Abstracts: Plenary Speakers

Spiros Argyros (National Technical University of Athens, Greece)
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HI EXTENSIONS OF $\mathcal{L}^\infty$ SPACES AND SPACES WITH VERY FEW OPERATORS
Tuesday, July 30, HA4, 9:00–9:50

We will present a general method of embedding Banach spaces with separable dual into $\mathcal{L}^\infty$ spaces admitting very few operators. In particular we will discuss the following two results.

Theorem 1. (i) For every X with X^* separable there exists a $\mathcal{L}^\infty$ space $\mathfrak{X}$ such that X is isomorphic to a subspace $\overline{X}$ of $\mathfrak{X}$ and $\mathfrak{X}/_{\overline{X}}$ is Hereditarily indecomposable satisfying the "scalar plus compact" property.

(ii) If ℓ_1 is not isomorphic to a complemented subspace of X^* then the aforementioned $\mathfrak{X}$ satisfies the "scalar plus compact" property.

The above yields that every separable reflexive space embeds into a $\mathcal{L}^\infty$ space satisfying the "scalar plus compact" property.

(Joint work with D. Freeman, R. Haydon, E.Odell, Th. Raikoftsalis, Th. Schlumprecht, D. Zisimopoulou.)

Kenneth Davidson (University of Waterloo, Canada)
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THE CHOQUET BOUNDARY OF AN OPERATOR SYSTEM
Saturday, August 3, HA4, 9:00–9:50

We solve one of Bill Arveson's favorite problems: every operator system (and hence every unital operator algebra) has sufficiently many boundary representations to generate the C*-envelope. This was a central question in Arveson's dilation program left open in his 1969 paper. Arveson solved the separable case recently, but our general solution is also more transparent and in the spirit of the original paper. (This is joint work with Matthew Kennedy.)

Gilles Godefroy (Institut de Mathematiques de Jussieu, France)
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Uniqueness of preduals in operator algebras
Monday, July 29, HA4, 14:00–14:50

It is well known that two non-isometric (and even non-isomorphic) Banach spaces can have isometric duals: the class of isometric preduals of l_1 provides classical examples. However, it frequently happens that a dual space has a unique isometric predual, as it is for instance the case for von Neumann algebras. We will provide simple topological tools which permit to show that weak-star closed spaces A of operators on a reflexive space X have unique isometric preduals as soon as weak-star approximation by compact operators is available in A. Some observations on approximation properties will also be mentioned.

Pamela Gorkin (Bucknell University, USA)
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Compositions of Blaschke products and three theorems of Frostman
Thursday, August 1, HA4, 9:00–9:50

A recent Monthly article gave a very simple algorithm for determining when a polynomial is a composition of two (nontrivial) polynomials. A natural next step is to determine when finite Blaschke products are compositions of two Blaschke products, neither of which are automorphism of the disk. Well discuss several algorithms for determining when a finite Blaschke product can be a composition and then well discuss the current state of affairs for inner functions focusing, in particular, on three theorems of O. Frostman. The talk will conclude with several open questions. This talk relies on recent work with John Akeroyd, work with I. Chalendar and J. R. Partington, as well as work with U. Daepp, A. Shaffer, B. Sokolowsky, and K. Voss.

Uffe Haagerup (University of Copenhagen, Denmark)
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Ultraproducts, QWEP von Neumann Algebras, and the Effros-Maréchal Topology
Monday, July 29, HA4, 9:30–10:20

The talk is based on a joint work with Hiroshi Ando and Carl Winslw (arXiv:1306.0460). Based on analysis on the Ocneanu/Groh-Raynaud ultraproducts and the Effros-Maréchal topology on the space vN(H) of von Neumann algebras acting on a separable Hilbert space H, we show that for a von Neumann algebra M in vN(H), the following conditions are equivalent:

1. M has the Kirchberg's quotient weak expectation property (QWEP).
2. M is in the closure of the set of injective factors on H with respect to the Effros-Marchal topology.
3. M admits an embedding i into the Ocneanu ultrapower N^ω of the injective III_1 factor N with a normal faithful conditional expectation from N^ω to M.
4. For every $\varepsilon > 0$, natural number n, and x_1,...,x_n in natural cone $P_M^\natural$ in the standard form for M, there is a natural number k and $a_1, \ldots, a_n$ in $M_k(\mathbb{C})_+$, such that $| < x_i, x_j > - \mathrm{tr}_k(a_i a_j)|$ is less than ε for $i, j = 1, \ldots, n$, where tr_k is the tracial state on $M_k(\mathbb{C})$.

Magdalena Musat (University of Copenhagen, Denmark)
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FACTORIZABLE COMPLETELY POSITIVE MAPS AND THE CONNES EMBEDDING PROBLEM

Wednesday, July 31, HA4, 9:00–9:50

The class of factorizable completely positive maps (originating in work of C. Anantharaman- Delaroche) has gained particular significance in quantum information theory in connection with the settling (in the negative) of the asymptotic quantum Birkhoff conjecture. More precisely, in joint work with Uffe Haagerup we proved earlier that every non-factorizable unital completely positive and trace-preserving map on $M_n(\mathbb{C})$, $n \geq 3$, provides a counterexample for the conjecture. We will explain a recently established connection to the Connes embedding problem in terms of a newly formulated asymptotic property of factorizable maps.

Vern Paulsen (Houston University, USA)
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FRAMES. GROUPS AND THE KADISON-SINGER PROBLEM
Wednesday, July 31, HA4, 14:00–14:50

In this talk we will survey some of the new results on the Kadison-Singer problem and emphasize a few of the special cases that we believe are approachable.

Volker Runde (University of Alberta, Canada)
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DUAL BANACH ALGEBRAS - AN OVERVIEW
Sunday, August 4, HA4, 11:00-11:50

A dual Banach algebra is a Banach algebra that is also a dual Banach space such that multiplication is separately weak* continuous. Von Neumann algebras are dual Banach algebras, but so are the measure algebras of locally compact groups. We discuss amenability properties for dual Banach algebras as well as their surprisingly intricate representation theory.

Mikael Rørdam (University of Copenhagen, Denmark)
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SUPRAMENABLE GROUPS AND THEIR ACTIONS ON LOCALLY COMPACT HAUSDORFF SPACES
Tuesday, July 30, HA4, 14:00–14:50

It is well-known that a discrete group is amenable if and only if whenever it acts on a compact Hausdorff space, then there is an invariant probability measure. Similarly, a group is supramenable if and only if whenever it acts co-compactly on a locally compact Hausdorff space, then there is a non-zero invariant Radon measure. In this case the group admits a free minimal purely infinite (and often times also amenable) action on the locally compact (non-compact) Cantor set. We also discuss geometric characterizations of supramenable groups.

The results are obtained by studying how groups act on their beta-compactification. We shall discuss this action and its universal properties.

This is joint work with J. Kellerhals and N. Monod, and in parts a work in progress with H. Matsui

Ebrahim Samei (University of Saskatchewan, Canada)
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A survey on Beurling-Fourier algebras
Saturday, August 3, HA4, 14:00–14:50

In this survey talk, we introduce and study the class of Beurling-Fourier algebras on locally compact groups. These algebras could be viewed as a non-commutative analogs of classical Beurling algebras. We investigate various properties for these algebras such as operator amenability, operator weak amenability, Arens regularity, and being completely isomorphic to operator algebras. We examine in more details Beurling-Fourier algebras on $SU(n)$, the group of n by n special unitary groups with various weights. We will see, in particular, that even though they usually behave similarly to the classical Beurling algebras, there are phenomenons occurs which relates very much to the non-commutative nature of these objects.

This talk in based on join works with Mahya Ghandahari, Hun Hee Lee, and Nico Spronk.

Brett Wick (Georgia Institute of Technology, USA)
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The Corona Problem for Besov-Sobolev Spaces on the Unit Ball
Thursday, August 1, HA4, 14:00–14:50

Carlesons Corona Theorem from the 1960s has served as a major motivation for many results in complex function theory, operator theory and harmonic analysis. In a simple form, the result states that for two bounded analytic functions f_1 and f_2 that don't simultaneously vanish, it is possible to nd two other bounded analytic functions g_1 and g_2 such that $f_1g_1 + f_2g_2 = 1$. Moreover, the functions g_1 and g_2 can be chosen with some norm control. In this talk we will discuss some generalizations of this result to Besov-Sobolev spaces on the unit ball in several complex variables.

Abstracts: Other Invited Speakers

Trond A. Abrahamsen (University of Agder, Krsitiansand, Norway)
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Uniformly square Banach spaces
Tuesday, July 30, Pascal, 16:00–16:30

We say that a Banach space is *locally uniformly square (LUS)* if for every x in the unit sphere S_X of X, there exists a sequence (y_n) in the unit ball B_X of X such that

$$\|x \pm y_n\| \to 1 \text{ and } \|y_n\| \to 1.$$

If X is LUS and the sequence (y_n) tends to 0 weakly, we say that X is *weakly locally uniformly square (ωLUS).*

We say that a Banach space is *uniformly square (US)* if for every $x_1, x_2, \ldots, x_N \in S_X$, there exists a sequence (y_n) in B_X such that

$$\|x_i \pm y_n\| \to 1 \text{ for every } i = 1, \ldots, N \text{ and } \|y_n\| \to 1.$$

If X is US and the sequence (y_n) tends to 0 weakly, we say that X is *weakly uniformly square (ωUS).*

The motivation for studying such spaces is the fact that they possess properties which in a sense are at the opposite side of the spectrum from the Radon-Nikodým property (any closed convex set has slices of arbitrarily small diameter). If X is

- LUS then the diameter of every slice of B_X is 2.
- ωLUS then the diameter of every non-empty relatively weakly open subset of B_X is 2.
- US then the diameter of every finite convex combination of slices of B_X is 2.

Other basic properties of such spaces will be discussed as well.
Joint work with J. Langemets and V. Lima.

Mahmood Alaghmandan (University of Saskatchewan, Canada)
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Hypergroups and weighted hypergroup algebras
Wednesday, July 31, Pascal, 11:00–11:30

Hypergroups as a generalized version of locally compact groups have similarities with topological groups. Emphasizing some of these similarities, we introduce and study Følner type conditions for hypergroups. We also observe some results yielded from Leptin conditions for Banach algebras defined on hypergroups, namely hypergroup algebras and Fourier algebras.

Also, defining weighted hypergroups, analogous to weighted groups, lets us study weighted hypergroup algebras. We investigate some properties of these algebras including Arens regularity, isomorphism to operator algebras, and amenability.

Jeronimo Alaminos (University of Granada, Spain)
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Spectral isometries
Thursday, August 1, Pascal, 15:00–15:30

We show that, for all Banach spaces X and Y, the spectral nearisometries and the approximate spectrum-preserving maps from $\mathcal{L}(X)$ onto $\mathcal{L}(Y)$ are perturbations of actual spectral isometries and spectrum-preserving maps, respectively.

Ernst Albrecht (Universität des Saarlandes, Germany)
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Spectral Properties of Toeplitz Operators on the Unit Ball and on the Unit Sphere
Thursday, August 1, HA4, 10:00–10:30

In this report on joint work with Zineb Akkar we consider Toeplitz operators on the Hardy and weighted Bergman Hilbert spaces of the unit sphere respectively of the unit ball in $\mathbb{C}^N$. Various aspects of the interplay between local and global properties of the symbols and local and global spectral properties of the corresponding Toeplitz operators are investigated. A local version of the spectral inclusion theorem of Davie and Jewell [1] is proved.

Using some recent results of Quiroga-Barranco and Vasilevski [3, 4], we describe some commutative C^*-subalgebras of the Toeplitz algebra for $N \geq 2$. The method of McDonald [2] to compute the essential spectrum of Toeplitz operators with certain piecewise continuous symbols is extended to a larger class of symbols including examples where the set of discontinuity points has strictly positive surface measure.

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Massoud Amini (Tarbiat Modares University, Tehran, Iran)
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C^*-ALGEBRAS OF 2-GROUPOIDS
Tuesday, July 30, HA4, 16:35–17:05

We define topological 2-groupoids and study locally compact 2-groupoids with 2-Haar systems. We consider quasi-invariant measures on the sets of 1-arrows and unit space and build the corresponding vertical and horizontal modular functions. For a given 2-Haar system, we construct the vertical and horizontal full C^*–algebras of a 2-groupoid and show that they are independent of the choice of the 2-Haar system, up to strong Morita equivalence, and make a correspondence between their bounded representations on Hilbert

spaces and those of the 2-groupoid on Hilbert bundles. We show that representations of certain closed 2-subgroupoids are induced to representations of the 2-groupoid and use regular representation to build the vertical and horizontal reduced C^*-algebras of the 2-groupoid. We establish strong Morita equivalence between C^*-algebras of the 2-groupoid of composable pairs and those of the 1-arrows and unit space. We describe the reduced C^*-algebras of r-discrete principal 2-groupoids and find their ideals and masa's.

Oleg Aristov (Russia)
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Topological radical for Banach modules
Saturday, August 3, Pascal, 11:35–12:05

We introduce the concept of topological radical of a Banach module. This closed submodule have two description: the as the intersection of ranges of maximal contractive monomorphism (from outside) and as the union of ranges of small morphisms (from inside). This concept is a functional analytic analogue for radical of module over a unital ring and has the similar categorical properties.

Dragu Atanasiu (University of Borås, Sweden)
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A Plancherel-type integral representation
Saturday, August 3, MVH12, 16:35–17:05

In this talk we present an integral representation which generalizes the integral representation of a positive functional on a nonunital commutative Banach algebra with involution. (Authors Dragu Atanasiu, University of Bors, Sweden and Angela Siple, University of Central Florida, Orlando, USA)

Gareth Braatvedt and Rudi Brits (University of Johannesburg, South Africa)
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Uniqueness and spectral variation in Banach algebras
Sunday, August 4, Pascal, 9:00–9:30

Let A be a complex semisimple Banach algebra with identity. We explore the situation whereby a portion of the elements of A have the same spectrum under multiplication by $a \in A$, as under multiplication by $b \in A$; and when this situation implies that a and b are the same. In particular we show that if the spectrum of ax equals the spectrum of bx for all x with a spectral radius away from the identity less than 1, then a and b coincide. By way of examples we show that this is the best situation possible in general. In another result we show that in the case where these spectra have at most 0 as an accumulation point for all $x \in A$, the assumption need only hold for an arbitrarily small open set in A, with the same conclusion. Additive versions of these results are also discussed.

Rudi Brits (University of Johannesburg, South Africa)
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GEOMETRY OF THE SPECTRAL SEMIDISTANCE IN BANACH ALGEBRAS
Sunday, August 4, Pascal, 9:35–10:05

Let A be a unital Banach algebra over $\mathbb{C}$, and suppose that the nonzero spectral values of, respectively, a and $b \in A$ are discrete sets which cluster at $0 \in \mathbb{C}$, if anywhere. We develop a plane geometric formula for the spectral semidistance of a and b which depends on the two spectra and the orthogonality relationships between the corresponding sets of Riesz projections associated with the nonzero spectral values. It is further shown that a and b are quasinilpotent equivalent if and only if all the Riesz projections, $p(\alpha, a)$ and $p(\alpha, b)$, correspond. For certain important classes of decomposable operators (compact, Riesz, etc.) the proposed formula reduces the involvement of the underlying Banach space X in the computation of the spectral semidistance, and appears to be a useful alternative to Vasilescu's geometric formula (which requires knowledge of the local spectra of the operators at each $0 \neq x \in X$). The apparent advantage gained through the use of a global spectral parameter in the formula aside, the various methods of complex analysis could then be employed to deal with the spectral projections: We give examples illustrating the utility of the main results.

Yemon Choi (University of Saskatchewan, Canada)
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Derivations from the disc algebra to natural modules
Sunday, August 4, HA4, 9:00–9:30

The disc algebra is a fundamental example in the theory of commutative Banach algebras, but many of its homological properties remain poorly understood. I will present some partial results for the 2nd cohomology group with coefficients in the algebra itself, showing how one can reduce the problem to the study of certain derivations, and comment on links with the known characterization of polynomially bounded Foguel–Hankel operators.

I will also present an explicit characterization of the continuous derivations from the disc algebra to its dual. By-products of this characterization are: a proof that all such derivations are compact; and an example of an explicit, non-weakly-compact derivation from the disc algebra to a suitable symmetric module. This is joint work with M. J. Heath.

Jason Crann (Carleton University/University of Lille 1,Canada/France)
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Amenability and injectivity of locally compact quantum groups
Tuesday, July 30, HA4, 11:35–12:05

As is well known, the equivalence between amenability of a locally compact group G and injectivity of its von Neumann algebra $\mathcal{L}(G)$ does not hold in general beyond discrete groups. In this talk, we will show that the equivalence persists for all locally compact groups if $\mathcal{L}(G)$ is considered as a $\mathcal{T}(L_2(G))$-module with respect to a natural action. In fact, we will prove an appropriate version of this result for every locally compact quantum group $\mathbb{G}$. Time permitting, we will discuss further homological properties of $\mathcal{T}(L_2(\mathbb{G}))$-modules and their connections to amenability. This is joint work with Matthias Neufang.

Garth Dales (University of Lancaster, UK)
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FINITELY GENERATED MAXIMAL LEFT IDEALS IN BANACH ALGEBRAS
Monday, August 3, Pascal, 16:00–16:30

I shall attack the following conjecture: Let A be a unital Banach algebra. Suppose that all maximal left ideals in A are finitely-generated (as left ideals). Then A is finite-dimensional. I shall give some general background to this question, and note that the conjecture is true when A is a C^*-algebra and when A is commutative. In the latter case, we do not need all the maximal left ideals to be finitely-generated: it is sufficient for those corresponding to points of the Shilov boundary to be so generated. However we cannot replace "Shilov boundary" by "Choquet boundary". I shall also set the scene for a version of the question that applies to the Banach algebra of all operators on a Banach space; this question will be discussed by Tomek Kania in a subsequent talk. My talk is based on a joint paper with Wieslaw Zelazko.

Matthew Daws (University of Leeds, UK)
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ALMOST PERIODIC FUNCTIONALS AND COMPACTIFICATIONS
Monday, July 29, HA4, 11:00–11:25

I will give a quick survey about almost periodic functionals on Banach algebras. Letting A be an algebra, and turning A^* into an A-bimodule is the usual way, a functional f is almost periodic if the orbit map $A \to A^*; a \mapsto a \cdot f$ is a compact operator. The collection of all such functionals, $AP(A)$ say, is a closed sub-bi-module which is "introverted" in the Arens product sense. One can then proceed to show that the product on A extends to a product on the dual $AP(A)^*$ which is jointly continuous on bounded sets. For the group algebras $A = L^1(G)$, $AP(A)$ turns out to be a sub-*-algebra of $L^\infty(G)$, and the character space a compact group– the Bohr compactification of G. This link with compactifications has lead people to consider the "dual" situation for the Fourier algebra (and, more recently, for various notions of "quantum groups".) Here it is much less clear when $AP(A)$ will be a C^*-algebra, and if it is, what sort of "group" structure it might possess. I will discuss some notions due to Runde, and some work of my own, which strengthen $AP(A)$ in various ways (while maintaining links with Banach algebraic notions). Time allowing, I will discuss some of the problems associated with non-Kac type

quantum groups, and joint work with Biswarup Das.

Elcim Elgun (University of Waterloo, Canada)
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THE EBERLEIN COMPACTIFICATION OF THE HEISENBERG TYPE GROUP $\mathbb{Z} \times \mathbb{T} \times \mathbb{T}$

Saturday, August 3, HA4, 17:10–17:40

Given a locally compact group G, the *Eberlein compactification* G^e is the spectrum of the uniform closure of the Fourier-Stieltjes algebra $B(G)$. It is a semitopological semigroup compactification and thus a quotient of the weakly almost periodic compactification of G. In this talk we aim to study the Eberlein compactification of the group $\mathbb{Z} \times \mathbb{T} \times \mathbb{T}$ equipped with Heisenberg type multiplication. First, we will see that transitivity properties of the action of $\mathbb{Z} \times \mathbb{T}$ on the central subgroup $\mathbb{T}$ force some aspects of the structure of $(\mathbb{Z} \times \mathbb{T} \times \mathbb{T})^e$ to be quite simple. On the other hand, we will observe that the Eberlein compactification of the direct product group $\mathbb{Z} \times \mathbb{T}$ is large with a complicated structure, and can be realized as a quotient of the Eberlein compactification $(\mathbb{Z} \times \mathbb{T} \times \mathbb{T})^e$.

Jörg Eschmeier (Saarland University, Germany)
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TOEPLITZ PROJECTIONS AND ESSENTIAL COMMUTANTS

Saturday, August 3, HA4, 10:00–10:30

A result of Ken Davidson from 1977, answering a question of Douglas, shows that an operator on $H^2(\mathbb{T})$ commutes modulo the compact operators with all analytic Toeplitz operators if and only if it is a compact perturbation of a Toeplitz operator with symbol in $H^\infty + C$. In papers of Guo, Ding and Sun from the late 90s analogues of this result are proved on the unit ball in $\mathbb{C}^n$. We show that for a large class of subnormal operator tuples there is a natural Toeplitz projection and use this construction to extend the above results to the case of essentially normal regular A-isometries. As a particular case we calculate the essential commutant of the analytic Toeplitz operators on a strictly pseudoconvex domain. As an application one can describe the first Hochschild cohomology group of certain Toeplitz algebras on strictly pseudoconvex domains.

Joel Feinstein (University of Nottingham, UK)
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Classicalisation of Swiss cheeses
Tuesday, July 30, Pascal, 15:00–15:30

Three of my former students (so far) have made significant contributions to this work: Matthew Heath (PhD), Jonathan Mason (PhD), and Hongfei Yang (MSc).

In this talk we will discuss various types of Swiss cheese set, and their applications. Here, a Swiss cheese set is a compact plane set obtained by deleting the union of some suitable sequence of open discs from some initial closed disc. Of course, without some additional conditions on the discs, this would mean that every compact plane set was a Swiss cheese set. In practice we place requirements on the positions and/or the radii of the deleted discs to ensure that the resulting set has desirable properties. Such Swiss cheese sets are a very useful source of examples in rational approximation theory and in the theory of uniform algebras.

We discuss some of the standard applications of Swiss cheese sets from the literature, including an example of O'Farrell (1979) of a regular uniform algebra with a continuous point derivation of infinite order. (This example is $R(X)$ for a suitable Swiss cheese set X.) We then describe a process which we call the 'classicalisation' of Swiss cheeses, which enables us to modify a Swiss cheese set X in order to improve its topological properties, while attempting to retain desired properties of $R(X)$. One direct application of this classicalisation procedure is to produce examples of essential, regular uniform algebras on locally connected, compact plane sets. However, more care is required in order to classicalise the example of O'Farrell. We discuss some of the issues, and how they can be overcome.

Adam Fuller (University of Nebraska-Lincoln, USA)
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Non-self-adjoint 2-graph algebras
Wednesday, July 31, Pascal, 10:00–10:30

We consider the weakly-closed non-self-adjoint operator algebras generated by representations of single-vertex 2-graphs. This is precisely the study of

algebras generated by 2 row-isometries, satisfying certain commutation relations. We show that these algebras all have a lower 3×3 triangular form, with the left-hand column being an ideal of the enveloping von Neumann algebra and the $(3,3)$ position being isomorphic to a higher-rank noncommutative Toeplitz algebra. This is joint work with Dilian Yang.

José E. Galé (University of Zaragoza, Spain)
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CONTINUOUS SHEFFER FAMILIES
Thursday, August 1, Pascal, 11:35–12:05

A convolution locally convex algebra (in the G. R. Allan sense) U of holomorphic functions is introduced as a natural setting where to place certain special functions. These are continuously parameterized versions of the orthogonal polynomials arising in the umbral calculus. Examples of semigroups and associated Sheffer-type or Appell-type families in U will be given. The Gamma function plays a central role in the picture.

The talk is based on joint work with J. S. Campos-Orozco.

György P. Gehér (University of Szeged, Hungary)
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ASYMPTOTIC BEHAVIOUR AND CYCLIC PROPERTIES OF TREE-SHIFT OPERATORS
Monday, July 29, HA4, 17:10–17:40

In this talk we are investigating a new class of operators called tree-shift operators (or weighted shifts on directed trees) introduced recently in [JJS3] by Z. J. JABŁONSKI, I. B. JUNG and J. STOCHEL. This class is a natural generalization of the so called weighted bilateral, unilateral and backward shift operators. The authors of [JJS3] were interested mainly in hyponormality, co-hyponormality, subnormality, hyperexpansivity e.t.c. Many of their examples for these properties are simpler than those previously found while investigating other classes of operators. In [JJS1] and [JJS2] the authors continued the study of tree-shift operators and constructed a closed non-hyponormal operator which generates Stieltjes moment sequences and investigated normal extensions of tree-shift operators. In [BJJS1] and [BJJS2] the authors provided a criterion for subnormality of both cases – bounded and

unbounded. This explains why there is a great potential in this topic, why it is worth working with this kind of operators.

During my talk my aim is to show how cyclicity is connected to asymptotic behaviour. In the first part of the talk we calculate the asymptotic limit and the isometric asymptote of a contractive tree-shift operator and that of the adjoint. Then we use the asymptotic behaviour and similarity properties to deal with cyclicity.

We also show that a weighted backward shift operator is cyclic if and only if there is at most one zero weight.

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Fereidoun Ghahramani (University of Manitoba, Canada)
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COMPARING VARIOUS NOTIONS OF APPROXIMATE AMENABILITY
Sunday, August 4, HA4, 10:10–10:40

The notion of approximate amenability was introduced by Richard J. Loy and I, in [4]. Later it was noted in [5] and [2] that there were other notions of approximate amenability somewhat related to the original one that appeared to be different from the original one, and yet had the property that all the known (naturally occurring or synthetic) examples of approximately amenable Banach algebras belonged to one or other class identified by one of these notions. Thus it was natural to know whether or not these notions were genuinely different from the original notion or from one another; the two prominent notions (for us) among these are the notions of *bounded approximate amenability* and *bounded approximate contractibility*. In this talk after recalling some previously known comparison results I will give a sketch of recent joint work with Charles Read, showing an example of approximately amenable Banach algebra that is not boundedly approximately amenable.

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WEAK AMENABILITY OF THE FOURIER ALGEBRA
Saturday, August 3, HA4, 16:00–16:30

A commutative Banach algebra, e.g. the Fourier algebra of a locally compact group, is said to be weakly amenable if it admits no non-zero, continuous derivations into its dual space. Due to the duality between the L^1-algebra and the Fourier algebra of a locally compact group, it is natural to suspect that the Fourier algebra of an amenable group is weakly amenable. But in 1992, Johnson constructed a non-zero bounded derivation from the Fourier algebra of the rotation group in 3 dimensions into its dual, which showed that the Fourier algebra of $\mathrm{SO}_3(\mathbb{R})$ is not weakly amenable. Subsequently, this result was extended to any non-Abelian, compact, connected group.

In this talk, we use techniques of non-Abelian harmonic analysis, and in particular continuous wavelet transforms, to construct explicit, non-zero derivations on the Fourier algebras of the $ax + b$ group and the reduced Heisenberg group. These are the first examples of locally compact groups with non-weak amenable Fourier algebras which do not contain closed copies of $\mathrm{SO}_3(\mathbb{R})$ or $\mathrm{SU}_2(\mathbb{C})$. Furthermore, using the structure theory of Lie groups, we deduce that the Fourier algebras of connected semisimple Lie groups also support non-zero derivations and are likewise not weakly amenable.

This talk is based on a joint work with Y. Choi.

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THE LOCAL MULTIPLIER ALGEBRA OF A C^*-ALGEBRA WITH FINITE-DIMENSIONAL IRREDUCIBLE REPRESENTATIONS
Monday, August 3, HA4, 15:00–15:30

In this talk we provide the computation of the local multiplier algebra for C^*-algebras having only finite-dimensional irreducible representations. We show that the local multiplier algebra coincides with the injective envelope in this case, and so the questions about stability and innerness of derivations are solved for the C^*-algebras in this class. The results do not involve any separability condition.

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FINITE SUMMABILITY IN NONCOMMUTATIVE GEOMETRY
Saturday, August 3, Pascal, 16:00–16:30

In noncommutative geometry Fredholm modules are a central object of study, summability of these makes life easier. In this talk we will discuss summability of bounded Fredholm modules. Connes' tracial obstruction to unbounded Fredholm module does not restrict existence of bounded Fredholm modules. We prove that any Fredholm module on a Cuntz-Krieger algebra is finitely summable and give an example of a bounded Fredholm module which is not finitely summable on any dense sub algebra. We also discuss possible obstructions to bounded Fredholm modules.

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ASYMPTOTIC CATEGORIES AND THEIR APPLICATIONS TO PROJECTIVE OPERATOR MODULES
Thursday, August 1, Pascal, 11:00–11:30

We shall speak only about two versions of the concept of a projective quantum (= operator) module: the *'extreme'*, actually introduced by Blecher [1], and *'metric'*, that seems to be new. There is a general-categorical frame-work, embracing the metric projectivity as well as all other kinds of projectivity we know. It is based on the notion of a rigged category, defined in the spirit of the relative abelian category of MacLane, and the derived notion of a free object. However, the extreme projectivity requires a kind of elaboration, *'asymptotic structure'*, which we shall discuss. The application of this abstract nonsense to quantum modules is based on the following observation: in the case of the best, 'freedom-loving', categories *the (just) projective objects are characterized as retracts, whereas asymptotically projective objects as the so-called near-retracts, of free objects*. For quantum modules both assertions can be expressed in terms of direct summands. We shall describe free objects in a large class of rigged categories. As a corollary, *free quantum modules turn out to be quantum l_1-sums of some specified families of what we call bricks*. The latter are modules of the form $A \otimes_{op} T_n$, where A is

the basic algebra, $\otimes_{op}$ means the operator-projective tensor product, and T_n is the space of $n \times n$ matrices, supplied by the trace class quantum norm. The importance of these T_n was demonstrated by Blecher; cf. below. As an immediate corollary, we obtain that *a quantum A-module is metrically, respectively, extremely projective iff it is a retract, respectively, near-retract of the quantum l_1-sum of some family of bricks.* (The part, concerning the extreme pro- jectivity, was originally proved by Blecher; see his argument, different from ours, in [1,Theorem 3.10]).

[1] D. P. Blecher. The standard dual of an operator space, Pacific J. of Math. v. 153, No. 1 (1992) 15-30.

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Convolution algebras of trace class operators
Tuesday, July 30, HA4, 11:00–11:25

We consider the convolution algebras $L_1(\mathbf{G})$ and $T(L_2(\mathbf{G}))$ associated with a locally compact quantum group $\mathbf{G}$, where $T(L_2(\mathbf{G}))$ is the space of trace class operators on $L_2(\mathbf{G})$ with the convolution induced by the right fundamental unitary of $\mathbf{G}$. We obtain a natural isomorphism between the completely bounded right multiplier algebras of $L_1(\mathbf{G})$ and $T(L_2(\mathbf{G}))$, and characterize the regularity of the quantum group $\mathbf{G}$ in terms of the convolution on $T(L_2(\mathbf{G}))$. We show that $T(L_2(\mathbf{G}))$ is strongly Arens irregular in the sense of Dales and Lau if and only if $\mathbf{G}$ is finite. Some commutation relations of completely bounded multipliers of $L_1(\mathbf{G})$ will also be discussed. This is joint work with Matthias Neufang and Zhong-Jin Ruan.

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Small Deformations of Algebras of Analytic Functions in C^n
Thursday, August 1, HA4, 16:00–16:30

For a domain Ω in C^n we denote by $A(\Omega)$ the algebra of functions that are continuous on $\overline{\Omega}$ and analytic on Ω. It has been known for a number of years, that the following three conditions are equivalent for domains in C^1:

1. Banach spaces $A(\Omega_1)$ and $A(\Omega_2)$ are nearly isometric (there is a linear map $T : A \to B$ such that $\|T\| \, \|T^{-1}\|$ is close to one),

2. Banach algebras $A(\Omega_1)$ and $A(\Omega_2)$ are nearly isomorphic (there is a linear surjective map $T : A \to B$ such that $\|T(fg) - T(f)T(g)\|$ is close to zero),

3. the quasiconformal distance between domains Ω_1 and Ω_2 is close to one.

It follows that any Banach algebra that is geometrically close to the disc algebra must in fact be identical with that algebra.

We will present some very recent generalizations of the above results to multidimensional setting where still very little is known. We will be able to describe small perturbations of the ball algebra, of the polydisc algebra, and we will discuss how the methods used for these two algebras may perhaps be applied for more general domains.

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CROSSED PRODUCT OF PRO-C^*-ALGEBRAS

Saturday, August 3, Pascal, 15:00–15:30

Crossed product of pro-C^*-algebras by inverse limit actions of locally compact groups were considered by Phillips [*Representable K-theory for σ –C^*-algebras*, K-Theory, 3(1989),5, 441-478], and Joiţa [*Crossed products of locally C^*-algebras,* Editura Academiei Române, Bucharest, 2007, ISBN 978-973-27-1600-7]. If α is an inverse limit action of a locally compact group G on a pro-C^*-algebra $A[\tau_\Gamma]$ whose topology is given by the family of C^*-seminorms $\Gamma = \{p_\lambda\}_{\lambda\in\Lambda}$, then the covariance algebra $L^1(G, \alpha, A[\tau_\Gamma])$ has a structure of locally m-convex $*$-algebra with the topology given by the family of submultiplicative seminorms $\{N_{p_\lambda}\}_{\lambda\in\Lambda}$, where $N_{p_\lambda}(f) = \int_G p_\lambda(f(g))\,dg$, and the crossed product of $A[\tau_\Gamma]$ by α is defined as the enveloping pro-C^*-algebra of $L^1(G, \alpha, A[\tau_\Gamma])$. In particular, for a given inverse limit automorphism α of a pro-C^*-algebra $A[\tau_\Gamma]$, we can associate to the pair $(A[\tau_\Gamma], \alpha)$ a pro-C^*-algebra by the crossed product construction, but if α is not an inverse limit automorphism, this construction is not possible because the covariance algebra has not a structure of locally m-convex $*$-algebra (N_{p_λ} is not a submultiplicative $*$-seminorm). On the other hand, a transformation group (X, G), with X a countably compactly generated Hausdorff topological space (X is a direct limit of a countable family of compact spaces $\{K_n\}_n$), induces an action β of G on the pro-C^*-algebra $C(X)$, which is not in general an

inverse limit action and so, we can not associate to (X, G) a pro-C^*-algebra by the above construction.

Given an automorphism α of a pro-C^*-algebra $A[\tau_\Gamma]$, or a transformation group (X, G), with X a countably compactly generated Hausdorff topological space, we can ask whether it is possible to associate to $(A[\tau_\Gamma], \alpha)$, respectively (X, G), a pro-C^*-algebra from which the properties of $(A[\tau_\Gamma], \alpha)$, respectively (X, G), can be recovered. In this talk, we will present some results in this direction.

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Isomorphism Invariants for Multivariable C*-dynamics

Tuesday, July 30, HA4, 15:00–15:30

Apart from the strong interest of the operator algebra community on C*-dynamics, additional motivation comes from the recent papers of Cornelissen and Marcolli in number theory and graph theory. In these papers Cornelissen and Marcolli make essential use of the work of Davidson and Katsoulis on tensor algebras and piecewise conjugacy of multivariable classical systems.

In our recent work with Katsoulis, we are able to examine piecewise conjugacy in the non-commutative setting. Nevertheless, in the course of proving this we were able to do more. We show that tensor algebras are a complete isomorphic invariant for unitary equivalence of a large class of systems, e.g., classical systems (even more, for systems by stably finite C*-algebras), and systems by *-epimorphisms.

This is joint work with Elias Katsoulis.

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Maximal left ideals of operators acting on a Banach space

Monday, July 29, Pascal, 16:35–17:05

We address the following two questions regarding the maximal left ideals of the Banach algebra $\mathcal{B}(E)$ of bounded operators acting on an infinite-dimensional Banach space E: (I) Does $\mathcal{B}(E)$ always contain a maximal left ideal which is not finitely generated? (II) Is every finitely-generated, maximal left ideal of $\mathcal{B}(E)$ necessarily of the form $\{T \in \mathcal{B}(E) : Tx = 0\}$

(*) for some non-zero $x \in E$? Since the two-sided ideal $\mathcal{F}(E)$ of finite-rank operators is not contained in any of the maximal left ideals given by (*), a positive answer to the second question would imply a positive answer to the first. Our main results are: (i) Question (I) has a positive answer for most (possibly all) infinite-dimensional Banach spaces; (ii) Question (II) has a positive answer if and only if no finitely-generated, maximal left ideal of $\mathcal{B}(E)$ contains $\mathcal{F}(E)$; (iii) the answer to Question (II) is positive for many, but not all, Banach spaces. We also make some remarks on a more general conjecture that a unital Banach algebra is finite-dimensional whenever all its maximal left ideals are finitely generated; this is true for C*-algebras.

(This is based on the recent preprint http://arxiv.org/abs/1208.4762 which is a joint work with H. G. Dales, T. Kochanek, P. Koszmider, N. J. Laustsen.)

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DUALITY RESULTS FOR GROUP VON NEUMANN ALGEBRAS AND JOINTLY INVARIANT OPERATOR SPACES

Wednesday, July 31, HA4, 15:00–15:30

We study subspaces of the projective tensor product $L^2(G)\widehat{\otimes}L^2(G)$ for a locally compact group G that are invariant under an action of the measure algebra $M(G)$ and simultaneously under all Schur multipliers. We relate them to subspaces of the group von Neumann algebra which are invariant under the action of the Fourier algebra $A(G)$.

This is joint work in progress with M. Anoussis (Aegean) and I.G. Todorov (Belfast).

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HYPER-INVARIANT SUBSPACES FOR SOME COMPACT PERTURBATION OF A DIAGONAL OPERATOR

Monday, July 29, HA4, 16:35–17:05

The hyper invariant subspace problem for a bounded operator T acting on a separable complex Hilbert space H, such that $T \neq \lambda I$, is about the existence of a non trivial closed subspace, which is invariant for all the operators

commuting with T. This is still an open question for operators of the form $D + K$, with D a diagonal operator and K a compact operator.

In this talk we will discuss the existence of non trivial hyper invariant subspaces for some operators of the form $D + K$.

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A generalization of a theorem of Stone and Kadison for ordered algebras with an order unit

Tuesday, July 30, Pascal, 11:00–11:30

The classical theorem of Stone and Kadison asserts that every ordered real algebra containing an order unit which is a multiplicative identity can be represented as a dense subalgebra of the algebra of continuous real-valued functions on a compact Hausdorff space via a norm- and order- preserving map that carries the order unit to the identity function. Motivated by the fact that many finitely generated ideals of ordered algebras contain an order unit, we generalize this result to the setting of ordered algebras with an order unit but not necessarily with a multiplicative identity. It emerges that the most natural framework for the representation theory of such algebras is provided by certain weighted function algebras.

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The Arveson-Douglas essential normality conjecture

Saturday, August 3, HA4, 11:00–11:30

A conjecture of Arveson and Douglas suggests a correspondence between algebraic varieties and C*-algebras of essentially normal operators. The conjecture is now over ten years old, yet it has been established only in certain special cases. In this talk, I will briefly explain why the conjecture is interesting, and describe some recent progress due to Orr Shalit and myself.

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DUAL ALGEBRAS AND A-MEASURES
Monday, July 29, Pascal, 15:00–15:30

The weak-star closures of Gleason parts of the spectrum of a function algebra A are studied. These closures relate to the second dual A^{**} and turn out to be both closed and open subsets of a compact hyperstonean space. Moreover, weak-* closures of the corresponding bands of measures are reducing. Among the applications we have a complete solution of an abstract version of the problem, whether the set of non-negative A-measures (called also Henkin measures) is closed with respect to the absolute continuity. When applied to the classical case of analytic functions on a domain of holomorhy $\Omega \subset \mathbb{C}^n$, our approach avoids the use of integral formulae for analytic functions and the strict pseudoconvexity, or other regularity of Ω. In another application we show under some general hypotheses that the bounded holomorphic functions on Ω form a dual algebra.

The coauthor of the presented result is Krzysztof Rudol.

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CRITERION OF IRREDUCIBILITY OF C^*-ALGEBRA GENERATED BY MAPPING
Saturday, August 3, Pascal, 17:10–17:40

Algebra $C^*\varphi(X)$ is generated by a mapping $\varphi : X \longrightarrow X$, where X is a countable set. This mapping gives rise to a family of partial isometries (finite or countable) acting on $l^2(X)$ which are the generators of $C^*\varphi(X)$. Thus the last could be classed as a C^*-algebra generated by partial isometries whose range and initial projections satisfy a specified set of conditions. I will briefly describe the main properties and structure of $C^*\varphi(X)$. I will formulate the criterion of irreducibility for $C^*\varphi(X)$ and some related results. I will also discuss various results for $C^*\varphi(X)$ which is not irreducible.

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IDEALS OF OPERATORS ON THE BANACH SPACE OF CONTINUOUS FUNCTIONS ON THE FIRST UNCOUNTABLE ORDINAL
Saturday, August 3, Pascal, 10:00–10:30

I shall report on joint work with Tomasz Kania (Lancaster) and Piotr Koszmider (Polish Academy of Sciences, Warsaw), in which we study the lattice of closed ideals of the Banach algebra $\mathscr{B}(C_0[0,\omega_1))$ of bounded operators acting on the Banach space $C_0[0,\omega_1)$ of scalar-valued, continuous functions which are defined on the locally compact ordinal interval $[0,\omega_1)$ and vanish eventually. (Here ω_1 denotes the first uncountable ordinal.) Our main theorem gives eight equivalent conditions, each describing the unique maximal ideal $\mathscr{M}$ of $\mathscr{B}(C_0[0,\omega_1))$.

Among the consequences of this result are: (i) $\mathscr{M}$ has a bounded left approximate identity; this complements a 25-year old result of Loy and Willis stating that $\mathscr{M}$ has a bounded right approximate identity; (ii) the trace space of $\mathscr{B}(C_0[0,\omega_1))$ is one-dimensional; (iii) the K-groups of $\mathscr{B}(C_0[0,\omega_1))$ are $\mathbb{Z}$ and $\{0\}$, respectively (provided that the scalar field is $\mathbb{C}$); (iv) $\mathscr{B}(C_0[0,\omega_1))$ has a unique second-largest ideal.

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OPERATOR AMENABILITY OF THE L^1-ALGEBRA OF A COMPACT QUANTUM GROUP

Wednesday, July 31, HA4, 10:00–10:30

We consider the question of operator amenability of the L^1-algebra of a compact quantum group. In order to answer the question we instead look at a related concept of operator biflatness. The final result says for a compact quantum group G, $L^1(G)$ is operator amenable if and only if G is co-amenable and of Kac type, which excludes examples like $SU_q(2)$.

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C^*-ALGEBRAS AND WEK* FIXED POINTS

Sunday, August 4, Pascal, 10:10–10:40

Let A be a separable C^*-algebra. We show that the dual $\widehat{A}$ of A is discrete if and only if the Banach dual A^* of A has the weak* fixed point property. Using this we show that a few more properties of A^* are equivalent to discreteness of $\widehat{A}$, among them the uniform weak* Kadec-Klee property for A^* and the coincidence of the weak* and the norm topology on the pure states of A

(resp. the unit sphere of A^*). This extends results about the special case of the C^*-algebra of a locally compact group and its Fourier-Stieltjes algebra, obtained by Fendler, Lau, and Leinert. In the group case, separability is not needed, in the general case it might be necessary (depending on the axioms used).

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NORMS OF IDEMPOTENT SCHUR MULTIPLIERS
Monday, July 29, HA4, 11:35–12:05

An idempotent Schur multiplier is a map $S_B\colon B(\ell^2) \to B(\ell^2)$ of the form $A \mapsto A * B$ where $*$ is entrywise multiplication of infinite matrices and B is a fixed matrix of zeros and ones. Livschits [1] has proven that the norm $\|S_B\|$ of such a map cannot lie in either of the "gaps" $(0, 1)$ or $(1, \sqrt{4/3})$.

It turns out that there are further gaps, and here we will explain how to identify the next four. Our method involves calculating the norms of some specific idempotent Schur multipliers and then applying simple combinatorial arguments. If time allows, we will also explain how to use techniques from [2] to show that these six gaps are present in the set of norms of all normal idempotent masa bimodule maps on $B(H)$.

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AN ALMOST $C_0(\mathcal{K})$-C*-ALGEBRA
Wednesday, July 30, HA4, 16:35–17:05

We introduce a class of C*-algebras called almost $C_0(\mathcal{K})$ and show that the C*-algebra of the 6-dimensional normal j-Lie group G_6 defined over $\widehat{G_6}$ as an algebra of operator fields is an example of an almost $C_0(\mathcal{K})$-C*-algebra. This is a joint work with Junko Inoue and Jean Ludwig.

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SPECTRA OF WEIGHTED COMPOSITION OPERATORS WITH AUTOMORPHIC SYMBOLS

Wednesday, July 31, Pascal, 15:00–15:30

Let φ be an automorphism of the open unit disc $\mathbb{D}$ and $u : \mathbb{D} \to \mathbb{C}$ an analytic map. For such φ, we shall discuss the spectra of invertible weighted composition operators $uC_\varphi(f) = u(f \circ \varphi)$ acting on a wide class of analytic function spaces; this class contains, for example, Hardy spaces, weighted Bergman spaces, and weighted Banach spaces of H^∞ type. We shall also discuss the spectral radius of uC_φ. This is joint work with Olli Hyvärinen, Ilmari Nieminen and Erno.Saukko.

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COMPLEX GEOMETRY OF THE SYMMETRISED BIDISC

Thursday, August 1, HA4, 15:00–15:30

We follow Kobayashi's approach in the theory of hyperbolic complex spaces and study the geometry and function theory of the symmetrised bidisc $\mathcal{G} = \{(z + w, zw) : |z| < 1, |w| < 1\}$ with the aid of n-extremal holomorphic maps from the open unit disc $\mathbb{D}$ to $\mathcal{G}$. Initial interest in the function theory and complex geometry of Γ arose from its connection with control engineering, but subsequently it is the implications for the theory of invariant distances that has proved most significant. The original engineering problem leads to the finite interpolation problem for $\mathrm{Hol}(\mathbb{D}, \mathcal{G})$ of analytic functions from $\mathbb{D}$ to $\mathcal{G}$.

We introduce a sequence $\mathcal{C}_\nu, \nu \geq 0$, of necessary conditions for solvability of an n-point interpolation problem for $\mathrm{Hol}(\mathbb{D}, \mathcal{G})$ and show that they are of strictly increasing strength. Extremality in condition $\mathcal{C}_\nu$ leads us to define classes $\mathcal{E}_{\nu n}$ of rational $\mathcal{G}$-inner functions, that is, analytic functions from

$\mathrm{Hol}(\mathbb{D}, \mathcal{G})$ whose boundary values almost everywhere on the unit circle lie in the distinguished boundary of $\mathcal{G}$. The classes are related to n-extremality and provide a kind of classification of rational $\mathcal{G}$-inner functions.

The talk is based on a joint work with Jim Agler and Nicholas Young.

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NON-SELFADJOINT DOUBLE COMMUTANT THEOREMS
Saturday, August 3, HA4, 11:35–12:05

The von Neumann Double Commutant Theorem states that if $\mathcal{N}$ is a unital and self- adjoint subalgebra of the set $\mathcal{B}(\mathcal{H})$ of all bounded linear operators acting on a Hilbert space $\mathcal{H}$, and if $\mathcal{N}' := \{T \in \mathcal{B}(\mathcal{H}) : TN = NT \text{ for all } N \in \mathcal{N}\}$, denotes the commutant of $\mathcal{N}$, then $\mathcal{N}'' = \mathcal{N}$. In this talk, we discuss not necessarily selfadjoint subalgebras $\mathcal{S}$ of $\mathcal{B}(\mathcal{H})$ whose second commutant $\mathcal{S}''$ agree with $\mathcal{S}$. More specifically, we examine the case where $\mathcal{S} = \mathcal{D} + \mathcal{R}$, where $\mathcal{R}$ is a bimodule over a masa $\mathcal{M}$ in $\mathcal{B}(\mathcal{H})$ and $\mathcal{D}$ is a unital subalgebra of $\mathcal{M}$.

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C^*-SEGAL ALGEBRAS WITH ORDER UNIT
Tuesday, July 30, Pascal, 10:00–10:30

In joint work with Jukka Kauppi (Oulu), we introduce the notion of a (noncommutative) C*-Segal algebra as a Banach algebra A

which is a dense ideal in a C*-algebra C, where the norm of A is strictly stronger than the one of C.

Several basic properties are investigated and, with the aid of the theory of multiplier modules, the structure of C*-Segal algebras with order unit is determined.

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RUSTON ELEMENTS AND FREDHOLM THEORY RELATIVE TO ARBITRARY HOMOMORPHISMS

Monday, July 29, Pascal, 11:00–11:30

Some Fredholm theory relative to two homomorphisms was developed in [4], and in [5] Ruston and almost Ruston elements were introduced relative to a bounded homomorphism. In this talk we expand the theory in [4]. We also show that it is possible to define Ruston and almost Ruston elements relative to a homomorphism which is not necessarily bounded and obtain a satisfactory theory in the case where the homomorphism has closed range (see [6]). In particular, we show that these concepts can be used to obtain alternative characterisations of Browder and Weyl spectra, in the case where the homomorphism has closed range and satisfies the Riesz property. In addition, we provide a number of applications and show that certain well-known results about continuous homomorphisms between Banach algebras have analogues for not necessarily continuous homomorphisms, generalising some of Robin Harte's results in [1], [2] and [3].

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THE SYMMETRIC STRONG DIAMETER 2 PROPERTY IN BANACH SPACES.
Saturday, August 3, Pascal, 16:35–17:05

The diameter 2 property (D2P) means that every non-void relatively weak open set of the unit ball B_X has diameter 2. In particular, every slice then has diameter 2. A property that implies the D2P (and much more) is the following: *X is said to enjoy the symmetric strong diameter 2 property if whenever $(S_i(x_i^*, \varepsilon_i))_{i=1}^n$ are n slices of B_X and $\varepsilon > 0$, there exist $x_i \in S_i$ and $\varphi \in B_X$ such that $x_i \pm \varphi \in S_i, i = 1, 2, ..., n$, and $\|\varphi\| > 1 - \varepsilon$.* Let us call this property the symmetric strong diameter 2 property (SSD2P)–a motivation for that particular name will be given in the talk. We will give examples of classes of Banach spaces having the SSD2P, discuss (lack of) stability when forming p-sums, look at possible passage of SSD2P to subspaces, see that Lindenstrauss spaces have the SSD2P, and finally, ask some natural questions arising.

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A NOTE ON WEIGHTED ORLICZ ALGEBRAS
Saturday, August 3, HA4, 16:35–17:05

Let G be a locally compact group and ω be a weight function on G and Φ denote a Young function. We obtain the weighted Orlicz space $L_w^\Phi(G)$ as a Banach algebra with respect to convolution and pointwise multiplication. The maximal ideal space of the convolution algebra $L_w^\Phi(G)$ on an abelian group G is also determined and certain Banach algebra properties are investigated.

This talk is based on joint work with A. Osancliol.

Thomas Vils Pedersen (University of Copenhagen, Denmark)
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PROPERTIES OF DERIVATIONS ON SOME CONVOLUTION ALGEBRAS
Thursday, August 1, Pascal, 10:00–10:30

For all the convolution algebras $L^1[0,1)$, L^1_{loc} and $A(\omega) = \bigcap_n L^1(\omega_n)$, the derivations are of the form $D_\mu f = Xf * \mu$ for suitable measures μ, where $(Xf)(t) = tf(t)$. We describe the (weakly) compact as well as the (weakly) Montel derivations on these algebras in terms of properties of the measure μ. Moreover, for all these algebras we show that the extension of D_μ to a natural dual space is weak-star continuous.

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QUANTUM POLYDISK, QUANTUM BALL, AND A q-ANALOG OF POINCARÉ'S THEOREM
Wednesday, July 31, Pascal, 16:00–16:30

The classical Poincaré theorem (1907) asserts that the polydisk $\mathbb{D}^n$ and the ball $\mathbb{B}^n$ in $\mathbb{C}^n$ are not biholomorphically equivalent for $n \geq 2$. Equivalently, this means that the Fréchet algebras $\mathscr{O}(\mathbb{D}^n)$ and $\mathscr{O}(\mathbb{B}^n)$ of holomorphic functions are not topologically isomorphic. Our goal is to prove a noncommutative version of the above result.

Given $q \in \mathbb{C}\backslash\{0\}$, we define q-analogs of $\mathscr{O}(\mathbb{D}^n)$ and $\mathscr{O}(\mathbb{B}^n)$ as certain noncommutative power series algebras. Both the resulting algebras $\mathscr{O}_q(\mathbb{D}^n)$ and $\mathscr{O}_q(\mathbb{B}^n)$ are the completions of the algebraic quantum affine space $\mathscr{O}_q^{\mathrm{reg}}(\mathbb{C}^n)$ w.r.t. certain families of seminorms. In the case where $0 < q < 1$, the algebra $\mathscr{O}_q(\mathbb{B}^n)$ admits an equivalent definition related to L. L. Vaksman's algebra $C_q(\bar{\mathbb{B}}^n)$ of continuous functions on the closed quantum ball. Both $\mathscr{O}_q(\mathbb{D}^n)$ and $\mathscr{O}_q(\mathbb{B}^n)$ can be viewed as Fréchet algebra deformations (in a suitable sense) of $\mathscr{O}(\mathbb{D}^n)$ and $\mathscr{O}(\mathbb{B}^n)$, respectively. Our main result is that $\mathscr{O}_q(\mathbb{D}^n)$ and $\mathscr{O}_q(\mathbb{B}^n)$ are not topologically isomorphic if $n \geq 2$ and $|q| = 1$. On the other hand, we show that they are topologically isomorphic if $|q| \neq 1$.

Krzysztof Piszczek (Adam Mickiewicz University, Poland)
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QUASINILPOTENT EQUIVALENCE IN BANACH ALGEBRAS
Wednesday, July 31, Pascal, 16:35–17:05

Let s be the space of rapidly decreasing sequences. It is a very important space in the structure theory of Fréchet spaces and has several natural representations as a function space. Let $\mathcal{S} := L(s', s)$ be the Fréchet space of linear and continuous operators from s to its dual s' equipped with the topology of uniform convergence on bounded sets. We then endow this space with the multiplication defined by

$$xy := x \circ \iota \circ y$$

where $\iota\colon s \hookrightarrow s'$ is the inclusion map. For reasons that will become apparent during the talk we call $\mathcal{S}$ the non-commutative Schwartz space.

By a derivation from $\mathcal{S}$ into a Fréchet $\mathcal{S}$-bimodule E we mean a linear map $\delta\colon \mathcal{S} \to E$ satisfying the 'derivation rule'

$$\delta(ab) = \delta(a)b + a\delta(b).$$

After introducing all necessary definitions we will show that any derivation from $\mathcal{S}$ into any Fréchet $\mathcal{S}$-bimodule is continuous.

Hung Le Pham (Victoria University of Wellington, New Zealand)
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MULTI-NORMS, WEAKLY COMPACTNESS, AND AMENABILITY OF GROUPS
Tuesday, July 30, HA4, 10:00–10:30

The theory of multi-norm was introduced by H. G. Dales and M. E. Polyakov, whose memoir has appeared recently in Dissertationes Math. In this talk, I'm going to apply this theory to give a characterization of relatively weakly compact subsets of $\mathfrak{L}^1$-spaces as those subsets that are *almost* (p, q)*-multi-bounded*, where $1 \leq p \leq q < \infty$. As an application of this, we shall prove that a linear operator T from an $\mathfrak{L}^\infty$-space to a Banach space is weakly compact if and only if

$$\lim_{n\to\infty} \frac{\pi_{q,p}^{(n)}(T)}{n^{1/q}} = 0\,.$$

Here $\pi_{q,p}^{(n)}(T)$ are the (q,p)-summing constants of the operator T. Another application is a proof that, for a locally compact group, its amenability is equivalent to a combinatorial condition that is apparently weaker than Følner's conditions.

This research arises out of previous joint work with H. G. Dales, M. Daws, and P. Ramsden, and I am grateful to Garth, Matt, and Paul for this.

Gerhard Racher (Universityof Salzburg, Austria)
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An exercise in amenable Banach algebras
Saturday, August 3, Pascal, 11:00–11:30

We present one further example when every weakly compact homomorphism from an amenable Banach algebra is finite dimensional. Along the lines of J. Gal, T. Ransford, and M. White in TAMS 331 (1992).

Cristina Radu (Universidade Federal do Rio de Janeiro, Brasil)
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Geodesics between Hilbertian Operator Spaces
Thursday, August 1, Pascal, 16:35–17:05

We show that the interpolation curve joining any two homogeneous Hilbertian operator spaces of the same dimension is a geodesic in the metric space defined by the completely bounded Banach Mazur distance. In proving this result we obtain explicit formula for the distance between certain well known operator spaces.

Thomas Ransford (Université Laval, Québec, Canada)
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Computation of analytic capacity and application to the subadditivity problem
Thursday, August 1, HA4, 11:35–12:05

I shall discuss a least-squares method for computing the analytic capacity of compact plane sets with piecewise-analytic boundary. The method furnishes rigorous upper and lower bounds that converge to the true value of the capacity. Examples computed via this method suggest a conjecture

which, if true, would imply that analytic capacity is subadditive. (Joint work with Malik Younsi.)

Heinrich Raubenheimer (University of Johannesburg, South Africa)
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Quasinilpotent equivalence in Banach algebras
Monday, July 29, Pascal, 11:35–12:05

We introduce the notion of quasinilpotent equivalence for elements in a Banach algebras and discuss a number of characterizations and consequences of this notion. The original idea of quasinilpotent equivalence goes back to Colojoară and Foiaş who introduced this notion for operators on a Banach space.

Oleg Reinov (Saint Petersburg State University, Russia)
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Eigenvalues of (r,p)-nuclear operators and (r,p)-approximation properties of Banach spaces
Tuesday, July 29, Pascal, 17:10–17:40

This talk may be considered as a small survey of results obtained very recently by me and my PhD student Qaisar Latif. We consider different types of nuclear operators and investigate the corresponding eigenvalues problems, applying the results for obtaining trace-formulas of Grothendieck–Lidskiĭ type. For more or less complete investigation of the problems, we had to introduce some new notions of approximation properties for Banach spaces with giving both positive and negative results in connection with the properties.

For example, we study the tensor products and corresponding operator ideals of the operators of kind

$(r;q)$ $T = \sum_{n=1}^{\infty} x'_n \otimes y_n$ with one of the sequence being weakly q-summable while another one is absolutely r-summable, for $r \in (0,1]$ (so, T is nuclear).

For this cases, we have, in particular,

(i) if $q' = p \in [1,2]$ and $T : X \to X$ is as above, then for $s > 0$ with $1/s = 1/r + 1/2 - 1/p$, T is of spectral type l_s. For $s = 1$, the nuclear trace and the spectral trace are well defined and coincide.

(ii) The result in (i) is sharp in a sense (roughly speaking, some approximation conditions are necessary). Discussing this sharpness, we give examples of operators U in Banach spaces, which are not nuclear, but whose adjoints U^* are of type mentioned in $(r; q)$ (even, for $2/3 < r < 1$).

The research was supported by the Higher Education Commission of Pakistan and by grant 12-01-00216 of RFBR.

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CONTRACTIVE IDEMPOTENTS ON LOCALLY COMPACT QUANTUM GROUPS
Wednesday, July 31, HA4, 11:00–11:25

A contractive idempotent on a locally compact group is a norm 1 measure on the group such that the measure is an idempotent under the convolution product. F.P. Greenleaf characterised such measures as twists by continuous characters of the Haar measures of compact subgroups. We shall discuss a generalisation of Greenleaf's result which gives an analogous characterisation for contractive idempotents on coamenable locally compact quantum groups. We shall also consider structures related to contractive idempotents. Namely, every contractive idempotent determines a convolution operator whose image is a ternary ring of operators (TRO) in the C*-algebra of "continuous functions vanishing at infinity" associated to the underlying quantum group. Conversely, certain TROs necessarily arise from contractive idempotents, leading to correspondence results under some conditions. The talk is based on joint work with Matthias Neufang, Adam Skalski and Nico Spronk.

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SERRE'S CONJECTURE FOR A BANACH ALGEBRA OF MEASURES USED IN CONTROL THEORY
Monday, July 29, Pascal, 17:10–17:40

Bert Schreiber (Wayne State University, USA)
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ALGEBRAS OF MULTILINEAR FORMS ON HYPERGROUPS
Wednesday, July 31, Pascal, 11:35–12:05

For locally compact hypergroups H_i, $i = 1, 2, \cdots, n$, let $CB(H_1, \cdots, H_n)$ denote the Banach space of completely bounded multilinear forms on $C_0(H_1) \times \cdots \times C_0(H_n)$, in the completely bounded norm. $CB(H_1, \cdots, H_n)$ can be given the structure of a Banach $*$-algebra under a multiplication and adjoint operation which agree with the convolution structure on the measure algebra $M(H_1 \times \cdots \times H_n)$. If the H_i are all abelian, $CB(H_1, \cdots, H_n)$ carries a naturally defined Fourier transform as functions on the space of semicharacters which generalizes the Fourier transform on hpergroup measure algebras. The construction of these Banach algebras will be outlined, and various other aspects of $CB(G_1, \cdots, G_n)$ will be described as time permits. This is joint work with Rupert Lasser.

Tatiana Shulman (University of Copenhagen)
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TRANSITIVITY AND ZERO-ERROR QUANTUM INFORMATION THEORY
Monday, July 29, HA4, 16:00–16:30

We are going to discuss how some facts on transitive subspaces of matrices can be applied to problems of quantum information theory, more specifically, to superactivation of quantum zero-error capacity. This is a joint work with M. Shirokov

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HARDY ALGEBRAS, BEREZIN TRANSFORMS, AND TAYLOR'S TAYLOR SERIES
Thursday, August 1, HA4, 11:00–11:30

Let $H^\infty(E)$ be the Hardy algebra of a countably generated W^*-correspondence E over a W^*-algebra with separable predual M. Also let Σ be an additive subcategory of the category of normal representations of M on separable

Hilbert space. For $\sigma \in \Sigma$, $\mathbb{D}(0,1,\sigma)$ denotes the open unit ball in the intertwiner space $\mathcal{I}(\sigma^E \circ \varphi, \sigma)$, where σ^E is the representation induced by E in the sense of Rieffel and φ gives the left action of M on E. The families $\{\mathbb{D}(0,1,\sigma)\}_{\sigma\in\Sigma}$ are variants of the matricial domains first studied by Taylor in the early 1970's and more recently by Voiculescu; Popescu; Helton, Klep, McCullough, and Slinglend; and by Kalyuzhny-Verbovetski and Vinnikov. Among other things they satisfy the inclusion $\mathbb{D}(0,1,\sigma)\oplus\mathbb{D}(0,1,\tau) \subseteq \mathbb{D}(0,1,\sigma\oplus\tau)$. Each $F \in H^\infty(E)$ determines a natural, holomorphic, $B(H_\sigma)$-valued function $\widehat{F}_\sigma$ on $\mathbb{D}(0,1,\sigma)$ that we call the σ-Berezin transform of F. The family $\{\widehat{F}_\sigma\}_{\sigma\in\Sigma}$ is uniformly bounded by $\|F\|$ and satisfies the intertwining equation $C\widehat{F}_\sigma(\mathfrak{z}) = \widehat{F}_\tau(\mathfrak{w})C$ for each C that intertwines σ and τ and satisfies $C\mathfrak{z} = \mathfrak{w}(I_E \otimes C)$. Thus $\{\widehat{F}_\sigma\}_{\sigma\in\Sigma}$ satisfies variants of the intertwining relations studied by Taylor and the others cited. We show, conversely, that if $\{f_\sigma\}_{\sigma\in\Sigma}$ is a uniformly bounded family of functions, $f_\sigma : \mathbb{D}(0,1,\sigma) \to B(H_\sigma)$, such that $Cf_\sigma(\mathfrak{z}) = f_\tau(\mathfrak{w})C$, for all C that intertwine σ and τ and satisfy $C\mathfrak{z} = \mathfrak{w}(I_E \otimes C)$, then f_σ admits one of Taylor's Taylor series. We use this series to show that given $\epsilon > 0$ and R, $0 < R < 1$, there is an $F \in H^\infty(E)$ that is a finite sum of tensors such that $\|f_\sigma(\mathfrak{z}) - \widehat{F}_\sigma(\mathfrak{z})\| < \epsilon$ for all σ and for all $\mathfrak{z} \in \mathbb{D}(0,R,\sigma)$.

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N-HYPERREFLEXIVITY OF THE BOUNDED n-COCYCLE SPACES OF BANACH ALGEBRAS

Sunday, August 4, HA4, 9:35–10:05

The study of reflexive and hyperreflexive linear spaces of operators has become an important topic in operator theory. The concept of hyperreflexivity has already been defined for subspaces of $B(X,Y)$, where X and Y are Banach spaces. We redefine this concept for the subspaces of $B^n(X,Y)$ for any $n \in N$, Taking into account the n-linear structure of $B^n(X,Y)$, we call the new concept $n-$hyperreflexivity. If A is a Banach algebra and X a Banach A-bimodule, we give sufficient conditions under which $\mathcal{Z}^n(A,X)$, the space of all bounded n-cocycles from A into X, is n-hyperreflexive. To do so, we define two notions related to a Banach algebra: The strong property (B) and bounded local units. The hereditary properties of both notions are presented. We apply our approach and show that the bounded n-cocycle spaces

related to certain C*-algebras and group algebras are n-hyperreflexive. We will also provide conditions under which we can construct more examples of n-hyperreflexive spaces. Joint work with Ebrahim Samei.

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MULTIPLICATIVE MAPS ON $B(H)$ THAT ARE CLOSE TO AN AUTOMORPHISM
Tuesday, July 30, Pascal, 11:35–12:05

Let B(H) be the algebra of all bounded operators on a Hilbert space H. It is shown that if f is a multiplicative map (not assumed linear) on B(H) and if f is sufficiently close to a algebra automorphism of B(H) then it is actually an automorphism (joint work with L. Marcoux and H. Radjavi).

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p-OPERATOR SPACES AND FEICHTINGER–FIGA-TALAMANCA–HERZ ALGEBRAS
Saturday, August 3, HA4, 15:00–15:30

We consider the minimal boundedly-translation-invariant Segal algebra $S_0^p(G)$ in the Figà-Talamanca–Herz algebra $A_p(G)$ of a locally compact group G. In the case that $p = 2$ and G is abelian this is the classical Segal algebra of Feichtinger. Hence we call this the Feichtinger–Figà-Talamanca–Herz Segal algebra of G. Remarkably, this space is also a Segal algebra in $L^1(G)$ and is, in fact, the minimal such algebra which is closed under pointwise multiplication by $A_P(G)$. Even for $p = 2$, this result is new for non-abelian G. We place a p-operator space structure on $S_0^p(G)$, and demonstrate the naturality of this by showing that it satisfies all natural functorial properties: projective tensor products, restriction to subgroups and averaging over normal subgroups. However, due to complications arising within the theory of p-operator spaces, we are forced to work with weakly completely bounded maps in many of our results.

This is joint work woth Serap Öztop of U. of Istanbul.

Wojciech Szymanski (University of Southen Denmark)
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AUTOMORPHISMS OF GRAPH ALGEBRAS
Tuesday, July 30, HA4, 16:00–16:30

We discuss recent progress in the study of automorphisms of graph C*-algebras. Our focus is on the interplay between analytic, topological and discrete methods (including computer supported experimental approach), as well as on the connections with symbolic dynamics. This is joint work with Roberto Conti (Rome), Jeong Hee Hong (Busan), James Avery and Rune Johansen (both in Copenhagen).

Fatemeh Taleghani (Azad University of Lahijan, Iran)
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STRUCTURE OF QUASI OPERATOR SPACES
Saturday, August 3, MVH12, 17:10–17:40

We define a specific C^*-seminorm on the bounded part of unital $*$-algebras which enables us to provide algebraic characterizations of operator spaces, operator systems and C^*-algebras. We call a subspace of a unital complex $*$-algebra A [resp. self adjoint subspace of A containing 1_A] a quasi operator space [resp. quasi operator system]. We extend the classical relationships among positivity, boundedness, complete positivity and complete boundedness to quasi operator systems. Schwarz inequality for 2-positive maps and Smith's theorem are also extended to quasi operator spaces. We study the order structure of $*$-vector spaces with a (not necessarily proper) cone, as abstract generalization of quasi operator systems. Then we obtain a characterization of bounded quasi operator spaces which is an algebraic analog of Ruan's characterization of operator spaces. This enables us to define minimal and maximal quasi operator space structures on a seminormed space.

This talk is based on joint work with G. H. Esslamzadeh

Thomas Tonev (University of Montana, Missoula)
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SUFFICIENT CONDITIONS FOR ISOMORPHISMS BETWEEN FUNCTION ALGEBRAS

Let $T\colon A \to B$ be a surjective (not necessarily linear) map between two function algebras on locally compact Hausdorff spaces X and Y with Choquet boundaries $\delta A \subset X$ and $\delta B \subset Y$. If $\|TfTg\| = \|fg\|$ for all $f, g \in A$, then there is a homeomorphism $\psi\colon \delta B \to \delta A$ so that $|(Tf)(y)| = |f(\psi(y))|$ for all $y \in \delta B$ and $f \in A$. If, more generally, $\sigma_\pi(TfTg) \subset \sigma_\pi(fg)$ for all $f, g \in A$ (where $\sigma_\pi(f)$ is the peripheral spectrum of f), we show that $(Tf)(y) = \alpha(y)\, f(\psi(y))$ for some $\alpha \in C(\delta B)$ with $\alpha^2 = 1$, i.e. T is a weighted composition operator on δB. This is true also if $\sigma_\pi(TfTg) \cap \sigma_\pi(fg) \neq \emptyset$ for all $f, g \in A$ and T preserves singleton peripheral spectra of algebra elements. In the case of metric spaces X the condition $\sigma_\pi(TfTg) \cap \sigma_\pi(fg) \neq \emptyset$ alone suffices for T to be a weighted composition operator. If, in addition $dist(\sigma_\pi(Tf), \sigma_\pi(f)) < 2$ for all $f \in A$, then in all cases $\alpha = 1$, i.e. $(Tf)(y) = f(\psi(y))$, therefore, T is a composition operator, and consequently, an isometric algebra isomorphism. (Jointly with J. Johnson, PhD student)

More generally, if $\|TfTg\| = \|fg\|$ and there is an $0 \leq \varepsilon < 2/3$, so that $\sigma_\pi(TfTg)$ is contained in an $(\varepsilon\,\|fg\|)$-neighborhood of $\sigma_\pi(fg)$ for all $f \in A$ and all $g \in A$ with $\|g\| = 1$, then there is an $\alpha \in C(\delta B)$ with $\alpha^2 = 1$ and a homeomorphism $\psi\colon \delta B \to \delta A$ so that $|(Tf)(y) - \alpha(y)\, f(\psi(y))| \leq 2\varepsilon\,|f(\psi(y)|$ for each $f \in A$ and every $y \in \delta B$, i.e. T is an almost weighted composition operator on δB. Moreover, if there are $0 \leq \varepsilon < 1$, $0 \leq \eta < 1$, so that $dist(\sigma_\pi(TfTg), \sigma_\pi(fg)) \leq \varepsilon\,\|fg\|$ and $\sigma_\pi(Tf)$ is contained in an η-neighborhood of $\sigma_\pi(f)$ for all $f \in A$ and all $g \in A$ with $\|g\| = 1$, then $|(Tf)(y) - f(\psi(y))| \leq (\varepsilon + \eta)\,|f(\psi(y))|$ for each $y \in \delta B$ and every $f \in A$, i.e. T is an almost algebraic isomorphism. (To appear in the PAMS)

Ivan Todorov (Queen's University Belfast, UK)
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SETS OF MULTIPLICITY IN LOCALLY COMPACT GROUPS AND THEIR OPERATOR VERSIONS
Wednesday, July 31, HA4, 16:00–16:30

A closed subset F of a locally compact group G is called a set of multiplicity if there exists a non-zero operator in the reduced C*-algebra $C_r^*(G)$ of G supported on F. Analogously, a subset E of $G \times G$ is called a set of operator multiplicity if there exists a non-zero compact operator acting on $L^2(G)$ supported on E. After recalling the historical background of the research in this area, recent results on the connection between sets of multiplicity and those of operator multiplicity will be discussed. Natural p-versions ($1 \leq p < \infty$) of these notions will be introduced and a similar relation will be presented in certain cases. Preservation under unions and direct products will be addressed.

The talk will be based on joint work with V. S. Shulman and L. Turowska.

Vladimir Troitsky (University of Alberta, Canada)
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NORM CLOSED OPERATOR IDEALS IN LORENTZ SEQUENCE SPACES
Tuesday, July 30, Pascal, 16:35–17:05

There are few Banach spaces X for which the structure of the norm closed ideals in the space of all bounded linear operators $L(X)$ is completely known. There are also a few spaces for which several norm closed ideals in $L(X)$ are known, but it is not known whether the list is exhaustive. In this work, we find several ideals in $L(X)$ where $X = d_{w,p}$ is a Lorentz sequence space. In particular, we study the following ideals: operators that factor through ℓ_p, strictly singular operators, operators that are not isomorphisms on any subspace which is isomorphic to the whole space, etc.

Viktoria Velasco (University of Granada, Spain)
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THE RADICAL OF AN ALGEBRA FREE OF ASSOCIATIVITY AND THE SPECTRUM
Thursday, August 1, Pascal, 16:35–17:05

We define an **algebra** as a linear space A provided with a bilinear map $(a, b) \mapsto ab$ from $A \times A \to A$ named the **multiplication** of A. Therefore, associative algebras are just a particular type of algebras (as well as the Jordan algebras or the power-associative algebras, for instance). We define the **spectrum** of an element in an algebra A as the corresponding to the following definition of invertibility: $a \in A$ is invertible if both multiplication operators L_a and R_a are bijective. Around this notion of spectrum we develop a basic theoretical support for a non-associative spectral theory. The **Jacobson's radical** of an algebra is defined (as the intersection of the primitive ideals) and it is characterized in terms of the quasi-nilpotent elements. Classical automatic continuity theorems are established in this setting free of the associativity.

Ami Viselter (University of Alberta, Canada)
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Ergodic theory for quantum (semi)groups

Wednesday, July 31, HA4, 11:35–12:05

We shall describe a generalization of recent work on aspects of ergodic theory of semigroup actions on von Neumann algebras to the context of quantum semigroups. A brief introduction to the analytic theory of quantum (semi)groups will be given.

Griffith Ware (Australian National University)
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New examples of Calkin algebras that have a unique algebra norm

Tuesday, July 30, HA4, 17:10–17:40

We shall discuss examples of Banach spaces X for which the Calkin algebra $\mathscr{B}(X)/\mathscr{K}(X)$ has a unique algebra norm (without assuming completeness). Previously, M. Meyer established this result for c_0 and ℓ_p, $1 \leq p < \infty$, by relying on very strong properties of block bases, specific to those spaces. We shall outline how these properties can be relaxed in order to prove the result for a wider class, including $\ell_p \oplus \ell_q$, $\ell_p(\ell_r^n)$, Tsirelson's space, and James' space. In particular, this answers a question raised by H.-0. Tylli.

Ioannis Zarakas (University of Athens, Greece)
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DERIVATIONS OF GENERALIZED B^*-ALGEBRAS
Saturday, August 3, MVH12, 16:00–16:30

Generalized B^*-algebras (shortly, GB^*-algebras) are generalizations of C^*-algebras. They were introduced and studied first by G.R. Allan, in 1967. P.G. Dixon showed, in 1970, that GB^*-algebras are algebras of unbounded operators. This automatically gives a strong impetus for their study. The Arens algebra $L^\omega[0,1] = \bigcap\limits_{1\leq p<\infty} L^p[0,1]$ equipped with the topology of the L^p-norms, $1 \leq p < \infty$, as well as pro$-C^*-$algebras (i.e, inverse limits of C^*-algebras) are typical examples of GB^*-algebras. Pro $-C^*-$algebras have been used as algebras of unbounded operators by A. Inoue (1971), G. Lassner (1972) and other researchers.

In this talk we shall discuss some results concerning the behaviour of derivations on GB^*-algebras. We note that if $A[\tau]$ is a GB^*-algebra, its "bounded part" is a C^*-algebra denoted by $A[B_0]$ and plays an important role for its study.

The results we shall present are the following:

1. The only derivation of a commutative Fréchet GB^*-algebra is the zero one.

An Example of a commutative $*-$algebra of unbounded operators (with the so–called "uniform topology", defined by a family of $*-$seminorms, not having the C^*-property) will be presented, having a non–zero derivation.

2. If $A[\tau]$ is a GB^*-algebra with $A[B_0]$ a type I_∞ W^*-algebra and $\delta : A[\tau] \to A[\tau]$ a derivation of $A[\tau]$, then δ is inner and thus continuous.

3. Let $A[\tau]$ be a Fréchet GB^*-algebra and $X[\tau']$ a Fréchet locally convex $A-$bimodule endowed with a continuous involution. Let $\delta : A[\tau] \to X[\tau']$ be a derivation such that $\delta \restriction_{A[B_0]}$ is $\tau \restriction_{A[B_0]} -\tau'$ continuous, then δ is $\tau - \tau'$ continuous.

At the end of the talk some questions will be stated.

- The talk is based on a joint work with M. Weigt.

Poster Talks:

David Cushing (Newcastle University, UK)
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PROJECTIVITY OF C^*-ALGEBRAS WITH FELL'S CONDITION

Ivan Feshchenko (Kiev University, Ukraine)
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ON THE ESSENTIAL SPECTRUM OF THE SUM OF SELFADJOINT OPERATORS AND CLOSEDNESS OF THE SUM OF OPERATOR RANGES

Let $\mathcal{H}$ be a complex Hilbert space, and $A_1, \dots, A_N$ be bounded self-adjoint operators in $\mathcal{H}$ such that $A_i A_j$ is compact for any $i \neq j$. It is well-known that $\sigma_e(\sum_{i=1}^N A_i) \setminus \{0\} = (\cup_{i=1}^N \sigma_e(A_i)) \setminus \{0\}$, where $\sigma_e(B)$ stands for the essential spectrum of a bounded self-adjoint operator B.

We get necessary and sufficient conditions for $0 \in \sigma_e(\sum_{i=1}^N A_i)$. This conditions are formulated in terms of the projection valued spectral measures of A_i, $i = 1, \dots, N$. Using this result, we obtain necessary and sufficient conditions for the sum of ranges of A_i, $i = 1, \dots, N$ to be closed.

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CROSSED PRODUCTS BY ENDOMORPHISMS AND RELATED PROBLEMS

Starting from an arbitrary $*$-endomorphism of a unital C^*-algebra, by presenting special 'matrix calculus' and giving explicit norm formulas, we will construct a crossed product. We will study the relations that define it as a universal C^*-algebra and discuss its relationship with other relevant constructions and problems. (Based on joint work with A. V. Lebedev.)

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HOMOLOGICAL PROPETIES OF IDEAL OF ALGEBRA $C(X)$, WHERE X IS AN ULTRAMETRIC COMPACT

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ON INTEGRABLE REPRESENTATIONS OF DEFORMED CCR

We study class of integrable representations of deformed Wick version of canonical commutation relations on two generators. Namely we consider a $*$-algebra $\mathcal{A}_\lambda$ with generators a_1, a_2 and relations

$$a_i^* a_i = 1 + a_i a_i^*, \quad a_1^* a_2 = a_2 a_1^*,$$

where $\lambda \in \mathbb{C}$, $|\lambda| = 1$, is fixed.

We construct largest quadratic and cubic homogeneous Wick ideals $\mathcal{I}_k$, $k = 2, 3$, of $\mathcal{A}_\lambda$, give precise definitions of integrable unbounded representation of $\mathcal{A}_\lambda/\mathcal{I}_k$, $k = 2, 3$, and describe irreducible integrable representations up to the unitary equivalence. In particular, it is shown that for $\mathcal{A}_\lambda/\mathcal{I}_2$ the analog of J. von Neumann result on uniqueness of irreducible integrable representation of CCR algebra holds. This is a joint work with V.Ostrovskyi and L.Turowska.

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Some relations of geometry of Banach spaces and approximation theory

Let B be a Banach space of *functions* on $\mathbb{R}^d$ or $\mathbb{T}^d$ for which translations are isometries (or on the sphere S^{d-1} for which rotations are isometries). We show that moduli of convexity and smoothness of the unit ball of B are related to sharp versions of certain important inequalities in approximation theory. These inequalities allow to characterize the error of approximation of a function by algebraic, trigonometric or spherical harmonic polynomials using approximation theoretic moduli of smoothness of the function (which in certain sense generalize the derivative). As applications, we obatin sharp versions of the classical Jackson and Marchaud type inequalities. The results cover L_p spaces with $1 < p < \infty$ and many Orlicz spaces (joint work with Z. Ditzian).

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The Hyers-Ulam stability of Weighted Composition Operators on Closed Subspaces of $C(X)$

Let X be a compact metric space and let $C(X)$ denote the space of all continuous complex-valued functions defined on X equipped with the supremum norm. Let $A = A(X)$ be a uniformly closed subspace of $C(X)$. We will consider the operators $T : A \to C(X)$ of the form $T : f \mapsto u \cdot f \circ \varphi$ (the symbol $\circ$ denote the composition of functions), where $u \in C(X)$ is a fixed function and $\varphi : X \to X$ is a selfmapping of X which is continuous on the support of function u , i.e., on the open set $S(u) = \{x \in X : u(x) \neq 0\}$ (in particular, we can choose the function u and the selfmapping φ such that the operator T may be acting in $A(X)$, i.e., $T : A(X) \to A(X)$). The operators of these forms are called the weighted composition operators induced by the function u (the weighted function) and by selfmapping φ . Since the endomorphisms of any semisimple commutative Banach algebras (also, any bounded linear operator on a Banach space) can be represented as operators of these forms, so the weighted composition operators are very interesting to study. Composition operators (i.e., the operators of the forms as operator T with the weighted function $u \equiv 1$) and weighted composition operators on the concrete uniform algebras are being investigated from different points of view (such as compactness, nuclearity, spectrum, etc.) by many authors. The aim of this report is to clarify the Hyers-Ulam stability of such operators. In particular, we characterize the weighted composition operators on uniform algebras which have the Hyers-Ulam stability.

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Weak amenability of certain Beurling algebras

For a locally compact Abelian group G weak amenability of the Beurling algebra $L^1(G, \omega)$ was recently characterized by Y. Zhang. In this talk I will focus on weak amenability of $L^1(G, \omega)$ for some non-commutative groups G.

The first group to consider will be the free group $\mathbb{F}_2$. I will show that if the weight ω depends only on the length $|x|$ of the word $x \in \mathbb{F}_2$ and is increasing as a function of the length, then $\ell^1(\mathbb{F}_2, \omega)$ is weakly amenable if and only if ω is bounded. In particular, $\ell^1(\mathbb{F}_2, \omega_\alpha)$ is not weakly amenable for any weight $\omega_\alpha(x) = (1 + |x|)^\alpha$ with $\alpha > 0$, in contrast to $\ell^1(\mathbb{Z}, \omega_\alpha)$ with $\omega_\alpha(n) = (1 + |n|)^\alpha$, which is weakly amenable whenever $0 < \alpha < 1/2$ as is proved by W.G. Bade, P.C. Curtis, and H.G. Dales.

Next I will show that if G is a σ-compact amenable group with a weight $\omega \geq 1$ on it, H is a normal subgroup of G, and the weight $\hat{\omega}$ on G/H is defined as an infimum of ω over the conjugacy classes, then weak amenability of $L^1(G, \omega)$ implies weak amenability of $L^1(G/H, \hat{\omega})$. This together with the result of Y. Zhang on amenability of Abelian group algebras will allow us to get a necessary condition for weak amenability of $L^1(G, \omega)$ when G is solvable and σ-compact. However, this condition is not sufficient, and the corresponding example for $ax + b$ group will be presented.

If time permits, I will also talk about some results on weak amenability of the center algebras $ZL^1(G)$ and $ZL^1(G, \omega)$.

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ON THE TOPOLOGICAL VERSION OF PROJECTIVITY FOR CLASICAL, OPERATOR AND SEMI-OPERATOR MODULES

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HYERS-ULAM STABILITY, EXPONENTIAL STABILITY AND DICHOTOMY FOR AUTONOMOUS SYSTEMS

Let $A \in M(n, \mathbb{C})$ and Consider the following discrete Cauchy problem

$$\begin{cases} x_{n+1} = Ax_n, \quad n \in \mathbb{Z}_+, \\ x_0 = b. \end{cases} \qquad (A, b)$$

Here, we give equivalent characterization for the stability of (A, b) in Hyers-Ulam sense in term of exponential stability and exponential dichotomy for matrix A. Similar characterizations for continuous case are also given.

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In this talk, we present the notion of (-1)-weak amenability. For a Banach algebra A, A'' is called (-1)-weakly amenable if A' is a Banach A''-bimodule and every bounded derivation from A'' into A' is inner.

To study this notion, first we give some examples of Banach algebras which are or are not (-1)-weakly amenable. For example, we consider (-1)-weak amenability of measure algebras, group algebras and Lipcshitz algebras, for some certain groups and semigroups.
We will present some heriditary properties such as, the role of the Arens products, the relationships between (-1)-weak amenability of A'' and its ideals and quotients and conditions on which (-1)-weak amenability can be transferred by a continuous homomorphism.
We also prove some general theorems for (-1)-weak amenability in commutative cases, point derivations, C^*-algebras, unitization, ... Moreover, we study the relations between the (-1)-weak amenability of A'' and weak amenability of A, weak amenability of A'' and (-1)-weak amenabibity of $A^{(4)}$.

By the Theorems that we proved, it seems that (-1)-weak amenability is too close to the notion of weak amenability, but we give some examples show that these notions are different.

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Decomposition of a unitary operator into a product of roots of the identity

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