

BIOL 79304 Seminar: Theory of Deep Learning

W, 2:00-4:00

4 cr

David Schwab

Description: This course will first provide an introduction to the basics of machine learning and deep learning. Topics covered in this part may include: essentials of statistical learning theory, bias-variance decomposition, regression and classification, gradient based optimization, theory of generalization, intro to neural networks, modern tricks for training neural networks, self-supervised and unsupervised learning. The course will then turn to “modern mysteries” where we will study recent phenomena that go counter to classical understanding of learning and connect to current research. Topics here may include, but are not limited to: double descent, theory of overparameterization, deep signal propagation, information bottleneck, out of distribution generalization, and metalearning.