

# **In Deep Learning, What Should Mathematical Theory Look Like?**

Ernest Ryu

*Mathematical Sciences, Seoul National University, Seoul, KOREA*

ernestyu@snu.ac.kr

## **ABSTRACT**

The intersection of deep learning and applied mathematics is an emerging area of research replete with exciting questions. However, there is a tension between the empiricism of deep learning and the rigor of mathematics, and formulating good research problems involves finding a delicate balance. In this talk, I will share my thoughts on how mathematical (rigorous) theory can be used in deep learning to obtain practically and theoretically impactful findings. Specifically, I will present my thoughts on some research archetypes that I have found to be fruitful.