



Contribution ID : 52

Type : **Poster**

PTED: A multi-dimensional two-sample test for scientific inference and generative machine learning

Two-sample tests are widely applicable in inference and generative modelling, yet users frequently fall back on heuristics and visual inspection due to lack of an accessible test that operates in multiple dimensions. I begin with a discussion on the 7 places two-sample tests are helpful when inferring astronomical parameters from data. Then I present Permutation Test using the Energy Distance (PTED), a Python implementation of a powerful two-sample test described in Székely and Rizzo [2004]. Because the statistic depends on the data only through pairwise distances, the test applies in high dimensions, on learned feature representations, at large or small or imbalanced sample sizes, and to any data type on which a distance can be defined. I highlight a number of instructive sensitivity tests on PTED alongside other multi-dimensional two-sample tests for comparison. PTED is the only method that is sensitive to all tests.

Did you give a contributed talk at CASCA 2026?

No

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

Postdoctoral

Which keyword describes the area of focus of this talk?

Astrostatistics

Primary author(s) : STONE, Connor (University of Toronto)

Presenter(s) : STONE, Connor (University of Toronto)