



**Workshop 2020**  
**September 24, 2020, online**

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**Title:** « The Un-Expected Bernstein Lemma: towards generalization error bounds with fast rates »

**Abstract:**

The race to explain deep learning's remarkable generalization performance has sparked renewed interest in learning (generalization) bounds. We account for the strange phenomenon that existing generalization error bounds such as PAC-Bayesian bounds are typically quite weak, involving a  $\sqrt{\text{complexity}/n}$  term even in 'nice' situations. From the literature on fast-rate conditions, one would expect a  $O(\text{complexity}/n)$  term in such situations though. We provide a novel technique leading to a MAC rather than PAC generalization bound that can have  $O(KL/n)$  on the right, based on an 'unexpected' (in more than one sense) generalization of Bernstein's inequality.

Joint work with Benjamin Guedj (INRIA and UCL) and Zakaria Mhammedi (ANU).