Banff International Research Station
for Mathematical Innovation and Discovery

Topics on von Neumann algebras
September 16-21, 2006

MEALS

Breakfast (Continental): 7:00–9:00 am, 2nd floor lounge, Corbett Hall, Sunday–Thursday
*Lunch (Buffet): 11:30 am–1:30 pm, Donald Cameron Hall, Sunday–Thursday
*Dinner (Buffet): 5:30–7:30 pm, Donald Cameron Hall, Saturday–Wednesday
Coffee Breaks: As per daily schedule, 2nd floor lounge, Corbett Hall
***Please remember to scan your meal card at the host/hostess station in the dining room for each lunch and dinner.**

MEETING ROOMS

All lectures will be held in Max Bell 159 (Max Bell Building accessible by bridge on 2nd floor of Corbett Hall). Hours: 6 am–12 midnight. LCD projector, overhead projectors and blackboards are available for presentations. *Please note that the meeting space designated for BIRS is the lower level of Max Bell, Rooms 155–159. Please respect that all other space has been contracted to other Banff Centre guests, including any Food and Beverage in those areas.*

PRELIMINARY SCHEDULE

Saturday

16:00	Check-in begins (Front Desk - Professional Development Centre - open 24 hours)
	Lecture rooms available after 16:00 (if desired)
17:30–19:30	Buffet Dinner, Donald Cameron Hall
20:00	Informal gathering in 2nd floor lounge, Corbett Hall (if desired)
	Beverages and small assortment of snacks available on a cash honour-system.

Sunday

7:00–8:45	Breakfast
8:45–9:00	Introduction and Welcome to BIRS by BIRS Station Manager, Max Bell 159
9:00–9:50	Sorin Popa: *On the Super-rigidity of Malleable Actions*
10:00–10:30	Jesse Peterson: *L^2-rigidity in von Neumann algebras*
10:35–11:00	Coffee Break, 2nd floor lounge, Corbett Hall
11:00–11:50	Narutaka Ozawa: *A comment on the free group factors*
12:00–13:30	Lunch
14:30–15:20	Nicolas Monod: *TBA*
15:30-16:00	Coffee Break, 2nd floor lounge, Corbett Hall
16:00–16:50	Mikaël Pichot: *The space of triangle buildings*
17:00–17:30	Adrian Ioana: *Orbit inequivalent actions for groups containing a copy of F_2*
17:35–19:30	Dinner

Monday

9:00–9:50 Vaughan Jones: *Connes tensor product in quantum physics?*
10:00–10:30 Pinhas Grossman: *Forked Temperley-Lieb Algebras and Intermediate Subfactors*
10:35–11:00 Coffee Break, 2nd floor lounge, Corbett Hall
11:00–11:50 Antony Wassermann: *TBA*
12:00–12:30 V.S. Sunder: *Kac algebras, doubles and planar algebras*
12:35–13:30 Lunch
13:30–14:20 Guided Tour of The Banff Centre; meet in the 2nd floor lounge, Corbett Hall
14:20–14:30 Group Photo; meet on the front steps of Corbett Hall
14:30–15:20 Dietmar Bisch: *A continuous family of hyperfinite subfactors*
15:30-16:00 Coffee Break, 2nd floor lounge, Corbett Hall
16:00–16:50 Zhenghan Wang: *TBA*
17:00–17:30 Eric Rowell: *Algebraic Problems in Topological Quantum Computing*
17:35–19:30 Dinner

Tuesday

9:00–9:50 Uffe Haagerup: *Classification of hyperfinite factors up to completely bounded isomorphism of their preduals (joint work with Magdalena Musat)*
10:00–10:30 Kenley Jung: *Microstate Free Entropy Dimension*
10:35–11:00 Coffee Break, 2nd floor lounge, Corbett Hall
11:00–11:50 Dmitri Shlyakhtenko: *Estimates for free entropy dimension*
12:00–12:30 Ken Dykema: *Free Entropy Dimension in Amalgamated Free Products*
12:35–13:30 Lunch
Free afternoon

Wednesday

9:00–9:50 Terry Gannon: *The braid group and modular forms (among other things)*
10:00–10:30 Marta Asaeda: *Galois group obstruction to principal graphs*
10:35–11:00 Coffee Break, 2nd floor lounge, Corbett Hall
11:00–11:50 David Evans: *TBA*
12:00–12:30 Shamindra Ghosh: *Planar algebras: A category theoretic point of view*
12:35–13:30 Lunch
14:30–15:20 Yasuyuki Kawahigashi: *Superconformal nets of factors and their classification*
15:30-16:00 Coffee Break, 2nd floor lounge, Corbett Hall
16:00–16:50 Roberto Longo: *Nuclearity for inclusions of real Hilbert spaces, representations of $SL(2,R)$ and CFT*
17:00–17:50 Feng Xu: *Mirror extensions of local nets*
18:00–19:30 Dinner

Thursday

7:00–9:00 Breakfast
9:00–9:50 Stefaan Vaes: *Type II_1 factors without non-trivial finite index subfactors*
10:00–10:30 Coffee Break, 2nd floor lounge, Corbett Hall
10:30–11:20 Masaki Izumi: *Type III factors distinguish (some) type III E_0-semigroups*
11:30–12:20 Closing Talk
12:30–13:30 Lunch
Checkout by 12 noon.

** 5-day workshops are welcome to use the BIRS facilities (2nd Floor Lounge, Max Bell Meeting Rooms, Reading Room) until 3 pm on Thursday, although participants are still required to checkout of the guest rooms by 12 noon. **

Topics on von Neumann algebras
September 16-21, 2006

ABSTRACTS
(in alphabetic order by speaker surname)

Speaker: **Marta Asaeda** (University of California, Riverside)
Title: *Galois group obstruction to principal graphs*
Abstract: TBA

Speaker: **Dietmar Bisch** (Vanderbilt University)
Title: *A continuous family of hyperfinite subfactors*
Abstract: I will present a construction of continuous families of non-isomorphic, irreducible, finite index subfactors of the hyperfinite II_1 factor with the same standard invariant. This is joint work with Remus Nicoara and Sorin Popa.

Speaker: **Ken Dykema** (Texas A&M University)
Title: *Free Entropy Dimension in Amalgamated Free Products*
Abstract: We calculate the free entropy dimension of natural generators in an amalgamated free product of the hyperfinite II_1-factor with itself, with amalgamation over an atomic, type I subalgebra. In particular, some 'exotic' Popa algebra generators of free group factors are shown to have the expected free entropy dimension. (Joint work with Nate Brown and Kenley Jung.)

Speaker: **David Evans** (Cardiff University)
Title: *TBA*
Abstract: TBA

Speaker: **Terry Gannon** (University of Alberta)
Title: *The braid group and modular forms (among other things)*
Abstract: TBA

Speaker: **Shamindra Ghosh** (Vanderbilt University)
Title: *Planar algebras: A category theoretic point of view*
Abstract: We define Jones's planar algebra as a map of multicategories and construct a planar algebra starting from a 1-cell in a pivotal strict 2-category. We introduce the concept of an affine representations of a planar algebra and prove some finiteness results for the affine representations of finite depth planar algebras. We also show that the radius of convergence of the dimension of an affine representation of the planar algebra associated to a finite depth subfactor is at least as big as the inverse-square of the modulus.

Speaker: **Pinhas Grossman** (Vanderbilt University)
Title: *Forked Temperley-Lieb Algebras and Intermediate Subfactors*
Abstract: TBA

Speaker: **Uffe Haagerup** (University of Southern Denmark)
Title: *Classification of hyperfinite factors up to completely bounded isomorphism of their preduals (joint*

work with Magdalena Musat)
Abstract: By a result of Christensen and Sinclair, all infinite dimensional hyperfinite factors are cb-isomorphic (i.e. isomorphic as operator spaces), but if one look at the preduals instead, the story is totally different: It turns out, that one can for instance separate Type II from Type III this way, and there are uncountably many non-cb-isomorphic preduals of hyperfinite Type III_0 factors, while the preduals of hyperfinite Type III_λ factors are all isomorphic when $0 < \lambda \leq 1$. The proofs uses Connes classification of injective (=hyperfinite) factors and the Connes-Takesaki "flow of weights" for Type III-factors.

Speaker: **Adrian Ioana** (University of California, Los Angeles)
Title: *Orbit inequivalent actions for groups containing a copy of F_2*
Abstract: TBA

Speaker: **Masaki Izumi** (Kyoto University)
Title: *Type III factors distinguish (some) type III E_0-semigroups*
Abstract: I'll give an account of new examples of uncountably many type III E_0-semigroups, which are distinguished by the type of analogues of the local observable algebras. Joint work with R. Srinivasan.

Speaker: **Vaughan Jones** (University of California, Berkeley)
Title: *Connes tensor product in quantum physics?*
Abstract: TBA

Speaker: **Kenley Jung** (University of California, Los Angeles)
Title: *Microstate Free Entropy Dimension*
Abstract: TBA

Speaker: **Yasuyuki Kawahigashi** (University of Tokyo)
Title: *Superconformal nets of factors and their classification*
Abstract: TBA

Speaker: **Roberto Longo** (University of Rome Tor Vergata)
Title: *Nuclearity for inclusions of real Hilbert spaces, representations of $SL(2, R)$ and CFT*
Abstract: TBA

Speaker: **Nicolas Monod** (University of Geneva)
Title: *TBA*
Abstract: TBA

Speaker: **Narutaka Ozawa** (University of Tokyo)
Title: *A comment on the free group factors*
Abstract: For a finite von Neumann algebra M, there are natural inclusions $M \subset L^2 \subset L^1$. I will talk about the space of those operators in $B(L^2)$ that are compact when viewed as operators from M into L^p $(p = 2, 1)$. I will particularly discuss the free group factors.

Speaker: **Jesse Peterson** (University of California, Berkeley)
Title: *L^2-rigidity in von Neumann algebras*
Abstract: TBA

Speaker: **Mikaël Pichot** (Institut des Hautes Etudes Scientifiques (IHES))
Title: *The space of triangle buildings*
Abstract: TBA

Speaker: **Sorin Popa** (University of California, Los Angeles)
Title: *On the Superrigidity of Malleable Actions*

Abstract: Let $\Gamma \curvearrowright X$ be a measure preserving action of a countable discrete group on a probabilty space. It is well understood by now that some weak form of property (T) for Γ combined with a *malleability* assumption on the way it acts on X entails sharp rigidity phenomena for the associated II_1 factor and orbit equivalence relation. I will present a new set of rigidity results for malleable actions, in which the property (T) assumption on Γ is no longer needed. Instead, the group needs to have a non-amenable subgroup H with infinite centralizer.

Speaker: **Eric Rowell** (Purdue University)
Title:*Algebraic Problems in Topological Quantum Computing*
Abstract: TBA

Speaker: **Dmitri Shlyakhtenko** (University of California, Los Angeles)
Title: *Estimates for free entropy dimension*
Abstract: We discuss some new and old estimates on free entropy dimension and connections with a free analog of an inequality of Otto and Villani (previously considered in the free case by Biane and Voiculescu) that occurs in their work on the Talagrand inequality.

Speaker: **V.S. Sunder** (IMSc, Chennai)
Title: *Kac algebras, doubles and planar algebras*
Abstract: We wish to describe the planar algebra of the 'double' (=asymptotic inclusion) of the fixed subfactor $R^H \subset R$ of an outer action of a finite-dimensional Kac algebra on the hyperfinite factor. It turns out that this happens to be identifiable as a sub-planar algebra of the related subfactor $R^{H^{*op}} \subset R$. We describe this result, some corollaries and an idea of the ingredients of the proof.

Speaker: **Stefaan Vaes** (Institut de Mathématiques de Jussieu)
Title: *Type II_1 factors without non-trivial finite index subfactors*
Abstract: We call a subfactor trivial if it is isomorphic with the diagonal inclusion of N into matrices over N. We prove the existence of type II_1 factors M such that every finite index subfactor is trivial. Also, every M-M-bimodule with finite coupling constant, is a multiple of $L^2(M)$. In particular, these II_1 factors do not have outer automorphisms: such factors were shown to exist by Ioana, Peterson, Popa and our methods are a generalization of theirs.

Speaker: **Zhenghan Wang** (Microsoft Corporation/Indiana University)
Title: *TBA*
Abstract: TBA

Speaker: **Antony Wassermann** (CNRS, Institut de Mathématiques, Luminy)
Title: *TBA*
Abstract: TBA

Speaker: **Feng Xu** (University of California, Riverside)
Title: *Mirror extensions of local nets*
Abstract: In this talk we will discuss a general theorem which under certain conditions constructs extensions of local nets from given ones. Such extensions are called mirror extensions since the corresponding link invariants are related to their mirror images in the given nets. When applying the theorem to conformal inclusions and diagonal cosets, we obtain infinite series of new examples of completely rational chiral conformal field theories. The talk is based on math.QA/0505367.