EOS
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Second EOS PRIMA Annual Meeting

March 29, 2019

Louvain House – Louvain–la–Neuve

10:00 - 11:00	*Painlevé functions, Fredholm determinants and combinatorics* **Oleg Lisovyi** (LMPT, Tours University, France)
11:00 - 11:30	Coffee break
11:30 - 12:00	*Deformations of the (Pin(n),osp(1|2)) Howe duality* **Roy Oste** (UGent)
12:00 - 12:30	*Bipartite fidelity of critical dense polymers* **Gilles Parez** (UCLouvain)

12:30 – 14:00 LUNCH

14:00 - 14:30	*Separation distance of minimal Green energy points* **Juan Criado del Rey** (KULeuven)
14:30 - 15:00	*The combinatorics of Wronskian polynomials* **Marco Stevens** (KULeuven)
15:00 - 15:30	Coffee break
15:30 - 16:00	*New realizations of Racah algebras* **Hendrik De Bie** (UGent)
16:00 - 16:30	*Planar orthogonal polynomials with multiple logarithmic singularities in the external potential* **Meng Yang** (UCLouvain)

fnrs FREEDOM TO RESEARCH
UCLouvain
KU LEUVEN
UNIVERSITEIT GENT
fwo Opening new horizons

Oleg Lisovyi – *Painlevé functions, Fredholm determinants and combinatorics*

I will explain how to associate a tau function to the Riemann-Hilbert problem set on a union of non-intersecting smooth closed curves with generic jump matrix. The main focus will be on the one-circle case, relevant to the analysis of Painlevé VI equation and its degenerations to Painlevé V and III. The tau functions in question will be defined as block Fredholm determinants of integral operators with integrable kernels. They can be alternatively represented as combinatorial sums over tuples of Young diagrams which coincide with the dual Nekrasov-Okounkov instanton partition functions for Riemann-Hilbert problems of isomonodromic origin.

Roy Oste – *Deformations of the (Pin(n),osp($1|2$)) Howe duality*

The classical Dirac operator is part of an osp(1|2) realisation inside the Weyl-Clifford algebra which is Pin-invariant. This leads to a multiplicity-free decomposition of the space of spinor-valued polynomials in terms of irreducible (Pin(n),osp(1|2)) modules. In this talk, we review the case where the symmetry is reduced to a finite reflection group and the Weyl algebra is replaced by a rational Cherednik algebra. Here, we explicitly determine the centraliser algebra of the analogue of the classical osp(1|2) realisation to again obtain a multiplicity-free decomposition of the space of spinor-valued polynomials.

Gilles Parez – *Bipartite fidelity of critical dense polymers*

The bipartite fidelity (BF) is an entanglement measure introduced in 2011 by Dubail and Stéphan (arXiv:1010.3716) as the overlap between the groundstate (GS) of the system and the GS of the system where two complementary subsystems are decoupled. For one-dimensional quantum critical models, a conformal field theory (CFT) derivation predicts a logarithmic divergence in the system size N with a multiplicative factor proportional to the central charge. Moreover, it provides an analytical expression for the constant term in the $1/N$ expansion.

We computed the BF for the model of critical dense polymers, which is known to be critical with a central charge $c = -2$, by using the correspondence between this model and a XX spin chain with the boundary conditions of Pasquier and Saleur. Our lattice calculations exactly match the CFT predictions for arbitrary aspect ratio. We were also able to extend this result in the case of a logarithmic CFT, both with lattice and field theoretical derivations.

This is a joint work with Alexi Morin-Duchesne and Philippe Ruelle. arXiv:1902.02246.

Juan Criado del Rey – *Separation distance of minimal Green energy points*

Point configurations on the unit sphere obtained by minimizing some classical energy function tend to exhibit good distribution properties. These configurations are usually well-distributed, having low discrepancy, large separation distance or large covering radius. If we would like to obtain well-distributed points on a general compact Riemannian manifold, a natural choice is the Green energy, in which the interaction between two points is given by the Green's kernel of the manifold. In this talk I will present some general results on the discrepancy and the separation distance of minimal Green energy points.

Marco Stevens – *The combinatorics of Wronskian polynomials*

Wronskian polynomials appear in a variety of contexts, amongst others in rational solutions of Painlevé equations and in the theory of exceptional orthogonal polynomials. One can use the combinatorial framework of integer partitions to describe such Wronskian polynomials and this effectively gives us tools to prove intriguing results about these polynomials. Furthermore, we make a connection to symmetric function theory and show how characters of irreducible representations of the symmetric group appear in the coefficients of certain Wronskian polynomials. This talk is based on joint projects with Niels Bonneux (KU Leuven), Clare Dunning (University of Kent), Zachary Hamaker (University of Michigan) and John Stembridge (University of Michigan).

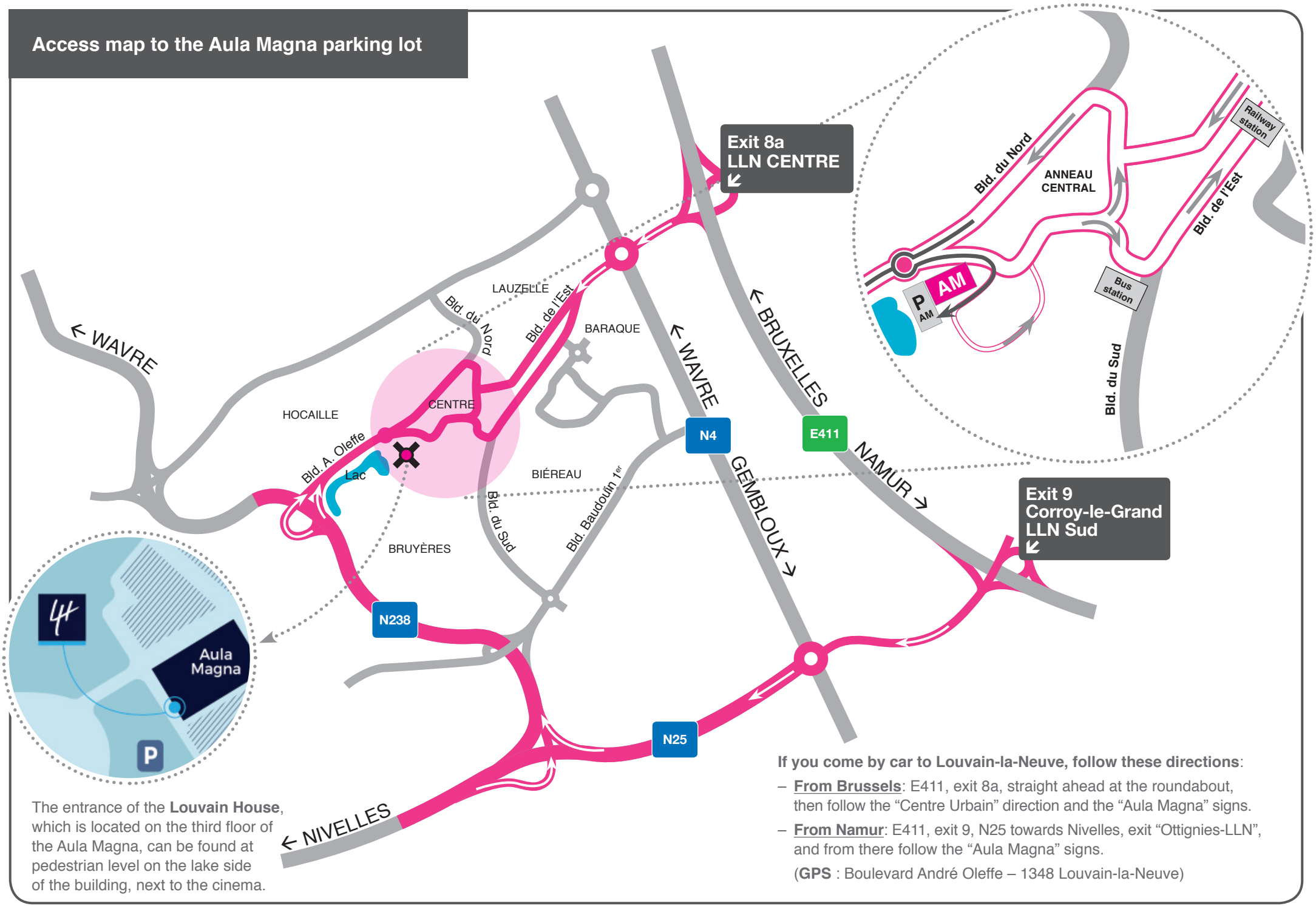
Hendrik De Bie – *New realizations of Racah algebras*

The Racah algebra is the algebraic structure underlying the Racah polynomials. It can be constructed in various ways, each with specific benefits. I'll highlight these constructions and their differences. I will end with an embedding problem we are currently working on.

Meng Yang – *Planar orthogonal polynomials with multiple logarithmic singularities in the external potential*

We consider the planar orthogonal polynomials with multiple logarithmic singularities in the potential and show that these orthogonal polynomials are the multiple orthogonal polynomials of Type II. This equivalence allows us to formulate the matrix Riemann–Hilbert problem for $p_n(z)$. We derive the strong asymptotics of $p_n(z)$ when n goes to Infinity and find the limiting locus of zeros of $p_n(z)$. This is a joint work with Seung-Yeop Lee (University of South Florida, U.S.).

Access map to the Aula Magna parking lot



The entrance of the **Louvain House**, which is located on the third floor of the Aula Magna, can be found at pedestrian level on the lake side of the building, next to the cinema.

If you come by car to Louvain-la-Neuve, follow these directions:

- **From Brussels**: E411, exit 8a, straight ahead at the roundabout, then follow the "Centre Urbain" direction and the "Aula Magna" signs.
- **From Namur**: E411, exit 9, N25 towards Nivelles, exit "Ottignies-LLN", and from there follow the "Aula Magna" signs.

(**GPS** : Boulevard André Oleffe – 1348 Louvain-la-Neuve)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AGORA
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RUELLE DE LA
LANTERNE
MAGIQUE
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HESBIGNONS
SENTIER DU
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