Contribution ID: **3**                                                    Type: **not specified**

# LeStrat-Net: machine learning in Lebesgue style stratified Monte Carlo

*Thursday, 27 February 2025 15:00 (30 minutes)*

In this talk we describe LeStrat-Net: a new algorithm to perform Monte Carlo integration using Lebesgue style stratified sampling and machine learning. We divide the domain of integration based on the height of the integrand, similar to Lebesgue integration. The isocontours of the integrand can in principle create regions of any shape and with many disconnected subregions. We take advantage of the capacity of neural networks to learn complicated functions in order to predict these complicated divisions and preclassify large samples of the domain space. From this preclassification we can select the required number of points to perform a number of tasks such as variance reduction, integration and even event selection. The network ultimately defines the regions with what it learned and is also used to calculate the multi-dimensional volume of each region.

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**Session Classification:**   Afternoon Talks