

Outro

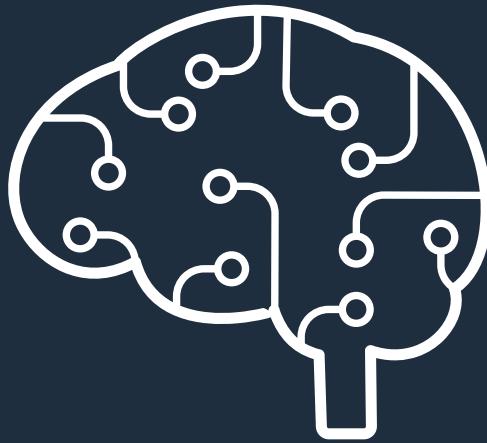


Dimensionality Reduction

Speaker: Waragon Phusuwan

Session: Outro

Module : Dimensionality Reduction



Speaker

Waragon Phusuwan

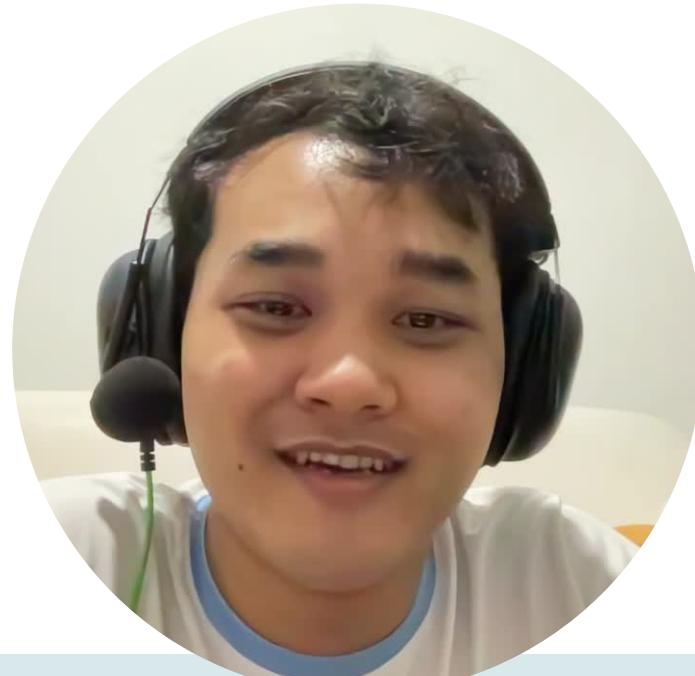
B.Sc. Physics
Chulalongkorn University

CCCN
Cognitive Clinical and Computational Neuroscience lab



Class summary

- Principal Component Analysis
- Uniform Manifold Approximation and Projection (UMAP)
- t-distributed Stochastic Neighbor Embedding (t-SNE)
- Potential of Heat-diffusion for Affinity-based Trajectory Embedding (PHATE)

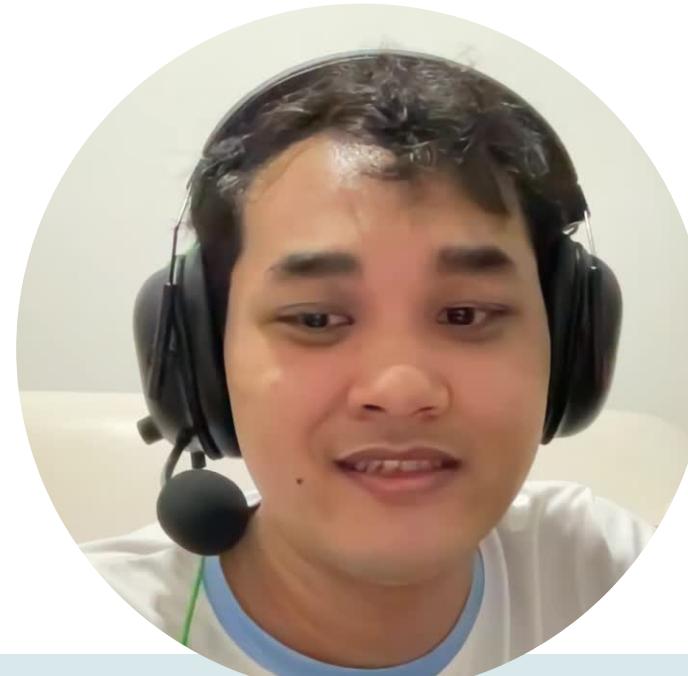


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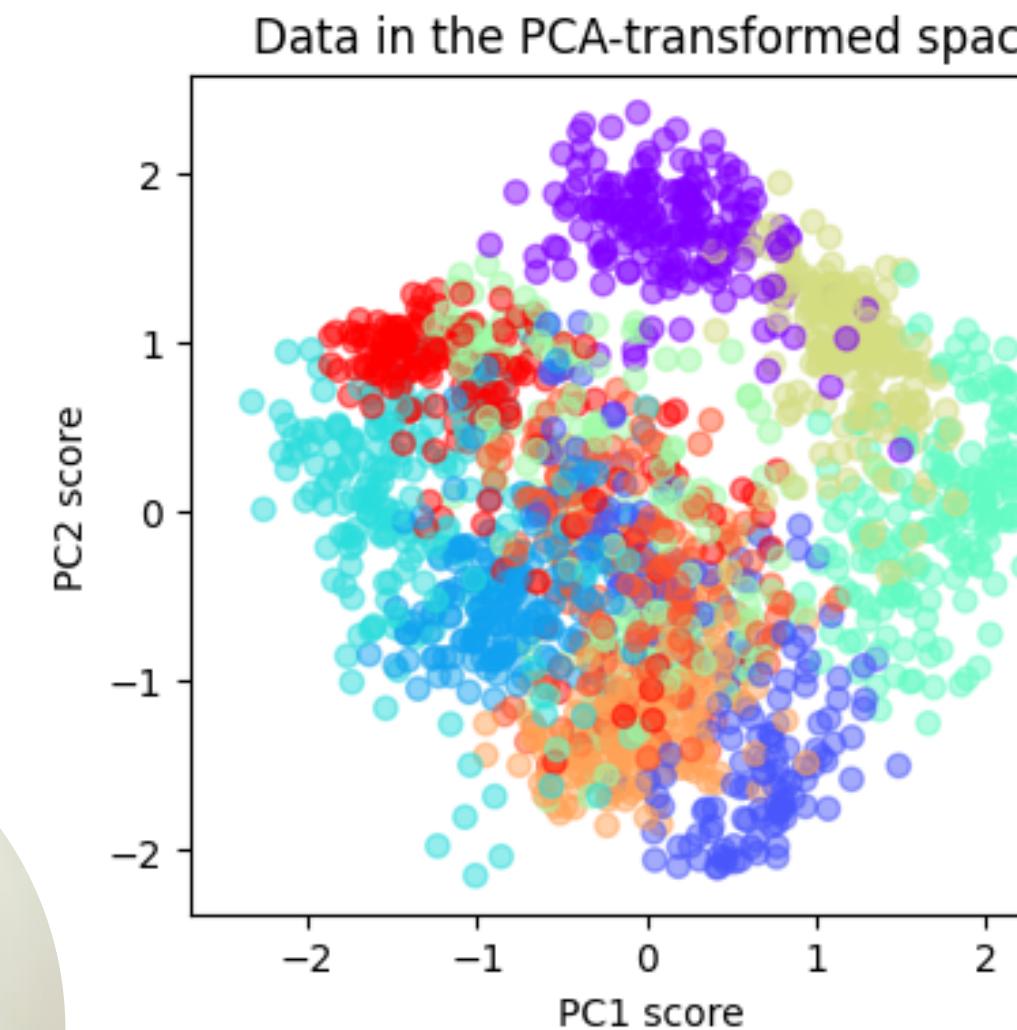
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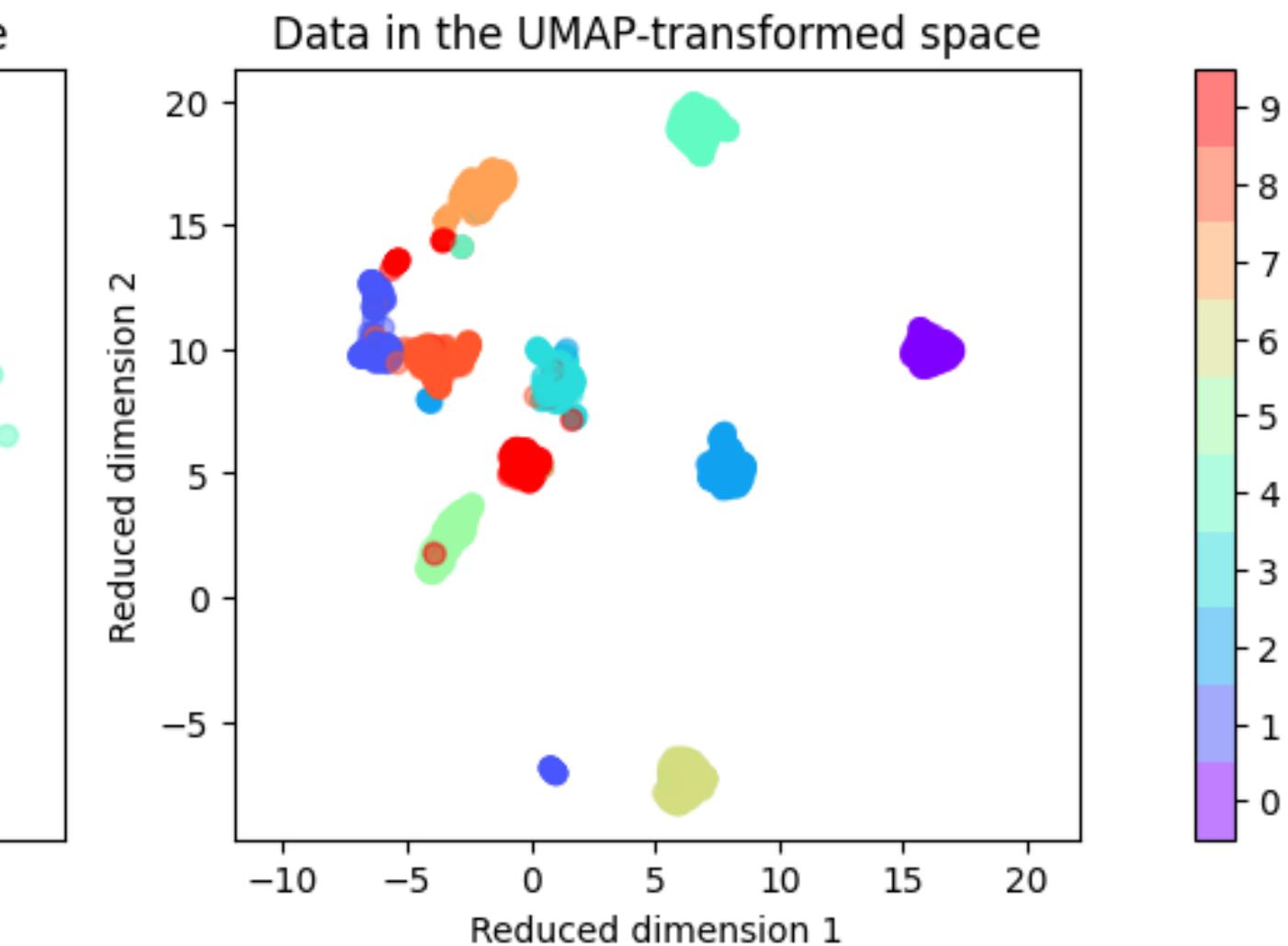
Class summary



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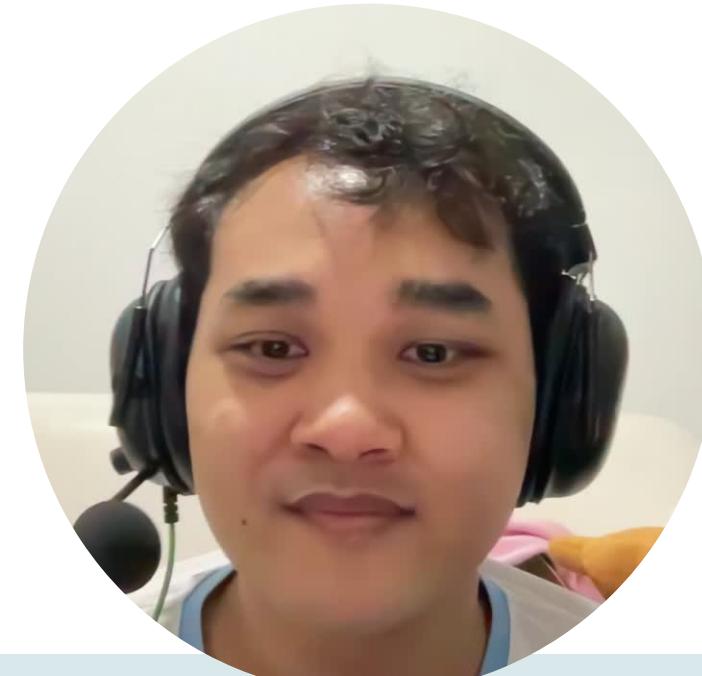
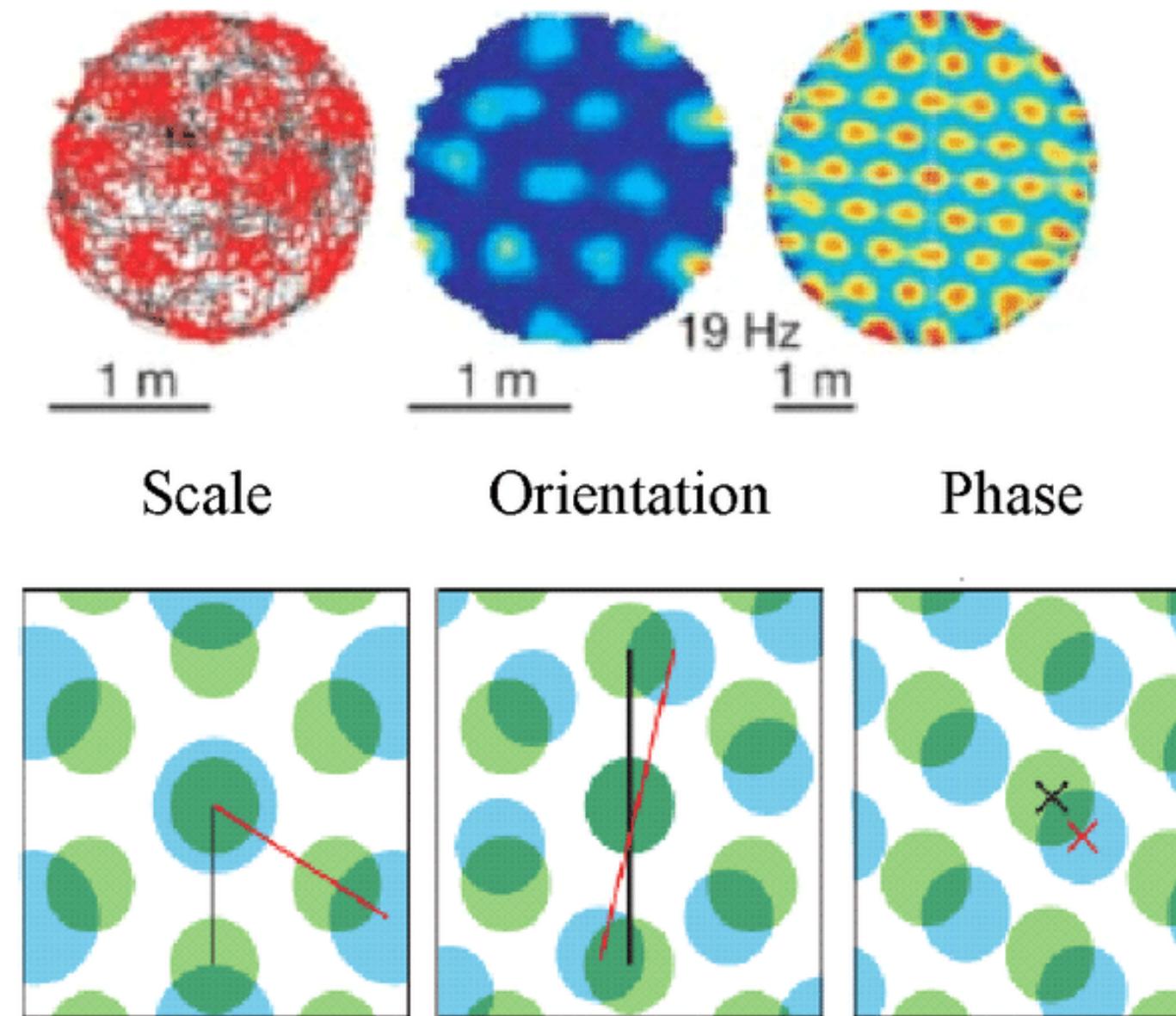


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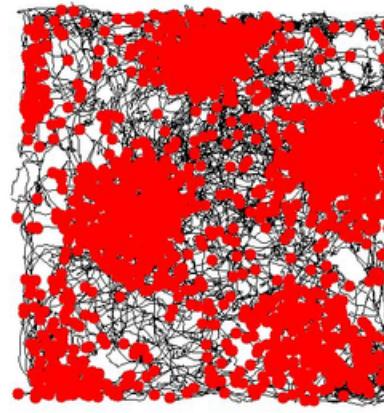
Module : Dimensionality Reduction

More on dimensionality reduction

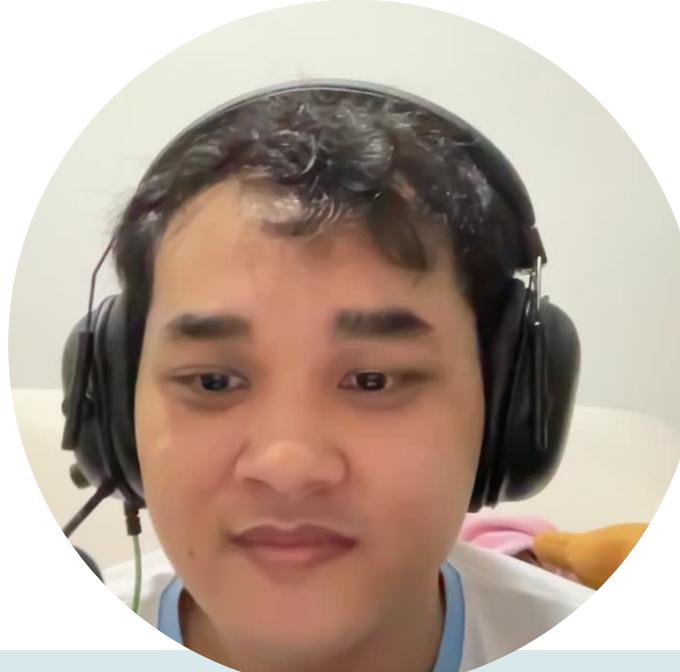


Math. Biol. Bioinf. 2018;13(Suppl.):t132-t161 doi: 10.17537/2018.13.t132

More on dimensionality reduction



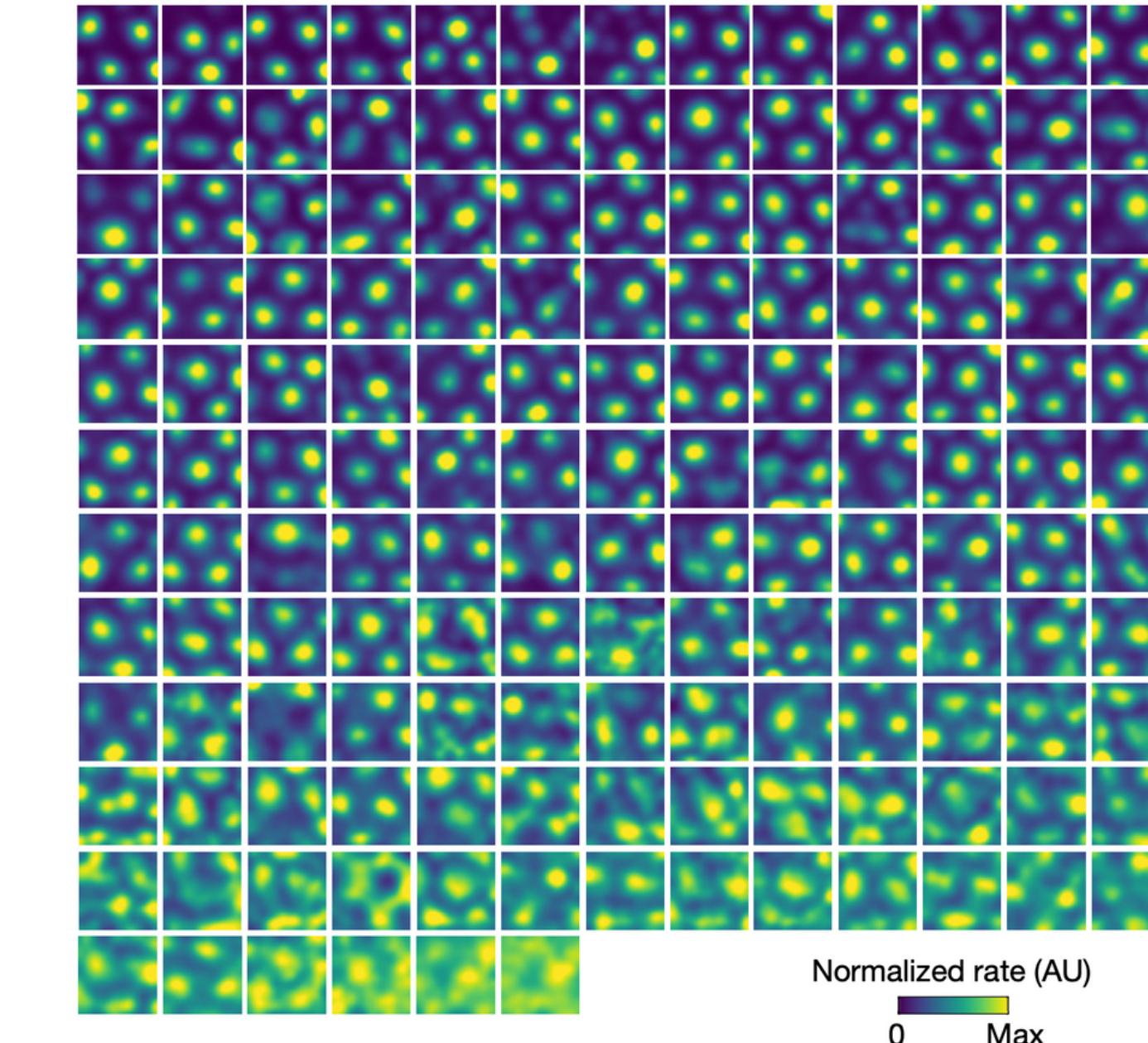
Src: [wikipedia.org/wiki/Grid_cell](https://en.wikipedia.org/wiki/Grid_cell)



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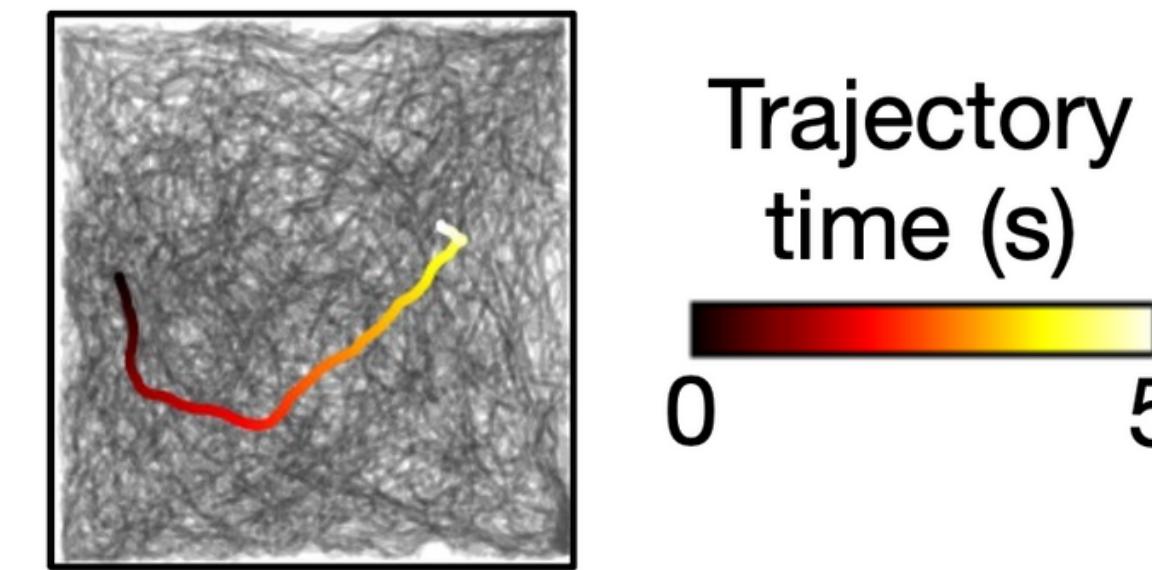
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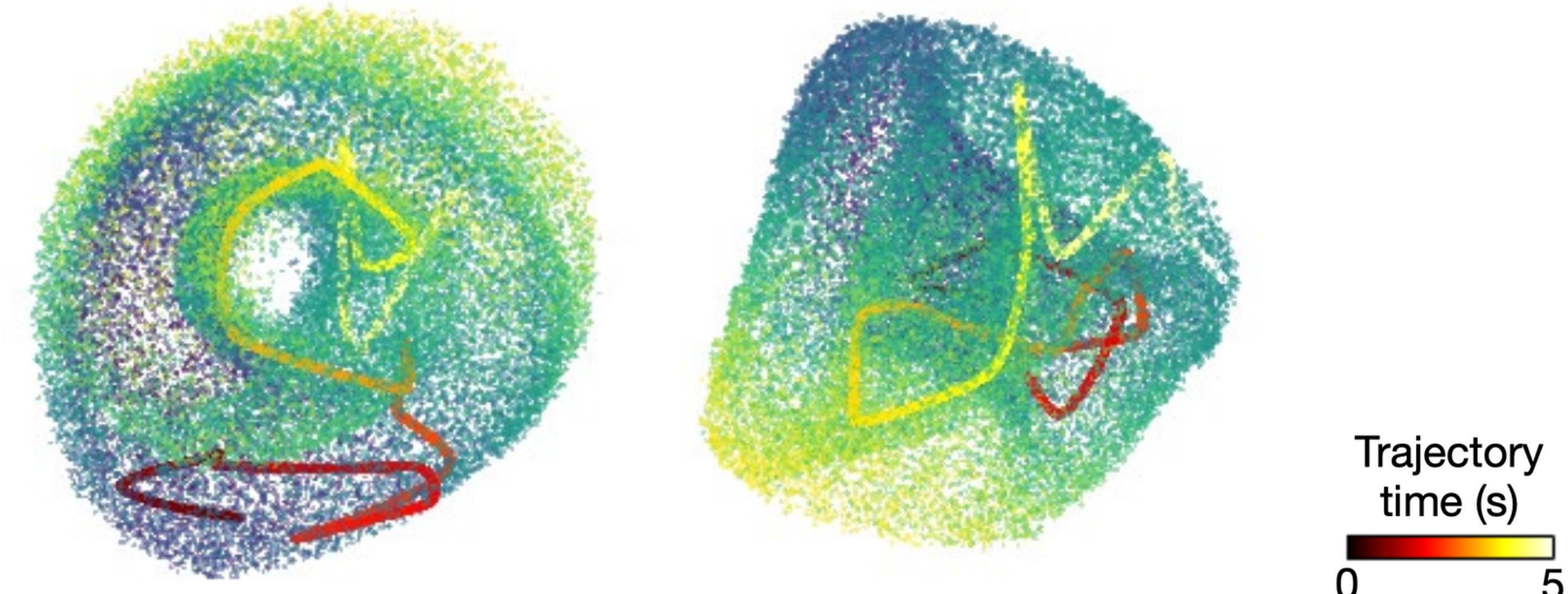
Gardner, R.J., Hermansen, E., Pachitariu, M. et al.
Toroidal topology of population activity in grid cells.
Nature 602, 123–128 (2022).

More on dimensionality reduction



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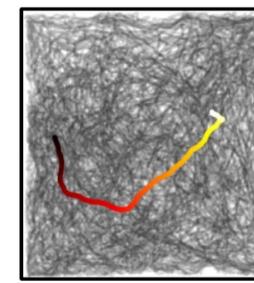
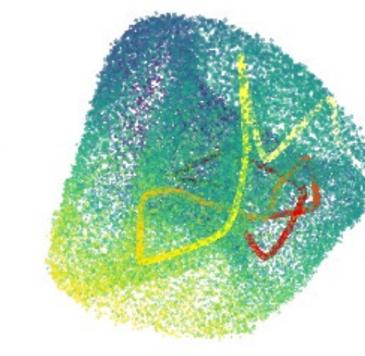
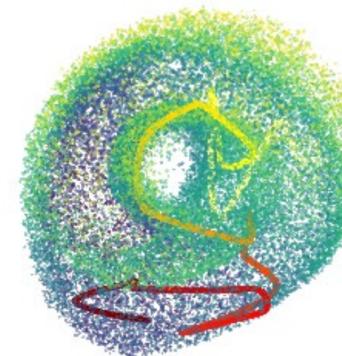


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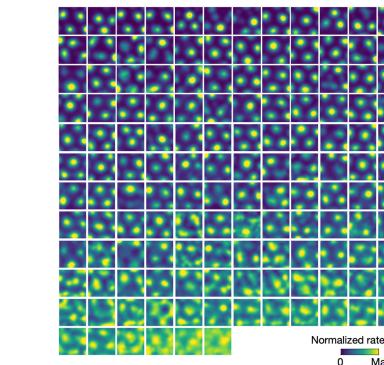


Should represent same information

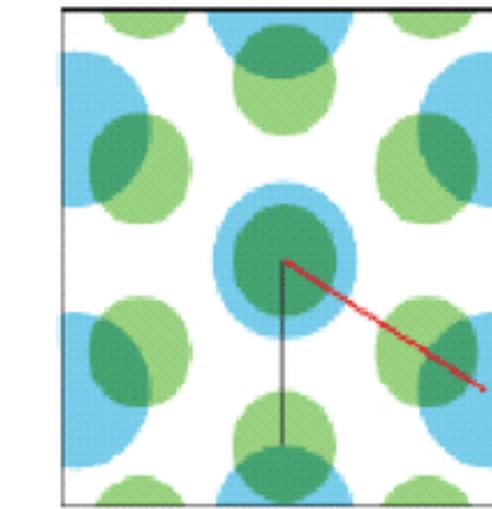


Trajectory
time (s)

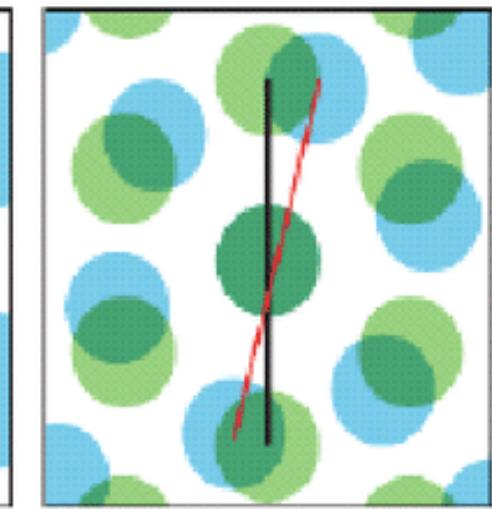
0 5



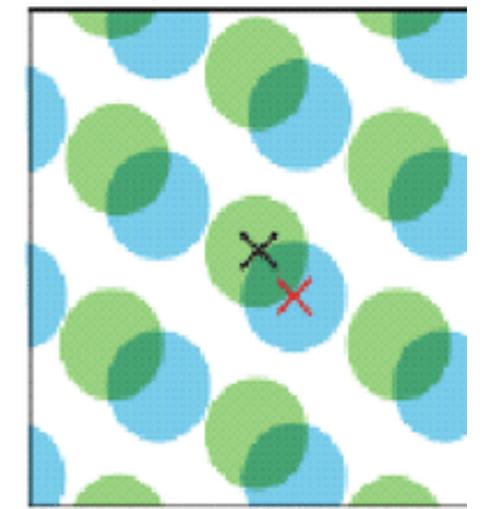
Scale



Orientation



Phase



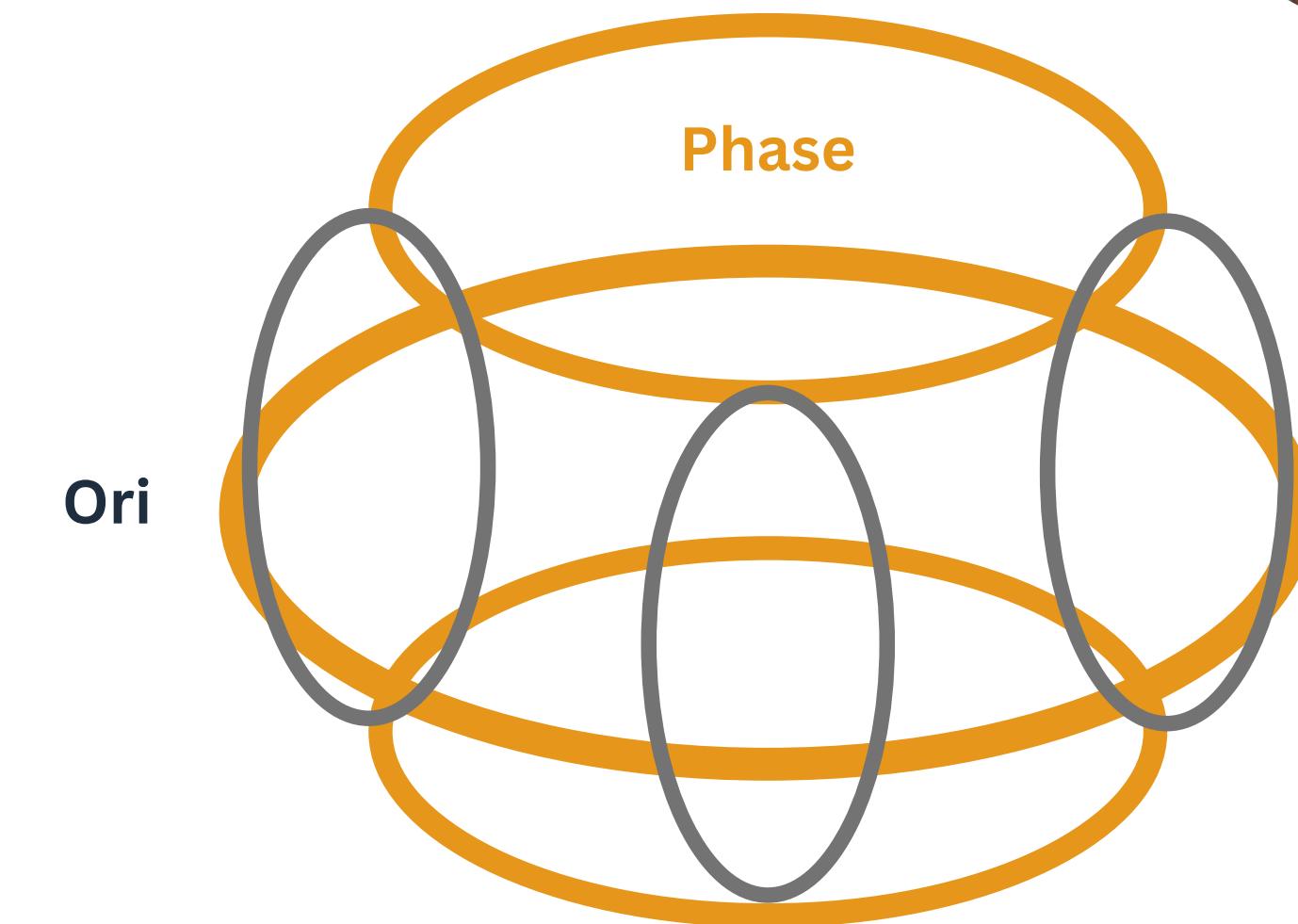
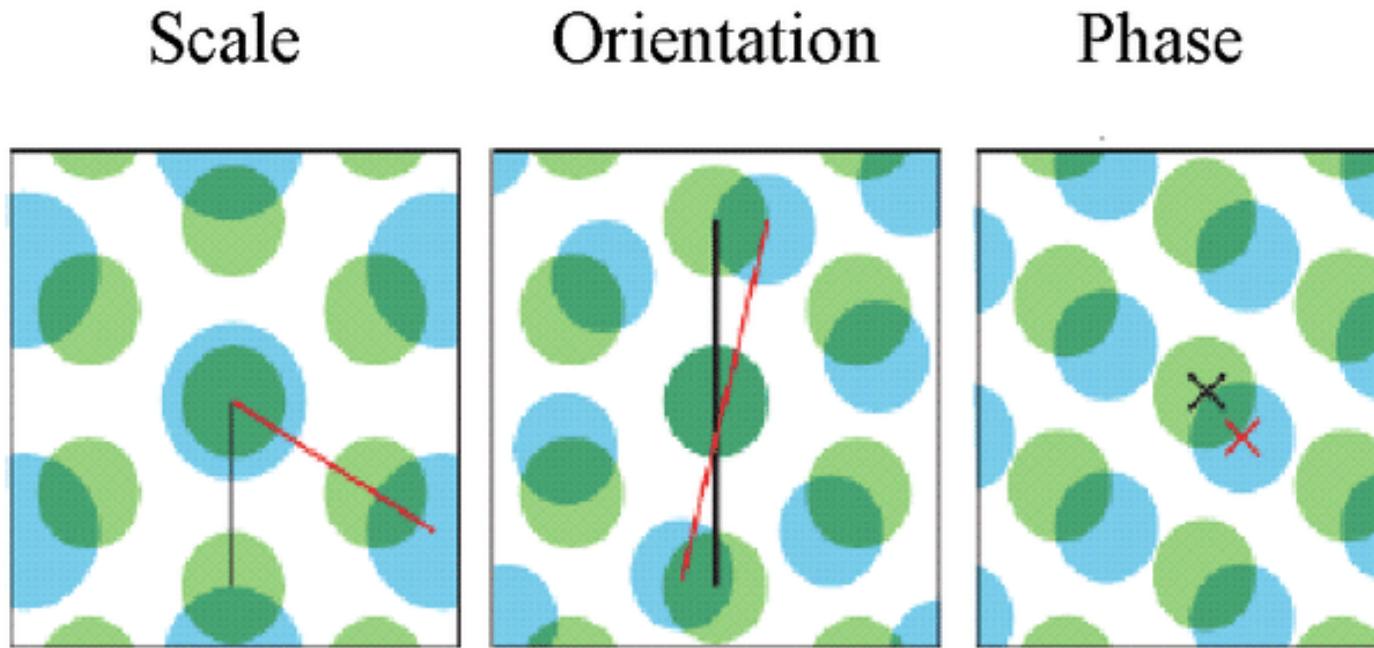
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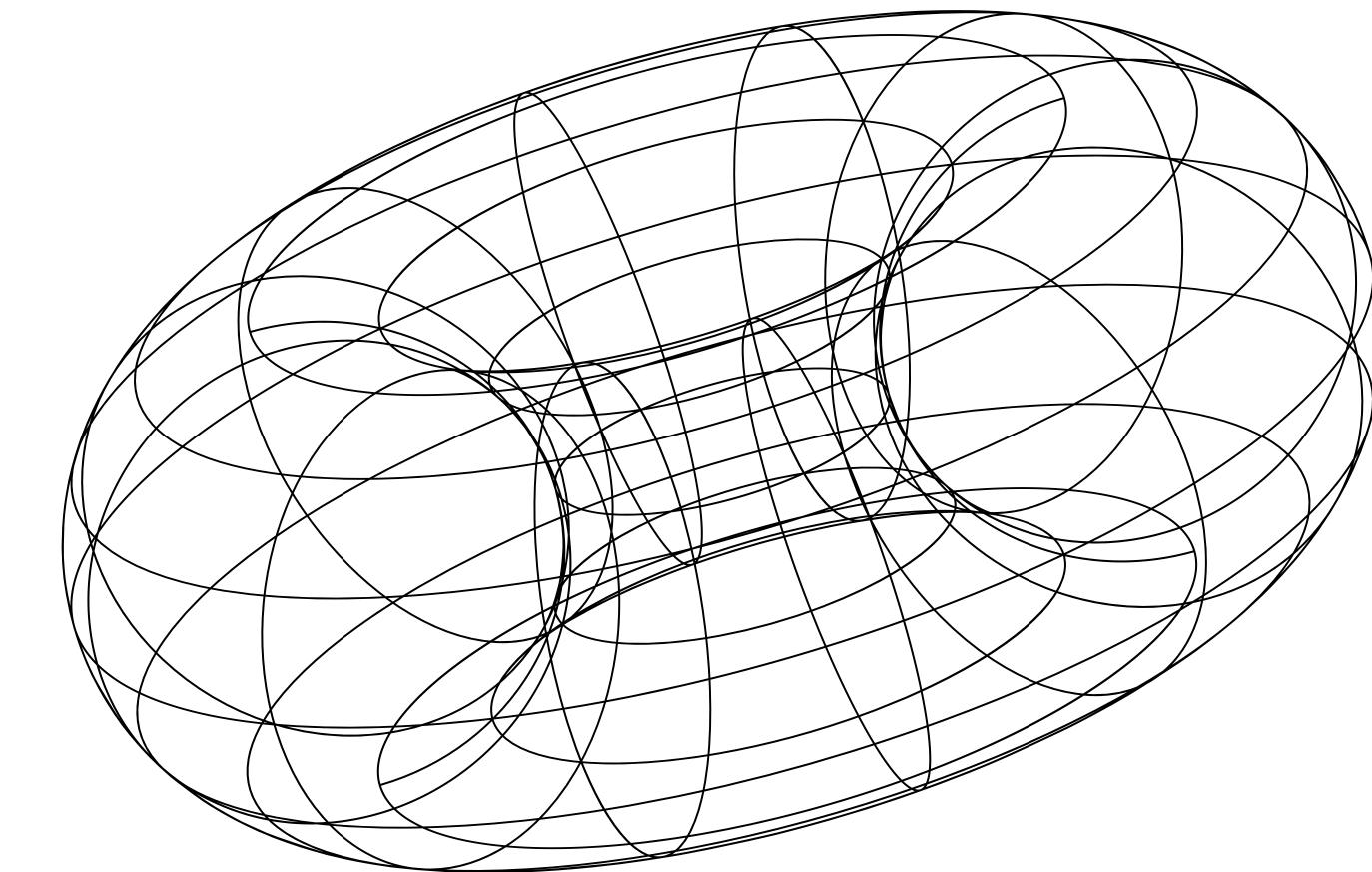
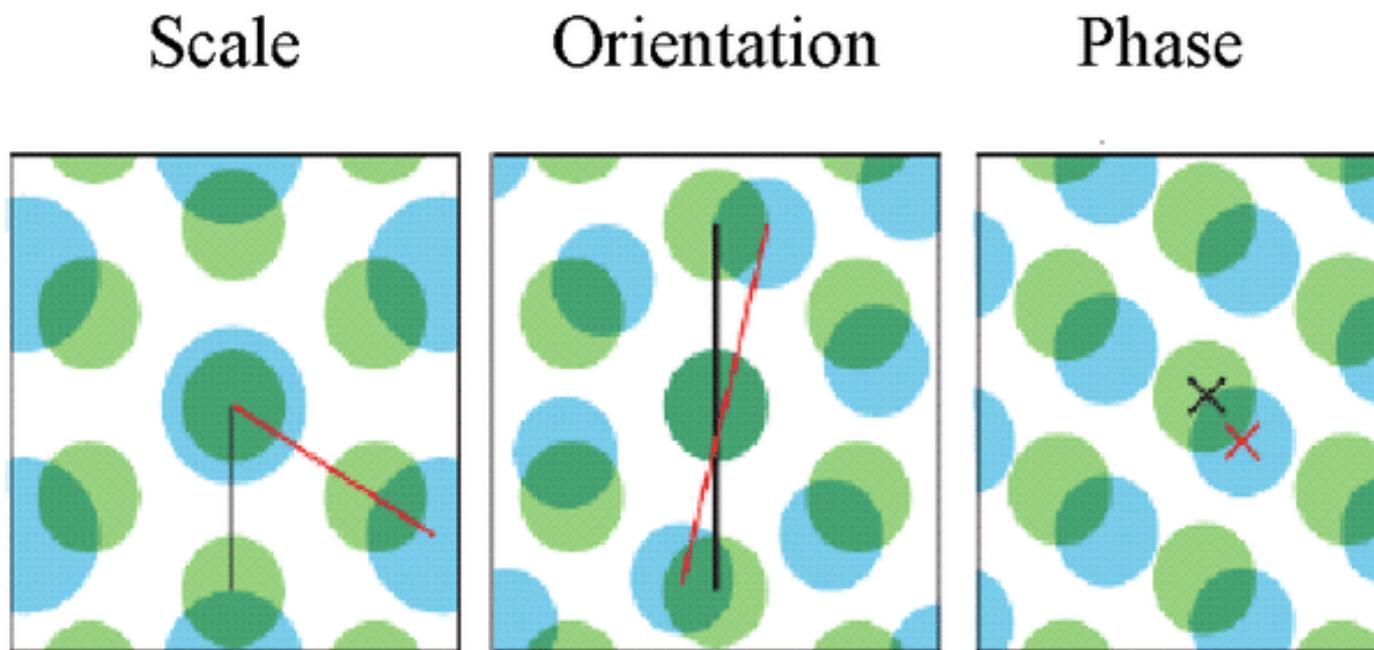


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Epilogue

Aid visualization



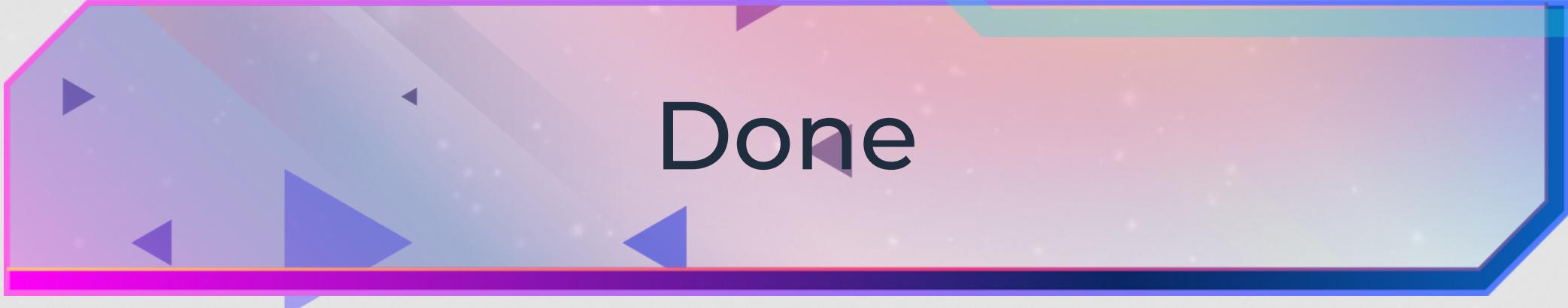
Reduce unnecessary calculation

Dimensionality reduction

Remove redundant dimension

Extract/Create useful dimension

Is this feature extraction?



Done



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