



Banff International Research Station

for Mathematical Innovation and Discovery

Differential Schemes and Differential Cohomology

22 – 24 June 2012

MEALS

Coffee Breaks: As per daily schedule, in the foyer of the TransCanada Pipeline Pavilion (TCPL) (*included in workshop*)

For meal options at the Banff Centre, there are food outlets on The Banff Centre campus such as Vistas Main Dining Room on the 4th floor of Sally Borden Building (breakfast: 7:00-9:30am; lunch: 11:30am-1:30pm; dinner: 5:30-7:30pm), Le Cafe (ground floor, Sally Borden Building) and the Maclab Bistro (Kinnear Centre). You will also find a good selection of restaurants in the town of Banff which is a 10-15 minute walk from Corbett Hall.

MEETING ROOMS

All lectures will be held in the new lecture theater in the TransCanada Pipelines Pavilion (TCPL). LCD projector and blackboards are available for presentations.

SCHEDULE

Friday

- 16:00** Check-in begins (Front Desk – Professional Development Centre - open 24 hours)
Lecture rooms available after 16:00.
- 19:30** Lectures (if desired) or informal gathering in 2nd floor lounge, Corbett Hall (if desired)
Beverages and a small assortment of snacks are available in the lounge on a cash honor system.

Saturday

- 7:00 - 9:00** Breakfast
- 9:00 - 9:10** A Welcome by BIRS Facilitator Caroline Green
- 9:15 - 10:15** Jim Freitag “Local Problems in Differential Algebra”
- 10:15 - 11:00** A short coffee break, followed by a discussion, on his talk, led by Jim.
- 11:00 - 12:00** Henri Gillet “Differential Algebra, Functors, and Arithmetic Geometry”
- 12:00 - 12:45** A general discussion, on his talk, led by Henri.

12:45 - 14:00 Lunch

14:00 - 15:00 Andy Magid “Grothendieck Topology”

15:00 - 16:00 A short coffee break, followed by a discussion, on his talk, led by Andy

Sunday

7:00 - 9:00 Breakfast

9:00 - 10:00 Ray Hoobler “Cohomology in a Differential Algebra Setting”

10:00 - 11:00 A short coffee break, followed by a discussion, on his talk, led by Ray.

Checkout by 12 noon.

** 2-day workshops are welcome to use BIRS facilities (2nd Floor Lounge, TCPL, Reading Room) until 15:00 on Sunday, although participants are still required to checkout of the guest rooms by 12 noon. There is no coffee break service on Sunday afternoon, but self-serve coffee and tea are always available in the 2nd floor lounge, Corbett Hall. **



Banff International Research Station

for Mathematical Innovation and Discovery

Differential Schemes and Differential Cohomology

22 – 24 June 2012

ABSTRACTS

(in alphabetic order by speaker surname)

Speaker: Jim Freitag (University of Illinois at Chicago)

Title: Local Problems in Differential Algebra

Abstract: The beginning of the talk will be an elementary introduction to basic differential algebra requiring no specific background. We will then discuss notions of dimension for affine and projective differential algebraic varieties. After reviewing dimension polynomials, heights, and other notions of dimension, we will discuss several open problems in differential algebraic geometry and some partial answers in special cases. Many of the problems will be under the general theme of studying various properties in moving families of differential algebraic varieties.

Speaker: Henri Gillet (University of Illinois at Chicago)

Title: Differential Algebra, Functors, and Arithmetic Geometry

Abstract: I will discuss differential algebra from the "functorial" point of view. The topics covered will be: functors & differential rings; higher derivations; formal group laws and prolongation/twisted jet spaces; geometric mordell and its generalizations; descent criteria in arbitrary characteristic.

Speaker: Ray Hoobler, CCNY and the CUNY Graduate Center

Title: Cohomology in a Differential Algebra Setting

Abstract: I will outline how to define and use the Delta flat topology. The main applications are to a cohomological interpretation of the differential Brauer group and to Kolchin's constrained cohomology. A new topology, the Picard-Vessiot topology, will be discussed along with an application to Deligne cohomology.

Speaker: Andy Magid (Professor Emeritus, University of Oklahoma)

Title: Grothendieck Topology

Abstract: An outline introduction for a general audience to Grothendieck topologies, abelian sheaves on them, and the Cech and derived functor cohomologies of the latter. Also to be covered are the 0 and 1 Cech cohomology sets on non-abelian sheaves and the connection to principal homogeneous spaces.