Schedule

Note: On Monday and Friday, we do not have talks, but coffee will be served at 10 am and 2 pm in the club hall (room 409), and everyone is welcome to come for free discussion (room 405).

ALL lectures/talks will take place in Room 321, IMPAN.

	Monday (Nov. 25)	Tuesday(Nov. 26)	Wednesday(Nov. 27)	Thursday(Nov. 28)	Friday(Nov. 29)
9:00-10:00		**Meyer**	**Meyer**	**Meyer**	
10:00	Coffee	Coffee	Coffee	Coffee	Coffee
10:30-11:30		**Carlsen**	**Szymański**	**Carlsen**	
11:40-12:40		**Bice**	**Li**	**Stachura**	
12:40-15:00					
15:00-16:00	Coffee	**Sliżewska**	**Antunes**	**Bardadyn**	

Abstracts

1. **Celso Antunes** „Effectivity and minimality for groupoid models over the natural numbers"

   A groupoid correspondence is a geometric object from which we can construct a C^*-correspondence between groupoid C^*-algebras. A proper groupoid correspondence gives raise to a proper C^*-correspondence, which is the case we work on. Given an étale groupoid G and a proper groupoid correspondence X, we can take its Cuntz-Pimsner algebra to generate a C^*-algebra out of this data. This generalizes various constructions like topological graphs, self-similar groups and self-similar graphs. We study a groupoid model for this C^*-algebra and prove conditions for which this is minimal and effective based on the initial data provided by the étale groupoid and the groupoid correspondence. We then compare our results to the ones already known for the examples described above.

2. **Krzysztof Bardadyn** „Cartan subalgebras and spectrum of weighted composition operators"

   A natural class of weighted composition operators aT, $a \in A$ on a Hilbert space of L^2 functions and weights in a multiplication operators algebra A satisfy conditions: $T^*AT \subseteq A$, $Ta = a \circ \varphi, a \in A$, where φ is a shift map on a spectrum of A. If φ is a local homeomorphism then the C^*-algebra $C^*(A,T)$ is modeled both by Exel's crossed product and Reanult-Deaconu groupoid. Using this we deduce that if φ is topologically free then $A \subseteq C^*(A,T)$ is a Cartan inclusion. Hence A is a maximal abelian subalgebra that detects ideals in $C^*(A,T)$. We show how these properties allows to describe the spectrum $\sigma(aT)$, $a \in A$. We also clarify the relationship between spectral radius $r(aT)$ and topological pressure. (Based on joint work with Bartosz Kwaśniewski.)

3. **Tristan Bice** „An Algebraic Approach to the Weyl Groupoid"

   We outline a more general algebraic approach to Kumjian and Renault's Weyl groupoid construction. Specifically, we construct the Weyl groupoid directly from the *-semigroup structure of the normalisers, thus unifying it with the Lawson-Lenz version of Exel's tight groupoid construction. This further leads to an alternative Weyl bundle construction (essentially equivalent to the "twist"in Kumjian and Renault's work) which recovers not just line bundles but general Fell bundles whose fibres contain unitaries and even „Fell-Hilbert bundles" corresponding to non-commutative Hilbert modules.

4. **Toke Carlsen** „C*-rigidity of topological dynamical systems"

   There is a long tradition for constructing C*-algebras from dynamical systems. An important motivation for doing this is to get new examples of C*-algebras that can be studied via dynamical systems, but sometimes it is also possible to recover a dynamical systems from its C*-algebra.

   C*-rigidity of dynamical systems is the principal that dynamical systems can be recovered, up to a suitable notion of equivalence, from C*-algebraic data associated to them. An example of this is the result of Giordano, Putnam, and Skau that

says that the crossed products of two Cantor minimal systems are isomorphic if and only if the Cantor minimal systems are strong orbit equivalent. Another example is the result by Tomiyama that says that the crossed products of two topologically transitive dynamical systems on compact metric spaces are isomorphic in a diagonal-preserving way if and only if the systems are flip conjugate.

Recently, it has been shown that it is possible to recover shifts of finite type up to flow equivalence, continuous orbit equivalence, and conjugacy from their Cuntz-Krieger algebras.

I will give an overview of these results and explain how groupoids can be used to prove and generalise them.

5. **Toke Carlsen** „Reconstruction of étale groupoids"

   I will explain how to extend Renault's construction of his Weyl groupoid in a way such that many graded locally compact Hausdorff étale groupoids can be recovered from their reduced C*-algebra.

6. **Kang Li** „Diagonal dimension for C^*-pairs"

   We will introduce the notion of diagonal dimension for diagonal pairs of C^*-algebras in the sense of Kumjian, and will compare it with the usual nuclear dimension for C^*-algebras. For instance, the Jiang-Su algebra $\mathcal{Z}$ admits a diagonal MASA D such that the diagonal dimension of $(\mathcal{Z}, D)$ is equal to n for any given natural number n even though the nuclear dimension of $\mathcal{Z}$ is equal to 1. We also show that the diagonal dimension of a uniform Roe algebra with respect to the standard diagonal is equal to the asymptotic dimension of its underlying metric space. Finally, we will discuss its relation to the dynamic asymptotic dimension of groupoids introduced by Guentner, Willett and Yu and the (fine) tower dimension of topological dynamical systems introduced by Kerr. Based on joint work with Hung-Chang Liao and Wilhelm Winter.

7. **Ralf Meyer** „Crossed products for inverse semigroups and their ideal structure"

   This series of talks is an invitation to my recent joint work with Bartosz Kwaśniewski.

   Actions of inverse semigroups contain actions of groups and étale groupoids and Fell bundles over them as special cases. The crossed products for such actions contain twisted groupoid C*-algebras of étale groupoids as a special case. Besides the full crossed product, I will explain the essential crossed product, which is defined through a conditional expectation with values in the local multiplier algebra of the coefficient algebra. If the inverse semigroup action is sufficiently non-trivial, then the inclusion of the coefficient algebra in the essential crossed product detects ideals, that is, a non-zero ideal in the crossed product has non-zero intersection with the coefficient algebra. The preferred definition of sufficiently non-trivial is a condition due to Kishimoto, which is called „aperiodic" in my joint articles with Kwaśniewski; this property is often equivalent to other non-triviality properties such as the topological freeness of the dual groupoid, which is defined as the transformation groupoid of the induced inverse semigroup action on the space of equivalence classes of irreducible representations of the coefficient

algebra. In particular, the essential groupoid C*-algebra of an étale, possibly non-Hausdorff, locally compact groupoid is simple if and only if the underlying groupoid is topologically free and minimal.

I plan to start explaining the generalised intersection property for groupoid C*-algebras of étale groupoids, which does not yet require heavy notation. Then I will briefly discuss some of the classical results by Kishimoto and Olesen–Pedersen for group actions by automorphisms and modify Kishimoto's original condition to the definition of an aperiodic inclusion of C*-algebras. Then I formulate the main theorem on the generalised intersection property for aperiodic inclusions. I will sketch the elegant direct proof of this result. (In the original article, a stronger property related to pure infiniteness of crossed products is proven, which requires more work.) Then I turn to crossed products by inverse semigroup actions. I will define full and essential crossed products for them and discuss aperiodicity for inverse semigroup actions.

8. **Aneta Sliżewska** „Fibre-wise linear Poisson structures related to W^*-algebras"

   We will investigate the fiber-wise linear Poisson structures as well as the Lie groupoid and Lie algebroid structures which are defined in the canonical way by the structure of a W^*-algebra (von Neumann algebra) $\mathfrak{M}$. The main role in this theory is played by the complex Banach-Lie groupoid of partially invertible elements of the algebra $\mathfrak{M}$ over the lattice $\mathcal{L}(\mathfrak{M})$ of orthogonal projections of this algebra. The Atiyah sequence and the predual Atiyah sequence corresponding to this groupoid are investigated from the point of view of Banach Poisson geometry. In particular we show that the predual Atiyah sequence fits in a short exact sequence of complex Banach sub-Poisson $\mathcal{VB}$-groupoids with the groupoid of partially invertible elements as the side groupoid.

9. **Piotr Stachura** „On Zakrzewski's morphisms of groupoids"

   I will present approach to groupoids started by S. Zakrzewski where morphisms of groupoids are relations not mappings. I'll give examples, show various „pictures" of those morphisms and their relation to actions of groupoids. If time permits I'll present some (basic) formal properties of this category of groupoids.

10. **Wojciech Szymański** „On conjugacy of subalgebras of graph C*-algebras"

    We discuss a few recent results related to the problem of distinguishing between outer and inner conjugacy of certain subalgebras of C*-algebras. Our main examples are MASAs in purely infinite, simple graph C*-algebras and UHF-subalgebras of the Cuntz algebras. This talk is based on joint work with Tomohiro Hayashi, Jeong Hee Hong and Sophie Emma Mikkelsen.