Contribution ID: **8**   Type: **not specified**

EveNet: Toward a Universal Foundation Model for Collider Physics

Tuesday, 3 March 2026 11:50 (30 minutes)

In high energy physics, most machine learning models are still built for narrow, task-specific analyses, which makes it hard to scale across the immense space of new physics possibilities. In this talk, I'll introduce EveNet, a foundation model we developed to change that paradigm.

EveNet is a transformer trained on 500 million simulated Standard Model events, combining self-supervised and supervised objectives to learn a common event representation. With just light fine-tuning, it handles very different analysis tasks effectively. Tested on CMS Open Data, it matches—and often outperforms—models trained specifically for those individual tasks. Even more interestingly, EveNet generalizes well to beyond-Standard-Model signals and real collision data, suggesting it's learning the underlying physical structure of the events themselves.

I'll discuss what this means for the future of collider studies—how a single pretrained network might streamline hundreds of analyses and move us closer to a genuinely universal, data-driven approach to event understanding.

Presenter: HSU, Shih-Chieh