

A hitchhiker's guide to computational topology - a new lens into the brain

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In my lecture I aim to give a hitchhiker's guide to computational topology [1] applied to neuroscience over the last decade or so. I shall draw upon interesting examples from the last decade [2-5], such as applications to hippocampal place cell and grid cell codes, the topology of neural codes, network neuroscience, etc.

In particular, I shall give an introduction to some of the most commonly used techniques, such as constructing interesting filtrations, simplicial complexes, and computing persistent homology [1]. I shall conclude with some new results where topological data analysis reveals insights into schizophrenia [6], task execution [7], and the perception of art [8].

References

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