Programme on

"Bivariant K-theory in Geometry and Physics"

November 5 - 30, 2018

organized by

Alan Carey (ANU, Canberra), Harald Grosse (U Vienna), Bram Mesland (U Bonn), Adam Rennie (U Wollongong), Walter van Suijlekom (Radboud U Nijmegen)

Seminar

The seminar meets 10.30-11.30 in the Boltzmann Lecture Hall of the Erwin Schrödinger Institute

- **Tuesday, November 6, 2018**

  Speaker: Hermann Schulz-Baldes (Friedrich-Alexander Universität Erlangen-Nürnberg)
  Title: TBA
  Abstract: TBA

- **Thursday, November 8, 2018**

  Speaker: Siegrfried Echterhoff (Westfahlische Wilhelms Universität Münster)
  Title: The minimal exact crossed product and the Baum-Connes conjecture
  Abstract: If G is a locally compact group which acts on a C*-algebra A, then the original Baum-Connes conjecture with coefficients asserts that a certain assembly map

  $$\mu : K^*_G(\underline{EG}; A) \to K_*(A \rtimes_r G)$$

  from the equivariant K-homology $K^*_G(\underline{EG}; A)$ of the universal proper G-space $\underline{EG}$ with coefficients in A into the K-theory of the reduced crossed product $A \rtimes_r G$ should always be an isomorphism. However, it was observed by Higson, Lafforgue, and Skandalis in 2002 that the conjecture fails for non-exact groups. Recently, Baum, Guentner, and Willett proposed a new version of the conjecture where the reduced crossed product is replaced by the smallest exact crossed-product functor which dominates the reduced crossed product. In this lecture we will report on recent joint work with Alcides Buss and Rufus Willett on the new conjecture and the properties of the smallest exact crossed product functor.

- **Friday, November 9, 2018**

  Speaker: Branimir Cacic (University of New Brunswick, Fredericton)
  Title: Noncommutative principal bundles in unbounded KK-theory
  Abstract: On the algebraic side of NCG, there is a well-established Hopf-algebraic theory of quantum principal bundles with quantum structure group; on the analytic side, unbounded KK-theory now allows us to treat various classes of Riemannian submersion, both commutative and noncommutative, in the language of spectral triples and correspondences. In the case of noncommutative principal bundles with compact connected Lie structure group G, one can combine these two approaches to yield a working unbounded KK-theoretic framework for noncommutative Riemannian principal G-bundles and principal connections that is fully compatible with ConnesLandi deformation; in particular, it yields explicit unbounded KK-theoretic factorisations of total geometries into vertical and basic geometries that are manifestly compatible with gauge-theoretic considerations. This is joint work with Bram Mesland.