Contribution ID: **11** Type: **not specified**

Building a Calabi-Yau Generator

Monday 8 December 2025 11:00 (45 minutes)

Fine, regular, and star triangulations (FRSTs) of four-dimensional reflexive polytopes give rise to toric varieties, within which generic anticanonical hypersurfaces yield smooth Calabi-Yau threefolds. We introduce CYTransformer, a deep learning model based on the transformer architecture, to automate the generation of FRSTs. We demonstrate that CYTransformer efficiently and unbiasedly samples FRSTs for polytopes across a range of sizes, and can self-improve through retraining on its own output. These results lay the foundation for AICY: a community-driven platform designed to combine self-improving machine learning models with a continuously expanding database to explore and catalog the Calabi-Yau landscape.

Presenter: Prof. SHIU, Gary (University of Wisconsin-Madison)