MATTHIAS NEUFANG, Carleton University, Ottawa, Toronto K1S 5B6
Amplification of completely bounded operators and applications

It is a characteristic feature of completely bounded operators on $B(H)$ to admit an amplification to the level of $B(H \otimes_2 K)$, where H and K are Hilbert spaces. Using Wittstock's Hahn-Banach principle and Tomiyama's slice map theorem, one deduces that, more generally, any completely bounded map on M can be amplified to a map on the von Neumann tensor product $M \bar{\otimes} N$, whenever M and N are either von Neumann algebras or dual operator spaces with at least one of them sharing the w^* operator approximation property. Our aim is to show that there is a simple and explicit formula of an amplification of completely bounded operators for all such pairs (M, N), thus providing a *constructive* approach to the amplification problem. The key idea is to combine two fundamental concepts in the theory of operator algebras, one being classical, the other one fairly modern: Tomiyama's slice maps on the one hand, and the description of the predual of $M \bar{\otimes} N$ given by Effros-Ruan in terms of the projective operator space tensor product, on the other hand.

We will further discuss the question of uniqueness of such an amplification, but mainly focus on various applications of our construction, such as:

- a generalization of the so-called Ge-Kadison Lemma;
- the amplification of completely bounded module homomorphisms;
- an *algebraic* characterization of normality for completely bounded maps in terms of a commutation relation for the associated amplification.

In particular, the latter result leads us to a new concept in operator algebra theory which may be viewed as a tensor product version of Arens regularity.