DAVID BLECHER
University of Houston

Operator space methods for operator algebras

We study operator algebras, attempting to generalize important C^*-algebraic notions, using tools from operator space theory.

MATTHEW DAWS
University of Leeds

Quantum compactifications of the Fourier algebra

The classical almost periodic compactification of a locally compact group G can be defined to be the largest compact group which contains a dense homomorphic image of G. This has an interpretation in terms of the Banach algebra $L^1(G)$, and certain module maps from $L^1(G)$ to its dual $L^\infty(G)$, which are compact. This definition obviously makes sense for any Banach algebra, and, in particular, has been studied for the Fourier algebra $A(G)$. By analogy with the $L^1(G)$ case, and arguing by duality, we might expect that the almost periodic compactification of $A(G)$ should be a group C*-algebra of some discrete group. This can be made precise by applying recent work of Soltan on compacitifications in the quantum group setting. The classical definition does not always yield this, however. We shall argue for some different definitions, making use of operator spaces, which do yield an object which can be regarded as a compactification.

GEORGIOS ELEFTHERAKIS
University of Athens

Morita type equivalences for dual operator algebras

This work is a generalization of Rieffel's characterization of Morita equivalence for W^*-algebras to the case of unital dual operator algebras.

We provide characterizations of TRO equivalence of two unital dual operator algebras $\mathcal{A}$ and $\mathcal{B}$ that is, of the existence of completely isometric normal representations α and β such that $\alpha(\mathcal{A}) = [\mathcal{M}^*\beta(\mathcal{B})\mathcal{M}]^{-w^*}$ and $\beta(\mathcal{B}) = [\mathcal{M}\alpha(\mathcal{A})\mathcal{M}^*]^{-w^*}$ for a ternary ring of operators $\mathcal{M}$.

The first characterization is in terms of the equivalence between appropriate categories of completely contractive normal representations of the algebras, where the morphisms are required to intertwine the representations as well as their restrictions to the diagonals.

The second characterization, obtained jointly with V.I. Paulsen, is in terms of stable isomorphism.

We present applications of this theory to the class of reflexive algebras, especially to CSL algebras.

BRIAN FORREST
University of Waterloo

Operator Spaces and Ideals in the Fourier Algebra

The concept of an operator space has proved to be extremely useful in addressing problems in Abstract Harmonic Analysis. In this talk we will focus on the role that operator spaces have played in answering a number of questions concerning the ideal structure of the Fourier algebra.

GASTON ANDRES GARCIA
Ciudad Universitaria

Quantum subgroups of a simple quantum group at roots of 1

Let G be a connected, simply connected, simple complex algebraic group and let ϵ be a primitive ℓ-th root of 1, ℓ odd and $3 \nmid \ell$ if G is of type G_2. In this talk we show how to construct and determine all quantum subgroups of the quantum group $\mathcal{O}_\epsilon(G)$, *i.e.* all Hopf algebra quotients of the quantized coordinate algebra of G. Then the question of isomorphism between these Hopf algebras is considered. Finally, we will use these results to show the existence of infinitely many non-isomorphic Hopf algebras of the same dimension, presented as extensions of finite quantum groups by finite groups. These results are part of joint works with N. Andruskiewitsch: *Quantum subgroups of a simple quantum group at roots of 1*, `arXiv:0707.0070v1` and *Extensions of finite quantum groups by finite groups*, `arXiv:math/0608647v6`.

UFFE HAAGERUP
University of Southern Denmark

Classification of hyperfinite factors up to completely bounded isomorphisms of their preduals

This talk is based on a joint work with Magdalena Musat. We consider the following problem: When are the preduals of two hyperfinte factors (on separable Hilbert spaces) cb-isomorphic, i.e. isomorphic as operator spaces ? We show that if M is semifinite and N is Type III, then their preduals are not cb-isomorphic. Moreover we construct a one parameter family of of hyperfinite type III_0 factors with mutually non cb-isomorphic preduals, and we give a characterization of those hyperfinite factors M whose preduals are cb-isomorphic to the predual of the hyperfinite type III_1 factor. In contrast, Christensen and Sinclair proved in 1989 that all infinite dimensional hyperfinite factors with separable preduals are cb-isomorphic and more recently, Rosenthal, Sukochev and the first named author proved that all hyperfinite type III_lambda factors, where 0 ¡ lambda =¡ 1, have cb-isomorphic preduals.

ZHIGUO HU
University of Windsor

Multipliers and the second dual of a Banach algebra

We will present some recent results on multipliers on a class of Banach algebras. They are used to characterize the predual of a locally compact quantum group under the representation proved by M. Junge, M. Neufang, and Z-J. Ruan. Various applications are obtained on the second dual a Banach algebra. This is joint work with M. Neufang and Z-J. Ruan.

MONICA ILIE
Lakehead University

Extensions of Fourier algebra homomorphisms

It is known that a completely bounded algebra homomorphism $\phi : A(G) \to B(H)$ is given by a piecewise affine map $\alpha : Y \subset H \to G$, when G is amenable and H a locally compact group (P.J. Cohen, B. Host, M. Ilie , N. Spronk). Then ϕ has a canonical extension to the Fourier Stieltjes algebra of $B(G)$ given by α. We study the connection between arbitrary extensions and the canonical one, in particular uniqueness properties. As an application we obtain description of completely bounded homomorphisms of the Fourier Stieltjes algebras, using along the way a characterization of w^*-continuous homomorphisms given by piecewise affine maps. This is joint work with R. Stokke.

MARIUS JUNGE
University of Chicago, Urbana-Champaign

Embedding problems for subspaces of Lp

We will given an overview on what is known on embedding L_p spaces in L_q for p,q between one and two in the category of operator spaces. The starting point of this story is of course the embedding of OH in noncommutative L_1. Behind all these embedding results are Khintchine type inequalities which can only be shown using free probability.

MALGORZATA KONWERSKA
University of Illinois at Urbana-Champaign

Law of the Iterated Logarithm in Noncommutative Probability Spaces

HUN HEE LEE
University of Waterloo

Finite dimensional subspaces of noncommutative L_p spaces

We consider the following noncommutative version of Lewis's classical result. Every n-dimensional subspace E of $L_p(M)$ $(1 < p < \infty)$ for a von Neumann algebra M satisfies

$$d_{cb}(E, RC_{p'}^n) \leq c_p \cdot n^{absfrac12-\frac{1}{p}}$$

for some constant c_p depending only on p, where $\frac{1}{p} + \frac{1}{p'} = 1$ and $RC_{p'}^n = [R_n \cap C_n, R_n + C_n]_{\frac{1}{p'}}$. Moreover, there is a projection $P : L_p(M) \to L_p(M)$ onto E with $normP_{cb} \leq c_p \cdot n^{absfrac12-frac1p}$. We follow the classical change of density argument with appropriate noncommutative variations in addition to the opposite trick.

CHRISTIAN LEMERDY
Universite de Franche-Comte

Dilations on noncommutative L^p-spaces)

Let $1 < p \neq 2 < \infty$ and let $L^p(M)$ be a noncommutative L^p-space associated to some von Neumann algebra M. We say that a bounded c_0-semigroup $(T_t)_{t\geq 0}$ on $L^p(M)$ admits a group dilation if there is another noncommutative L^p-space $L^p(N)$, a bounded c_0-group $(U_t)_t$ on $L^p(N)$ and two bounded operators $J\colon L^p(M) \to L^p(N)$ and $Q\colon L^p(N) \to L^p(M)$ such that $T_t = QU_tJ$ for any $t \geq 0$. One has a similar definition for a discrete semigroup $(T^n)_{n\geq 0}$ associated with a single operator $T\colon L^p(M) \to L^p(M)$. This talk will be devoted to the question of determining which semigroups (either continuous or discrete) admit a group dilation. We will review a few recent theoritical results, some important examples, and connections with H^∞ functional calculus and square functions.

FRANOISE LUST-PIQUARD
Universite de Cergy-Pontoise

Generalized Ornstein-Uhlenbeck semi-groups on stratified groups

Let $G = \exp \mathcal{G}$ be a stratified group with dilation δ. Let $(X_i)_{i=1}^n$ be a basis of the first layer of $\mathcal{G}, \nabla f = (X_i f)_{i=1}^n$, let $L = -\sum_{i=1}^n X_i^2$ be the subLaplacian and let p be the (heat) kernel of e^{-L}. We consider the semi-groups defined on $L^q(pdg)$ by $e^{-t\nabla^*\nabla}$ and

$$e^{-tN} f(\gamma) = \int_G f(\delta_{e^{-t}}\gamma\delta_{\sqrt{1-e^{-2t}}}g)p(g)dg.$$

In particular if f is real valued $\langle Nf, f\rangle_{L^2(pdg)} = \left\| |\nabla f|^2 \right\|_{L^2(pdg)}$.
The spectrum $\sigma(N)$ on $L^q(pdg), 1 \leq q < \infty$ always contain $\mathbb{N}$ and equals $\mathbb{N}$ if G is step 2.

TAO MEI
University of Illinois at Urbana-Champaign

Noncommutative H^1 and BMO spaces

We study analogues of the classical (real) H^1 and BMO spaces in the noncommutative setting. Let M be a semifinite von Neumann algebra. Let $(T_t)_t$ be a semigroup of trace preserving (completely) positive opertors on $L^p(M)$. We consider the BMO space and Hardy spaces associated with the subordinated semigroup $(P_t)_t$. An analogue of the classical $H^1 - BMO$ duality inequality is obtained if $(T_t)_t$ does not increase (decrease) too fast. We also get the inverse relation for some noncommutative H^1 and BMO's with an additional assumption for $(T_t)_t$.

MAGDALENA MUSAT
University of Memphis

The Effros-Ruan conjecture for bilinear forms on C-algebras*
(Joint work with Uffe Haagerup)

In 1991 Effros and Ruan conjectured that a certain Grothendieck-type inequality for a bilinear form on C*-algebras holds if (and only if) the bilinear form is jointly completely bounded. In 2002 Pisier and Shlyakhtenko proved that this inequality holds in the more general setting of operator spaces, provided that the operator spaces in question are exact. Moreover, they proved that the conjecture of Effros and Ruan holds for pairs of C*-algebras, of which at least one is exact. In recent joint work with Uffe Haagerup we prove that the Effros-Ruan conjecture holds for general C*-algebras, with constant one. More precisely, we show that for every jointly completely bounded (for short, j.c.b.) bilinear form on C*-algebras A and B, there exist states f_1, f_2 on A and g_1, g_2 on B such that for all $a \in A$ and $b \in B$,

$$|u(a,b)| \leq \|u\|_{jcb}(f_1(aa^*)^{1/2}g_1(b^*b)^{1/2} + f_2(a^*a)^{1/2}g_2(bb^*)^{1/2}).$$

While the approach by Pisier and Shlyakhtenko relies on free probability techniques, our proof uses more classical operator algebra theory, namely, Tomita-Takesaki theory and special properties of the Powers factors of type III_λ, $0 < \lambda < 1$.

TIMUR OIKHBERG
University of California, Irvine

Representations of Banach algebras as algebras of completely bounded maps

We consider the following problem: suppose $\pi : A \to B(E)$ is a unital contractive representation (here, A is a Banach algebra, and E is a Banach space). When can we equip E with an operator space structure X in such a way that $CB(X)$ consists of 2-summing perturbations of $\pi(A)$? We obtain a positive answer in some special cases. In particular, we show that, for any dual Banach algebra A with a separable predual, there exists a separable operator space X and a unital isometric representation $\pi : A \to B(X)$ s.t. $CB(X) = \pi(A) + \Pi_2(X)$. The key tool in the construction is the notion of "hyperreflexivity with respect to an operator ideal."

The technique of representing Banach algebras in a way described above allows us to construct operator spaces with "pathological" properties. Time permitting, we will exhibit some examples of such spaces.

NARUTAKA OZAWA
University of California, Los Angeles

On a class of II_1 factors with at most one Cartan subalgebra

I will present examples of II_1 factors with one or no Cartan subalgebras. Moreover, I will prove that the normalizer of any amenable subalgebra of a free group factor is again amenable. This is a joint work with Sorin Popa.

JAVIER PARCET
CSIC

Mixed-norm inequalities and a transference method

Let $f_1, f_2, \ldots, f_n$ be a family of independent random variables on a given probability space (Ω, μ). If $1 \le q \le p < \infty$, the combination of Khintchine and Rosenthal inequalities easily produces the mixed-norm inequality

$$\Big\| \sum_{k=1}^n f_k \otimes \delta_k \Big\|_{L_p(\Omega;\ell_q)} \sim \Big(\sum_{k=1}^n \|f_k\|_p^p \Big)^{\frac{1}{p}} + \Big(\sum_{k=1}^n \|f_k\|_q^q \Big)^{\frac{1}{q}},$$

with constants independent of n. We shall discuss noncommutative forms of this inequality and its dual version for $1 < p \le q \le \infty$. Moreover, we shall introduce a transference method which allows us to replace freeness by a wide notion of noncommutative independence. These mixed-norm inequalities are in the core of recent results on operator space

L_p embedding theory by M. Junge and the speaker. Our transference method provides better constants in some cases and a new nonembedability result. This is joint work with Marius Junge.

VOLKER RUNDE
University of Alberta

Reiter's property (P_1) for locally compact quantum groups

A locally compact group G is said to have Reiter's property (P_p) with $p \in [1, \infty)$ if there is a net $(m_\alpha)_\alpha$ of non-negative norm one functions in $L^p(G)$ such that $\|L_x m_\alpha - m_\alpha\|_p \to 0$ uniformly in x on compact subsets of G. It is well known that property (P_p) for any p is equivalent to G being amenable. The fact that an amenable locally compact group has property (P_2) can be used to give a proof of Leptin's theorem that avoids Følner type conditions. We formulate Reiter's property (P_1) for locally compact quantum groups and show that it is equivalent to amenability amenability.

PIOTR SOLTAN
University of Warsaw

On the Heisenberg double

After introducing some preliminary notions I will describe how searching for the Haar measure on a quantum group defined by a modular multiplicative unitary leads to the concept of the Heisenberg double. I will define this object in analytic framework of general quantum groups and discuss some of its properties.

NICO SPRONK
University of Waterloo

Convolutions on compact groups and Fourier algebras of coset spaces

In this note we study two related questions. (1) For a compact group G, what are the ranges of the convolution maps on $A(G \times G)$ given for u, v in $A(G)$ by $u \times v \mapsto u * \check{v}$ ($\check{v}(s) = v(s^{-1})$) and $u \times v \mapsto u * v$? (2) For a locally compact group G and a compact subgroup K, what are the amenability properties of the Fourier algebra of the coset space $A(G/K)$? The algebra $A(G/K)$ was defined and studied by Brian Forrest.

In answering the first question, we obtain for compact groups which do not admit an abelian subgroup of finite index, some new subalgebras of $A(G)$. Using those algebras we can find many instances in which $A(G/K)$ fails the most rudimentary amenability property: operator weak amenability. However, using different techniques, we show that if the connected component of the identity of G is abelian, then $A(G/K)$ always satisfies

the stronger property that it is hyper-Tauberian, which is a concept developed by Ebrahim Samei. We also establish a criterion which characterises operator amenability of $A(G/K)$ for a class of groups which includes the maximally almost periodic groups.

This is joint work with Brian Forrest and Ebrahim Samei.

REIJI TOMATSU
University of Tokyo

Poisson boundaries of random walks on duals of q-deformed classical compact Lie groups

The Poisson boundary of random walks on $\widehat{SU_q(N)}$ was computed by Izumi-Neshveyev-Tuset and it is isomorphic to the quantum flag manifold $\mathbb{T}^{N-1}\backslash SU_q(N)$. I will present a generalization of this result to the other q-deformed classical compact Lie groups or further to all co-amenable compact quantum groups with commutative fusion rules.

STEFAAN VAES
K.U.Leuven

Boundaries of discrete quantum groups

I will discuss two types of boundary actions for a family of universal discrete quantum groups. In a joint work with Vergnioux, boundaries at infinity are constructed as unital C*-algebras and are used to prove exactness of reduced C*-algebras as well as solidity (in the sense of Ozawa) of the associated von Neumann algebras. In a more recent joint work with Vander Vennet, Poisson boundaries of random walks on certain universal discrete quantum groups are identified with fields of infinite tensor products of matrix algebras.

LEONID VAINERMAN
University of Caen

Twisting of locally compact quantum groups. Deformation of the Haar measure

We describe the twisting construction for deformation of locally compact quantum groups. A new feature, in contrast to the previous work, is a non-trivial deformation of the Haar measure. This allows to construct new interesting concrete examples of locally compact quantum groups. This is the joint work with Pierre Fima.

QUANHUA XU
University of Franche-Comt

Completely 1*-summing maps between some homogeneous Hilbertian operator spaces*

We discuss in this talk completely 1-summing maps between two homogenous spaces E and F that are quotients of subspaces of $C \oplus R$. We show that $\Pi_1^o(E, F)$ coincides with a Schatten-Orlicz class. We determine explicitly the underlying Orlicz function when $E = C_p$ or CR_p and $F = C_q$ or CR_q. The talk ends with a discussion on the constants of injectivity and exactness of these spaces. This is a joint work with Marius Junge.