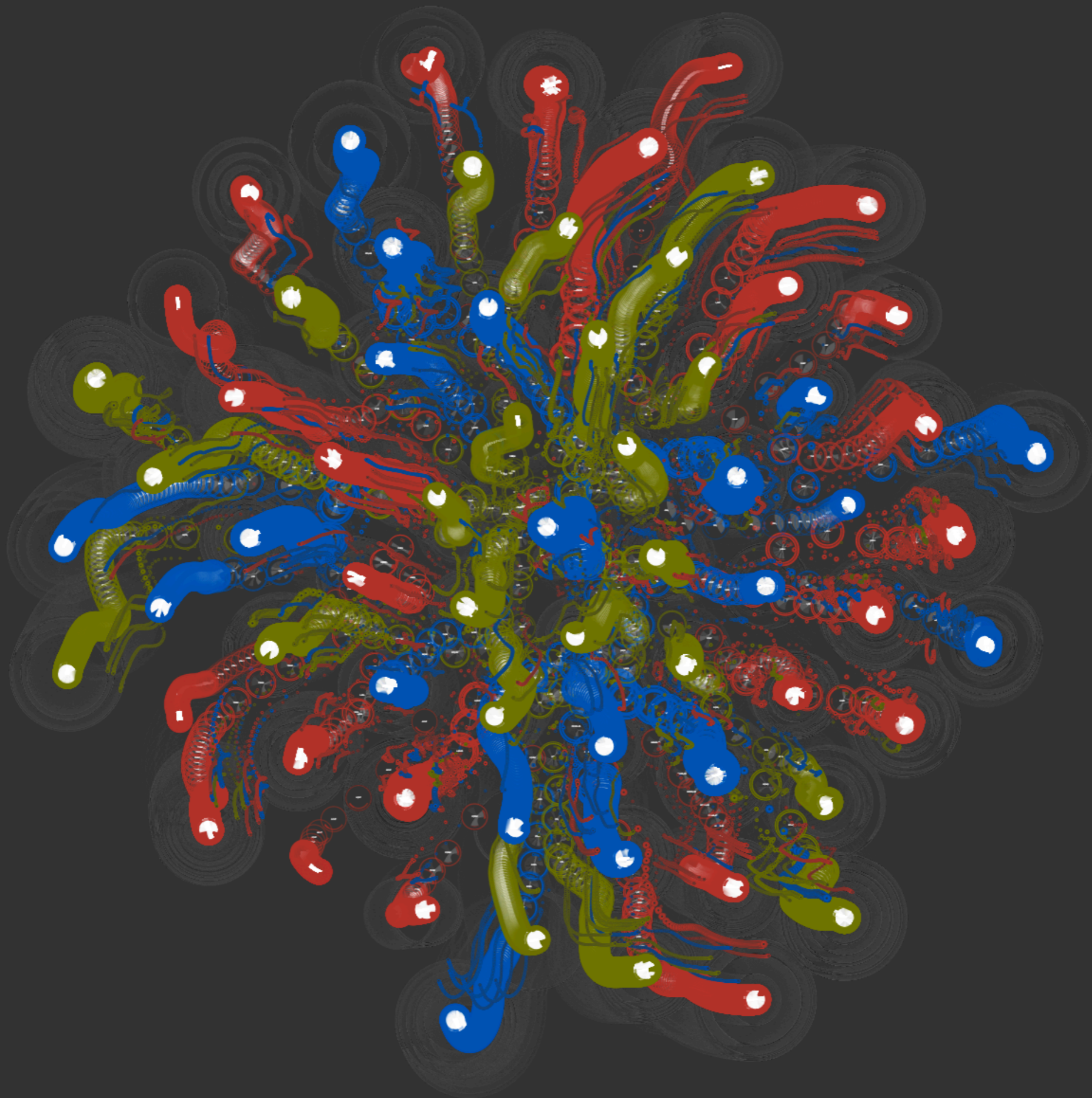
Visualize someone is a delicate task

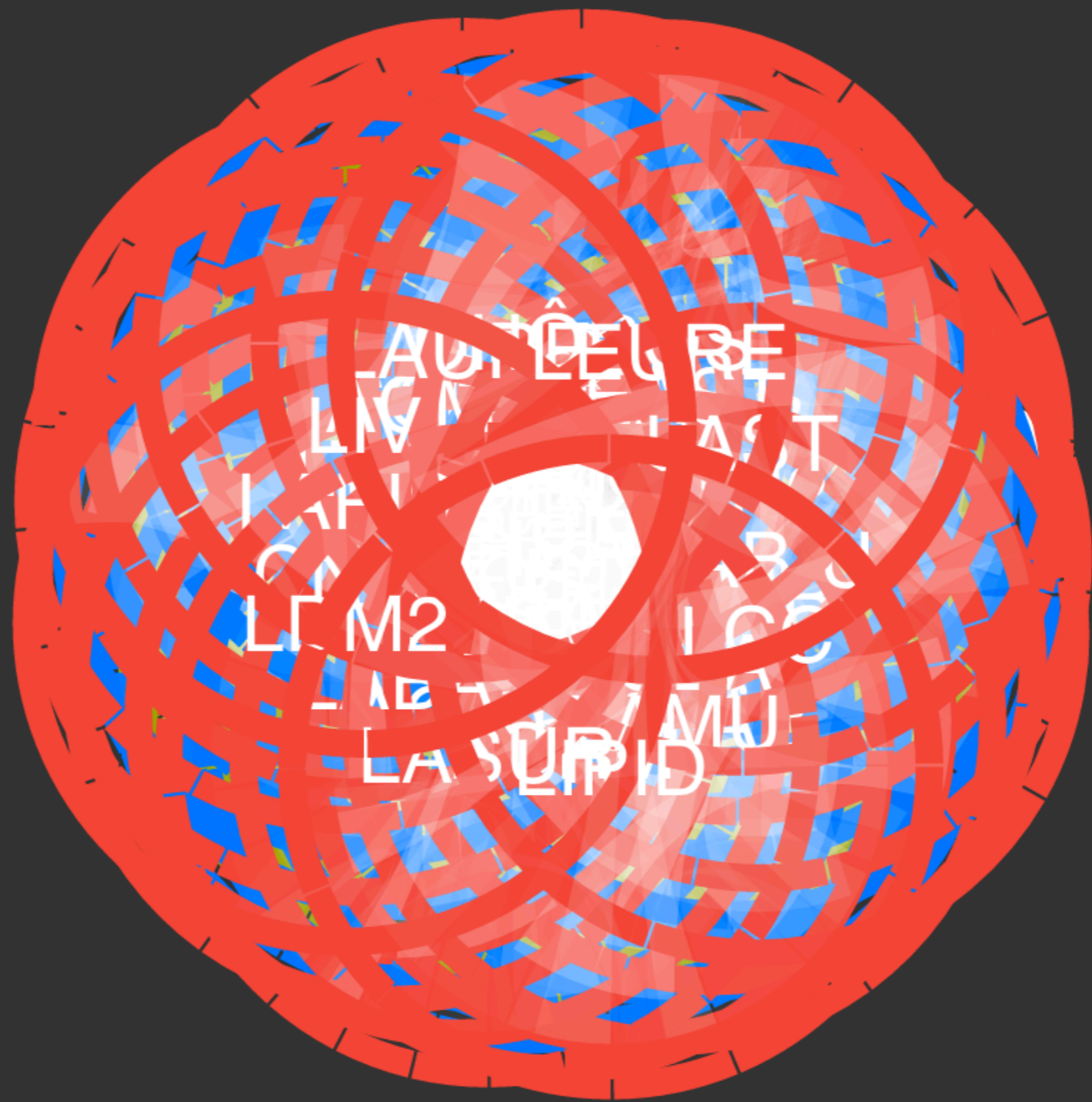
It exists a threshold of privacy

Assembling individuals changes such a threshold

Glitches

inconveniences during programming







LESO-PB



LUD



LMR

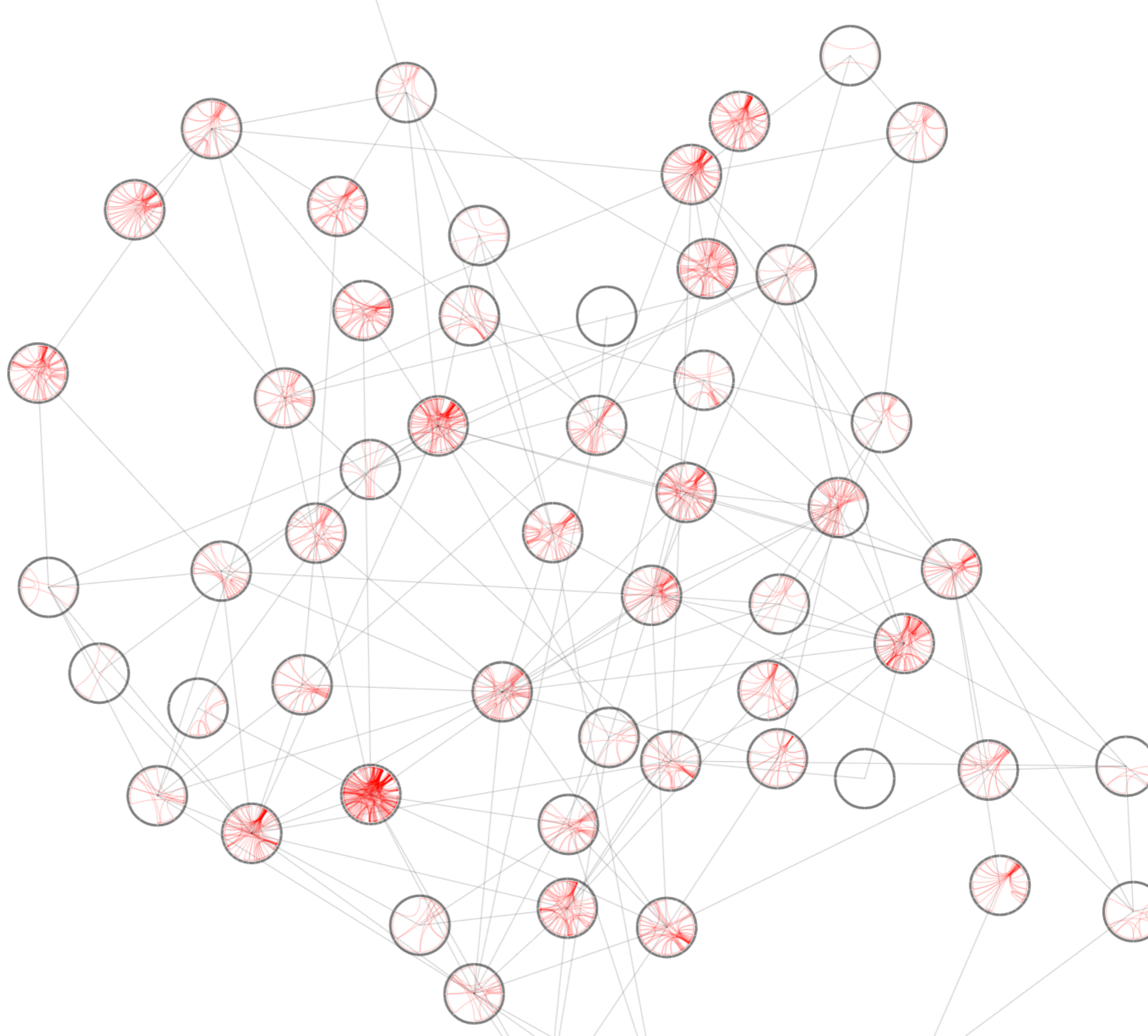
TOX



LBE

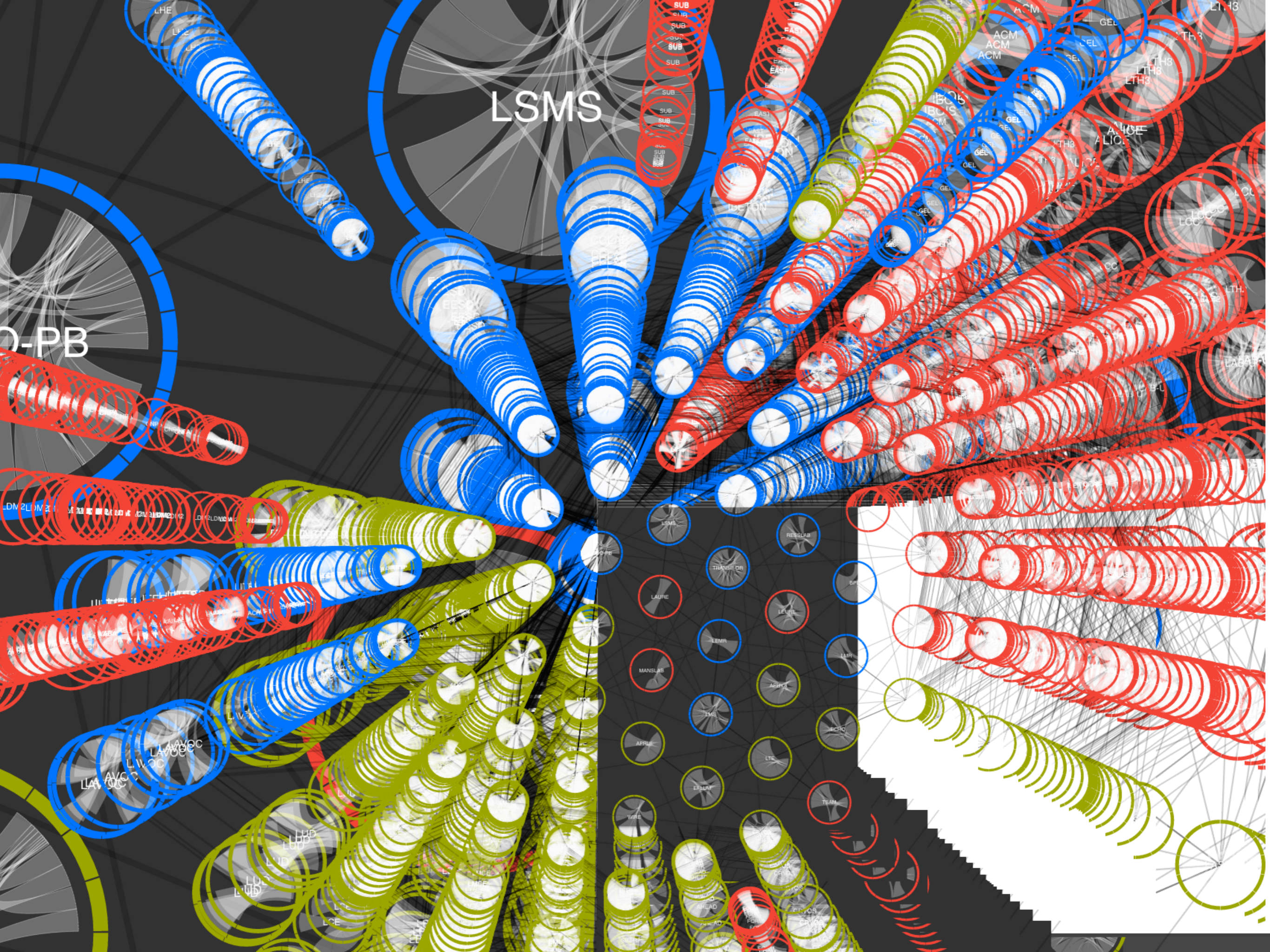


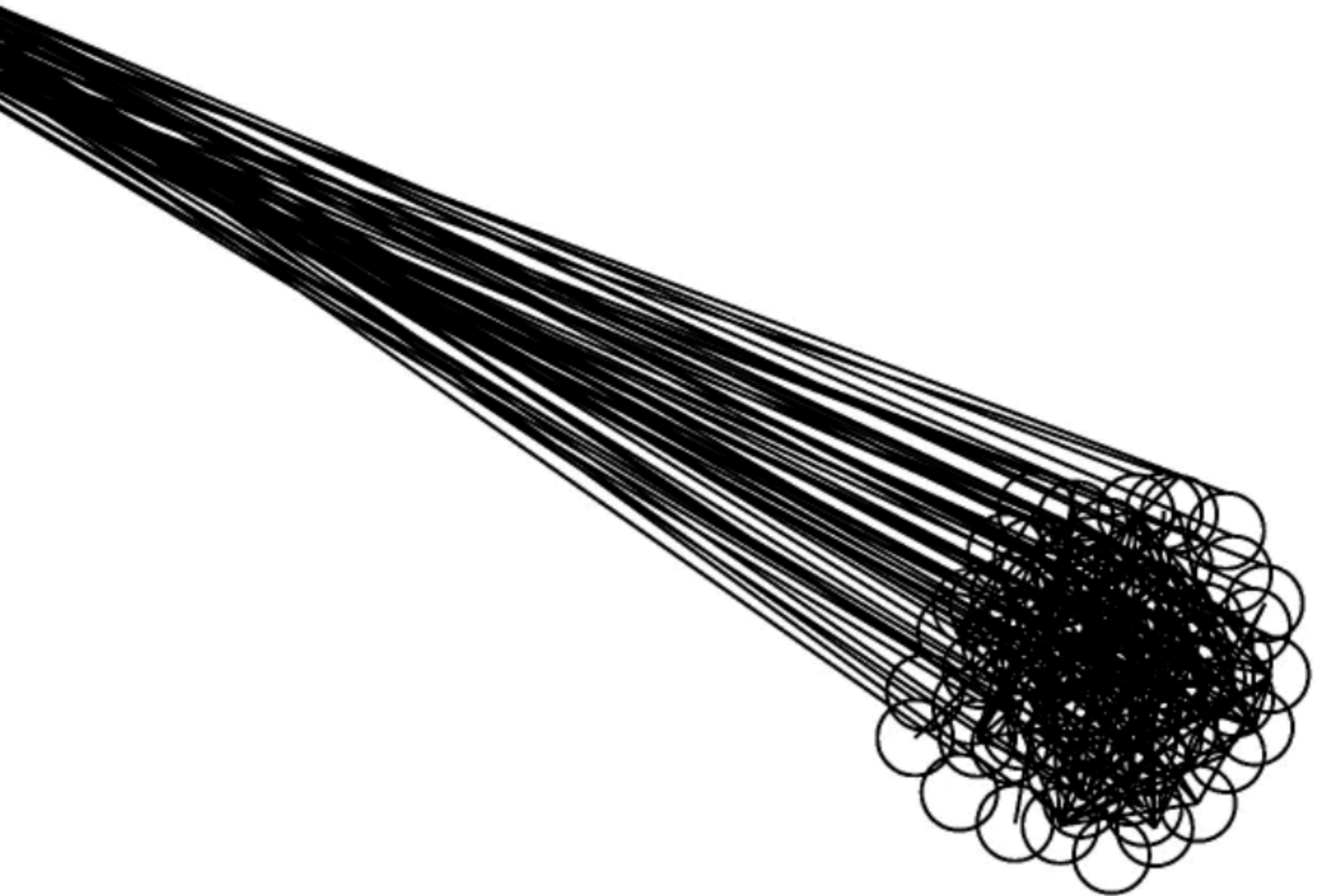
CEL

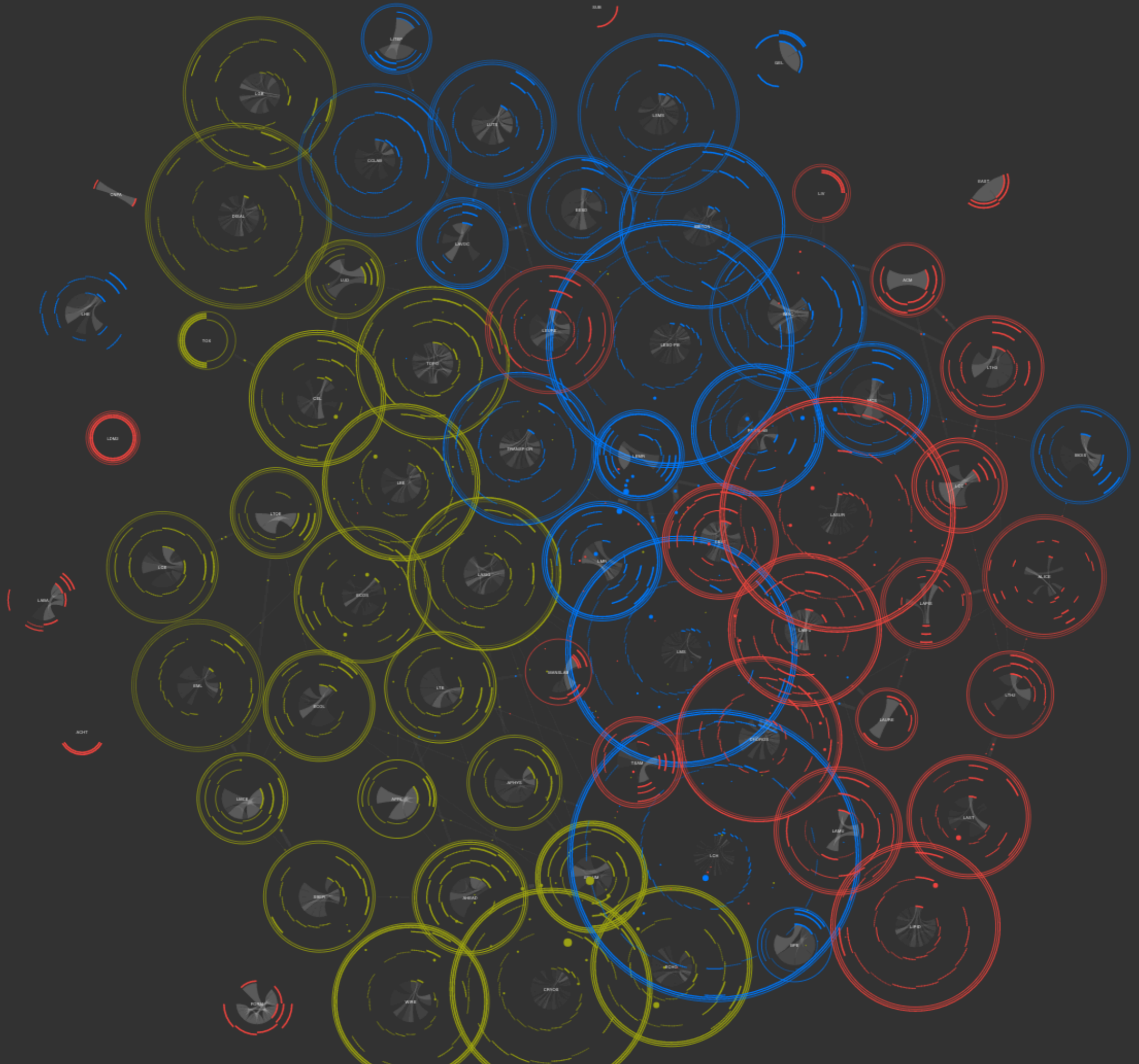


LSMS

D-PB







Thanks

<https://dariorodighiero.com>