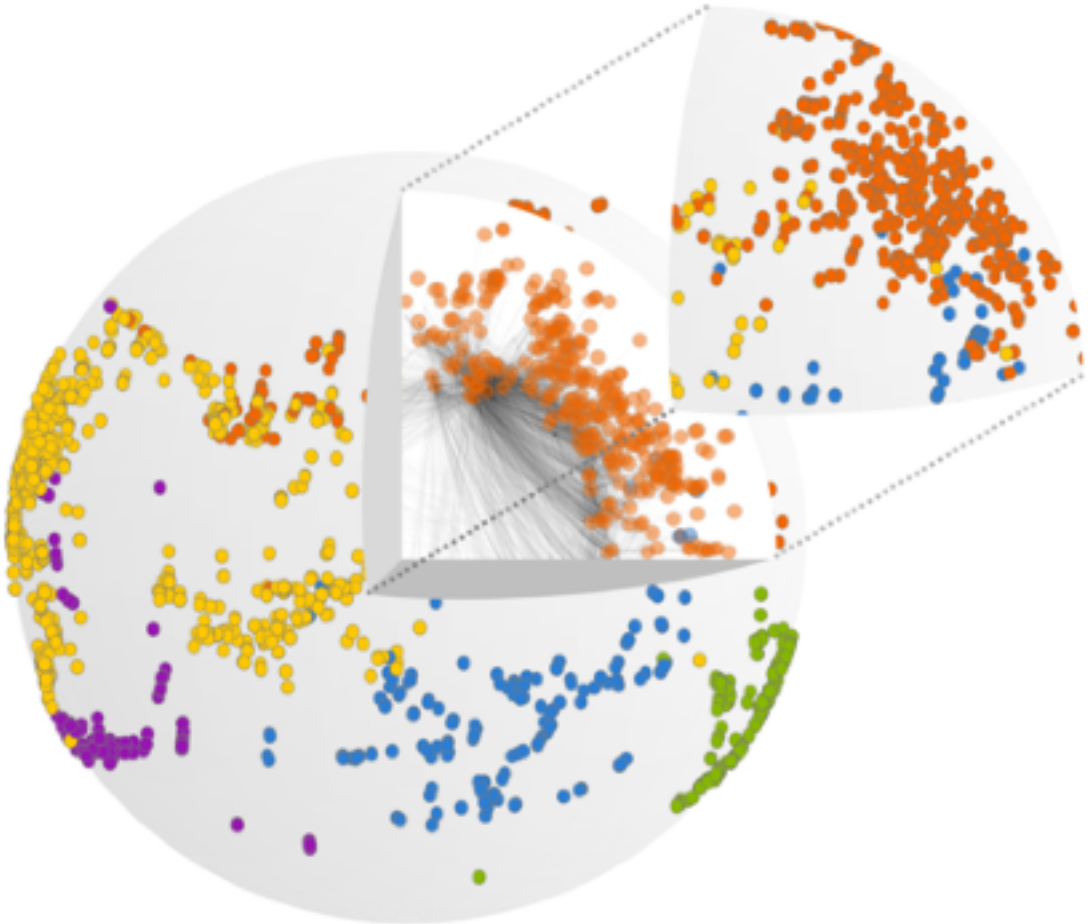
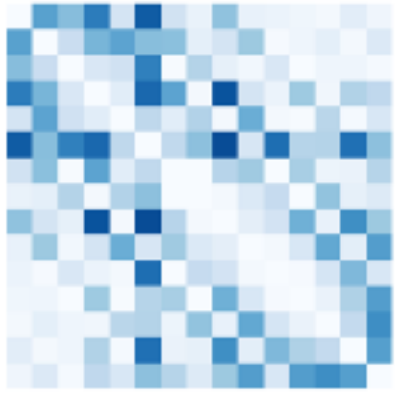
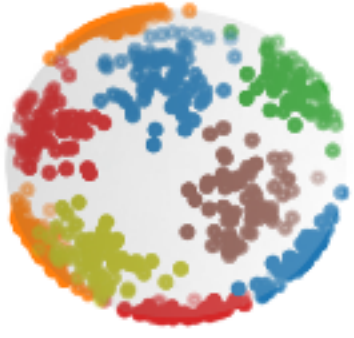
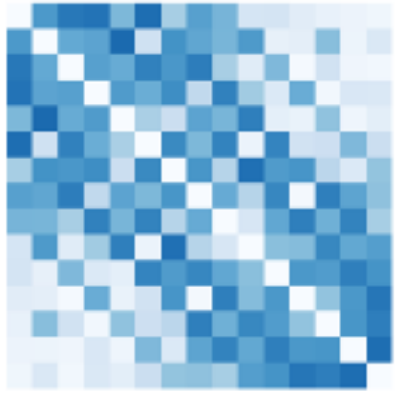
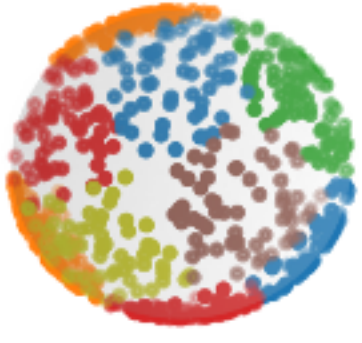
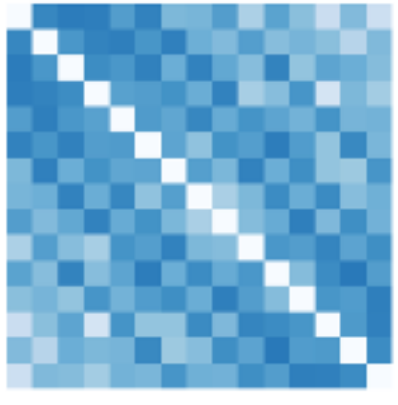
22





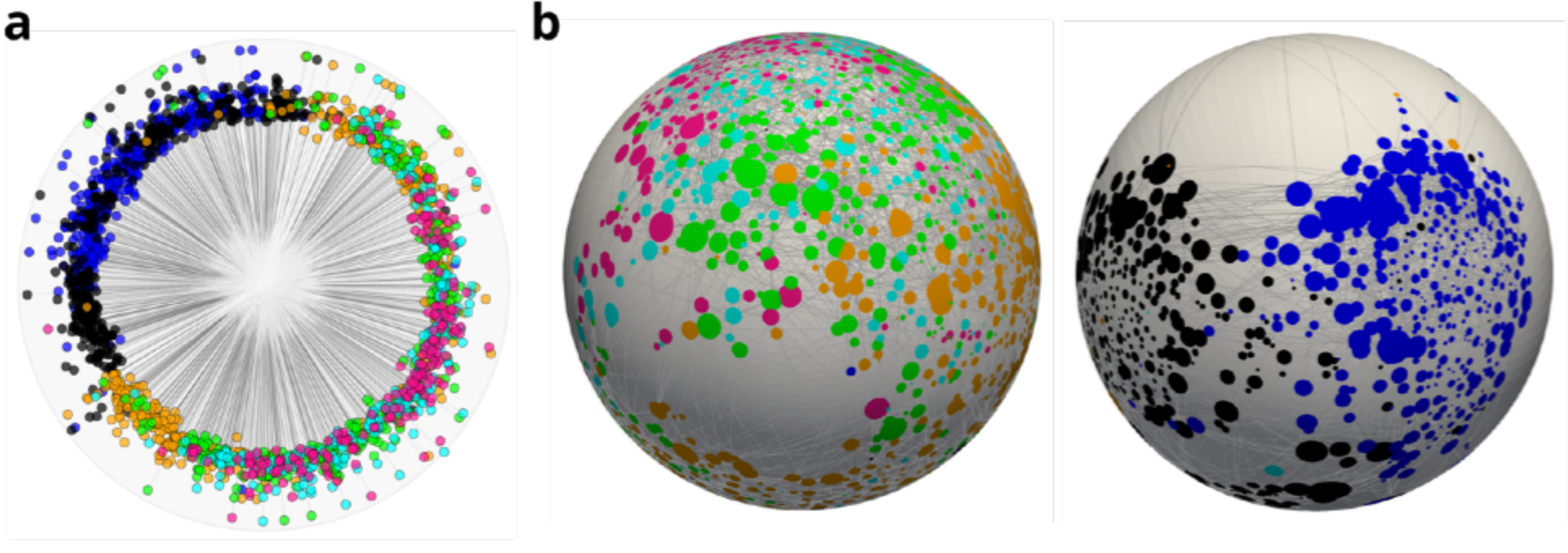




A hyperbolic solution to modular architecture?

The $\mathbb{S}^1/\mathbb{H}^2$ models are easily generalizable to arbitrary dimensions. This *extra space* allows for a rich modular architecture.

The modular architecture of several real complex networks are more naturally represented in more dimension.



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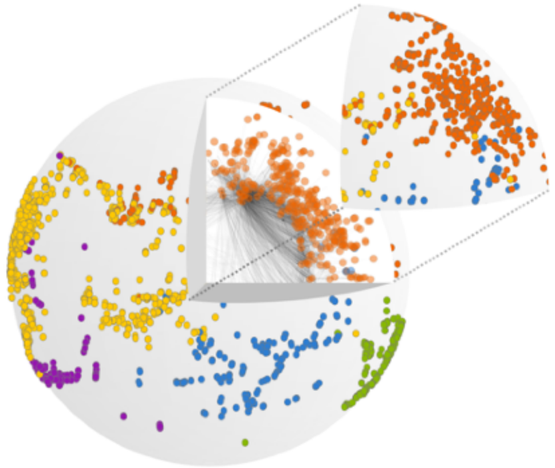

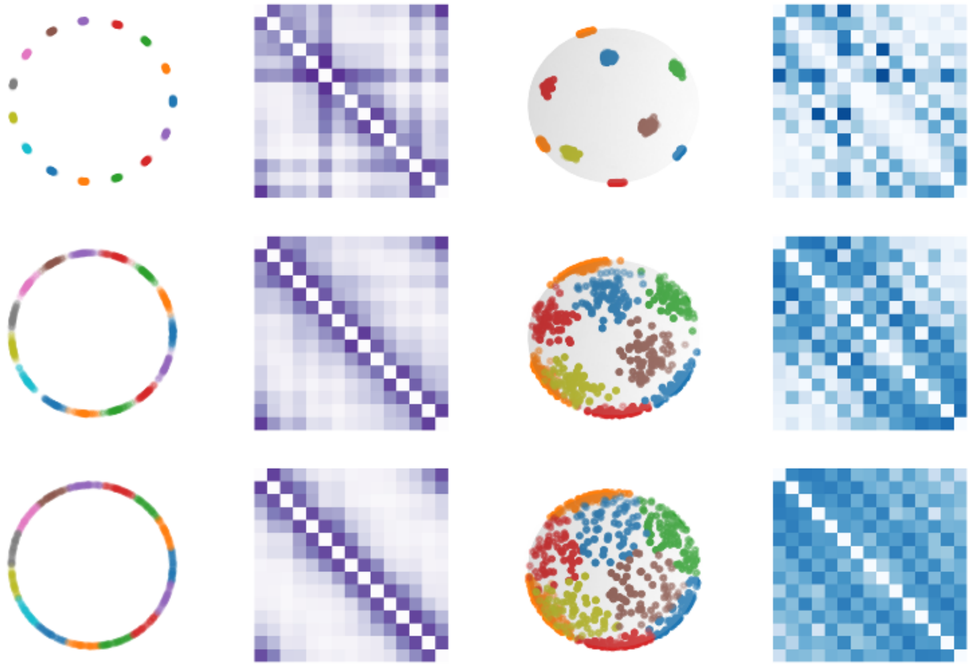

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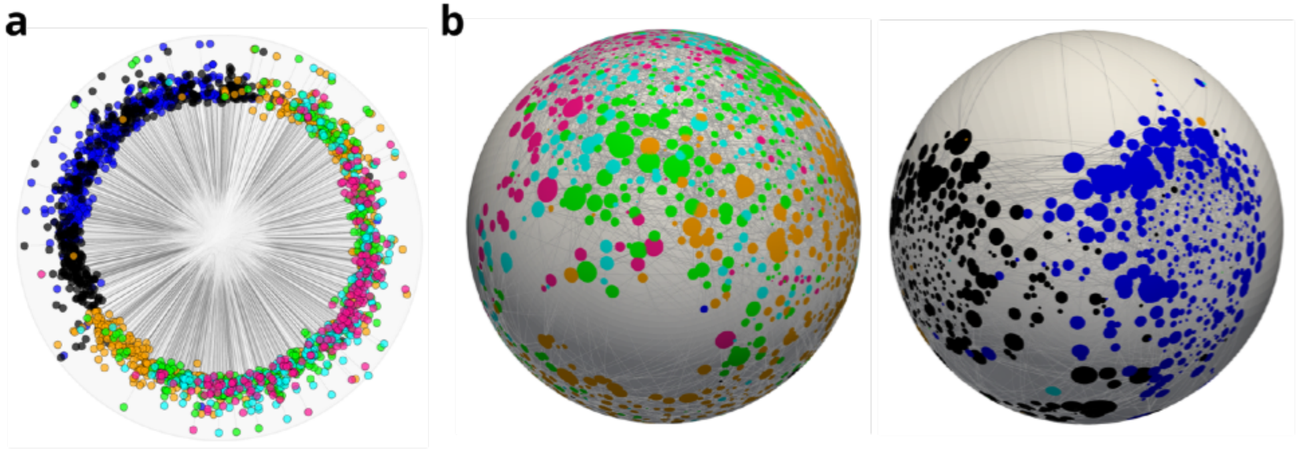
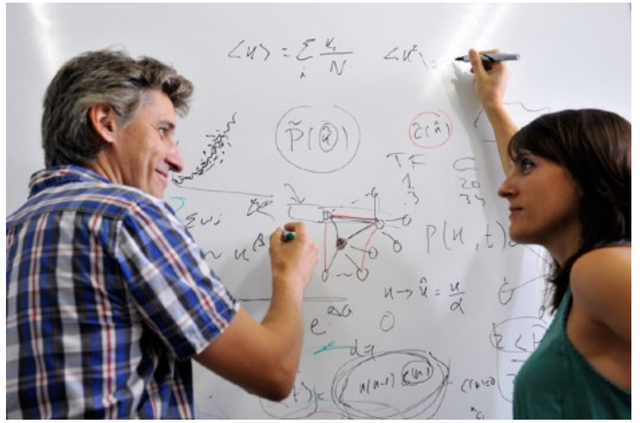


Work done in collaboration with

- Robert Jankowski (U. Barcelona)
- M. Ángeles Serrano (U. Barcelona)
- Marián Boguñá (U. Barcelona)
- Patrick Desrosiers (CERVO Brain Research Centre)
- Béatrice Désy (Victoria University of Wellington)



Further details

- Allard, Serrano & Boguñá, *Geometric description of clustering in directed networks*, Nat. Phys. (in press), arXiv:2302.09055
- Jankowski, Allard, Boguñá & Serrano, *D-Mercator: multidimensional hyperbolic embedding of real networks*, arXiv:2304.06580
- Désy, Desrosiers & Allard, *Dimension matters when modeling network communities in hyperbolic spaces*, PNAS Nexus 2, pgad136 (2023)

- https://github.com/networkgeometry/directed-geometric-networks
- https://github.com/networkgeometry/d-mercator
- https://github.com/bdesy/communities_modelSd

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