

# T-DAYS II

## Journées de Topologie à Caen

Université de Caen, LMNO  
19-20 September 2016

Organizing committee  
P. Bellingeri, J. Guaschi

### - Programme -

*The meeting will be held in "Room 124", building S3, first floor.*

#### Monday 19th

14h00 – 14h50	Susan Williams	Periodic graphs, spanning trees and Mahler measure
15h00 – 15h50	Daniel Silver	Lehmer's Question and Graph Complexity
16h10 – 17h00	Seiichi Kamada	Tensor products of quandles and classifying 1-handles attaching to surface-links

#### Tuesday 20th

09h00 – 9h50	Tara Brendle	Congruence subgroups of braid groups and the integral Burau representation
10h10 – 11h00	Emmanuel Wagner	Extending local moves to welded knotted objects
11h10 – 12h00	Peter Wong	The $R_{\infty}$ property of Artin pure braid groups

### - Abstracts -

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**Tara Brendle** (Glasgow)

*Congruence subgroups of braid groups and the integral Burau representation*

TBA

**Seiichi Kamada** (Osaka)

*Tensor products of quandles and classifying 1-handles attaching to surface-links*

We introduce the notion of a tensor product of quandles. Using the (canonical) tensor products of knot quandles and symmetric knot quandles, we discuss classification of 1-handles attaching to a surface-link in 4-space.

**Daniel Silver** (Alabama)

*Lehmer's Question and Graph Complexity*

D.H. Lehmer's question about roots of polynomials with integer coefficients has remained an important open question for more than 80 years.

In this joint work with Susan Williams we show that Lehmer's Question is equivalent to an elementary question about graph complexity and spanning trees.

**Emmanuel Wagner** (Dijon)

*Extending local moves to welded knotted objects*

We consider welded knotted objects (links, string links, braids) under several equivalence relations, such as self-crossing changes, self-virtualizations, band pass, Delta and forbidden moves. We establish several relations between them and for some particular cases we provide a topological interpretation and a complete classification for such quotients.

Coauthors: Benjamin Audoux, Paolo Bellingeri and Jean-Baptiste Meilhan

**Susan Williams** (Alabama)

*Periodic graphs, spanning trees and Mahler measure*

Infinite periodic graphs, graphs that are invariant under translation in one or more independent directions, are of interest in crystallography and statistical mechanics. One measure of complexity for such a graph is the spanning tree entropy, the exponential growth rate of the number of spanning trees in a sequence of finite subgraphs approximating the whole graph. This entropy has been calculated using mainly combinatoric and analytic arguments.

Using ideas of algebraic dynamics, we give a simplified approach to showing that the spanning tree entropy is the Mahler measure of a Laplacian polynomial that is easily obtained from graph data. Our work has applications to knot theory (joint work with Daniel Silver).

**Peter Wong** (Bates)

*The  $SR_{\infty}$  property of Artin pure braid groups*

A group  $G$  is said to have property  $SR_{\infty}$  if every automorphism  $\varphi$  of  $G$  has an infinite number of  $\varphi$ -conjugacy classes of elements. We will use the Bieri-Neumann-Strebel invariant and its variant ( $\Omega$  theory) to show that the Artin pure braid groups possess the property  $SR_{\infty}$ .