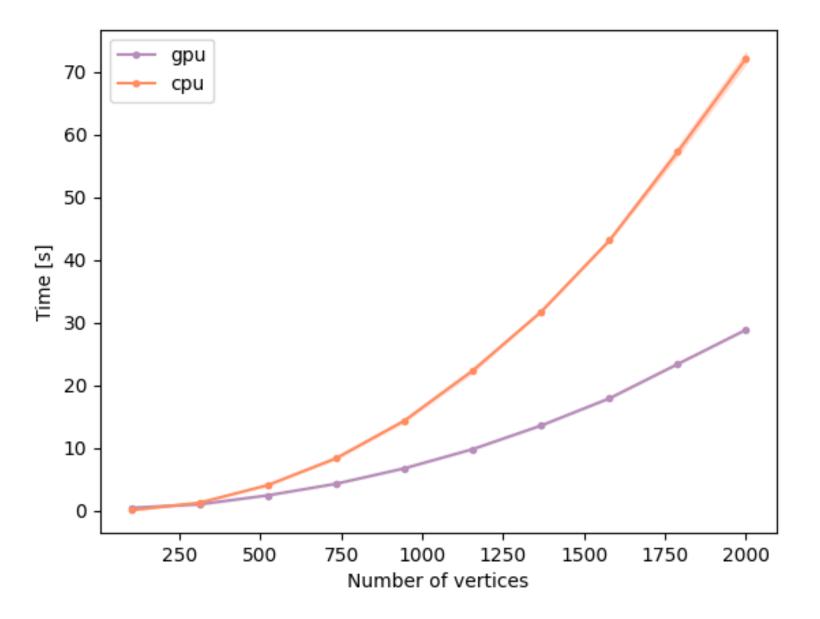
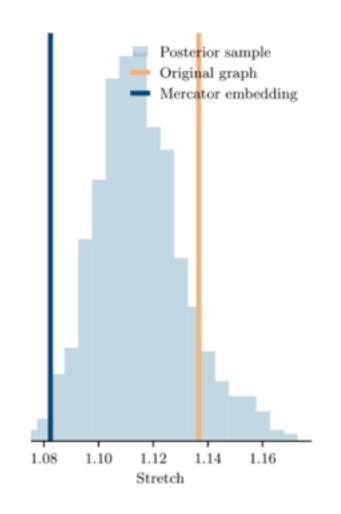
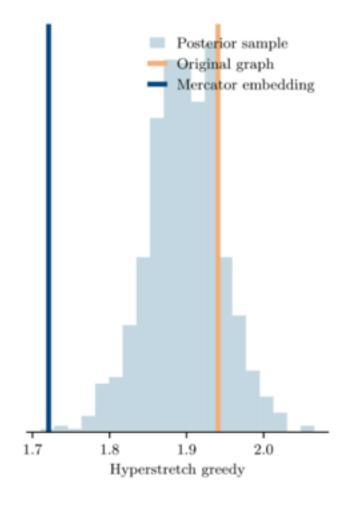
Challenges: some solutions

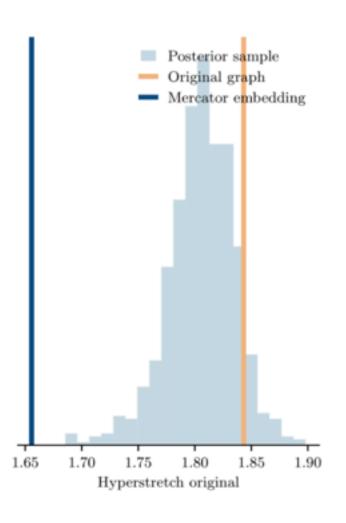
Still slow...

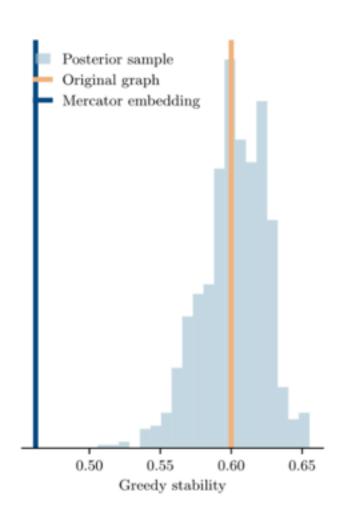


... but we now have uncertainties on graph metrics!

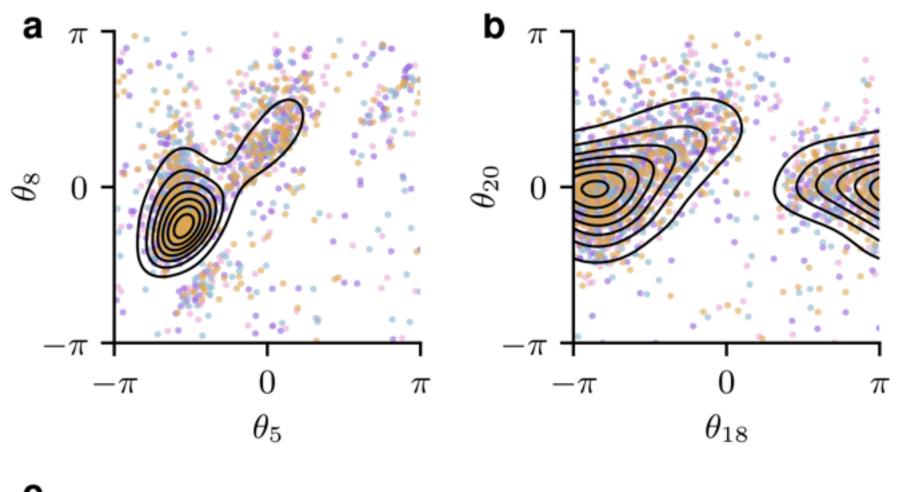


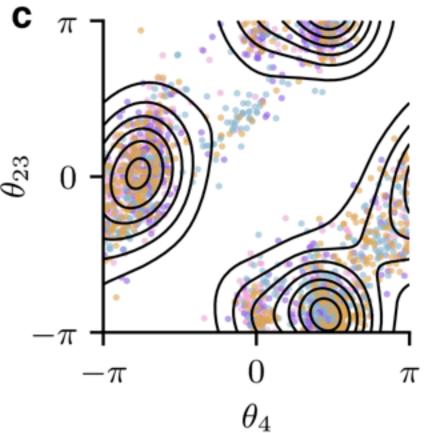






...and these uncertainties are not "trivial" (non-normal).





- Chain 1Chain 2
- Chain 3
- Chain 4

Challenges

- Network geometry is a promising framework, but its applicability relies heavily on our capacity to find high quality embeddings of the original datasets, which is hard.
- ▶ We cannot power our way through this challenge using GPUs or supercomputers: we need to design smarter algorithms.



M. Ángeles Serrano Universitat de Barcelona & ICREA



Jérémi Lesage Université Laval

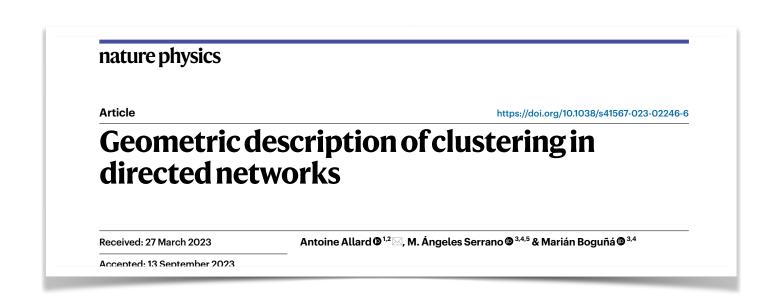
Marián Boguñá Universitat de Barcelona

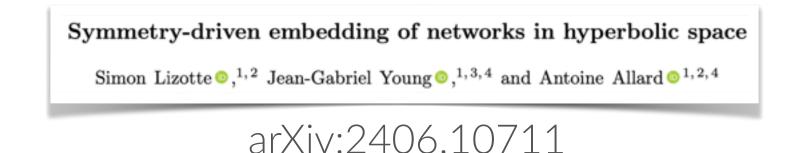


Jean-Gabriel Young University of Vermont

Simon Lizotte Université Laval







Hyperbolic Embedding of Directed Networks

Jérémi Lesage, M. Ángeles Serrano, Marián Boguñá and Antoine Allard

Preprint on arXiv expected early 2025