

Report on the first Canadian Hopf algebra conference

The first Canadian Hopf algebra conference: the role of Hopf algebras in Noncommutative Geometry was held at the University of New Brunswick, September 3-6, 2008, at the Wu centre and the physics department. The organizers were Alain Connes, Piotr M. Hajac, Dan Kucerovsky, Henri Moscovici, and Bahram Rangipour. This conference was affiliated with the Centre for Noncommutative Geometry and Topology, University of New Brunswick, Fredericton. The conference attracted top researchers in the field from all over the globe. Speakers were from Alabama, Colorado, France, Hungary, Italy, Pennsylvania, Poland, and the UK. It should be mentioned that local researchers also participated in the conference as audience and/or speakers. The conference achieved its goal which was to establish the new area of mathematics which emphasizes the use of Hopf algebras in noncommutative Geometry.

The conference was designed in a unique way to let the participants interact with each other. They were accommodated in the same hotel. Lunches and dinners were mostly organized so that they could discuss scientifically as much as possible. At the end of each day before dinner there was a free discussion session led by one of the experts. New researches were initiated in these sessions.

The first day was started by Tomasz Brzezinski, who is a known specialist in Hopf algebras and corings from the UK. He lectured about “Contramodule coefficients for Hopf-cyclic homology”. His results introduce new coefficients for Hopf cyclic cohomology. The next speaker was Gabriella Bohm. Bohm is one of the mathematicians in NCG who uses category theory as one of her primary tools. She talked about “A categorical approach to Hopf cyclic (co)homology”. Her new perspective, joint with D. Stefan, on Hopf cyclic cohomology has solved a longstanding problem in NCG which was the definition of the Hopf cyclic cohomology for Hopf algebras over the noncommutative rings with coefficients in SAYD modules. The last talk of the first day was given by B. Rangipour. He is one of the founders of Hopf cyclic cohomology with coefficients. He talked about “Characteristic map in Hopf cyclic cohomology via Weil complex”. He presented a new way to construct Hopf cyclic classes from a finite complex which is quasi isomorphic with the truncated Weil complex. The first day ended with a free discussion about the applications of Hopf-cyclic theory with coefficients.

Ulrich Kraehmer was the first speaker of the second day. He talked about

“Duality and products in algebraic (co)homology theories”. His nice observation unifies many unrelated dualities under the umbrella of Hopf \times -algebras. Kraehmer is known for his computation of twisted cyclic cohomology of some quantum groups. The second speaker of the day was Tomasz Maszczyk. He talked about “A characteristic map without an invariant trace”. One of the most fundamental tools in geometry and also in NCG is characteristic maps. These maps usually build on an invariant trace. His result could be used in places that the algebra, the coordinate algebra of the noncommutative space, in question lacks an invariant trace. Theodore Banica finished the lectures of the day by lecturing on “Liberation of orthogonal Lie groups”. Roughly speaking he showed a one-to-one correspondence between classical groups and free quantum groups. Banica is known for his research on free quantum groups. The second day ended by a free discussion on the general framework of cyclic theory.

The third day of the workshop was begun by Andrew Dean. Dean’s talk was about “Classification of C^* -dynamical systems”. Dean is a known Canadian mathematician working on C^* -algebras. The next speaker was Giovanni Landi. Landi is well-known for his fundamental research, joint with Alain Connes, on the noncommutative geometric structure of quantum groups. He talked about “Monopole and instantons on the quantum projective space”. The first speaker in the afternoon was Piotr M. Hajac, who is known for his fundamental work on Hopf Galois theory which is an active area of research in NCG. He spoke about “The Chern-Galois character and Ehresmann cyclic homology”. The last talk of the day was given by Alexander Gorokhovskiy. He talked about “Secondary Characteristic Classes and Cyclic Cohomology of Hopf Algebras”. Gorokhovskiy is well known for his work on characteristic classes in noncommutative geometry and also on deformation of gerbes on manifolds. This day ended by a free discussion on the coefficients of Hopf-cyclic theory.

Colin Ingalls started the last day of the workshop by giving a talk on “Noncommutative Coordinate rings of Stacks”. He presented his studies on semigroupoid schemes and showed a correspondence between Deligne-Mumford stacks and equivalence classes of hereditary orders on smooth curves. Ingalls is a known Canadian mathematician working on noncommutative algebraic geometry. The next speakers was York Sommerhauser, who talked about “Frobenius-Schur indicators and congruence subgroups”. He presented his recent studies on Frobenius-Schur indicators for some Hopf algebras. Sommerhauser is known for his deep research on Yetter-Drinfeld Hopf al-

gebras. The afternoon was started by Margaret Beattie who spoke on “Generalized Quantum doubles with projection”. She gave an interesting lecture on the quantum double and its generalization. Beattie is known for her research on pointed Hopf algebras and classification of finite dimensional Hopf algebras. The last, but not the least, speaker of the workshop was Paul Baum. He lectured impressively on “Peter-Weyl algebra and free actions of compact quantum groups”. Baum is known for his many achievements in mathematics but he is famous for his conjecture, joint with with Alain Connes, about the bijectivity of the assembly map. The workshop ended with a free discussion on algebraic and non-algebraic formulations of cyclic theory and followed by the conference dinner at Palate. The participants still send the organizers their comments on the conference and mention the good time they had at UNB. The organizer thank AARMS for its continuous support.

Budget Report

The First Annual Canadian Hopf Algebras and Noncommutative Geometry meeting was held at the University of New Brunswick in Fredericton from Sept 2nd to Sept 5th, 2008. The organizers were Alain Connes, Dan Kucerovsky, Henri Moscovici, and Bahram Rangipour. This conference was a continuation of a workshop series, associated with our Centre for Noncommutative Geometry and Topology, that Khalkhali, Kucerovsky, and Rangipour have been organizing at the Fields Institute (with partial support from the Fields).

We spent a total of 6,365.66\$ on supporting travel expenses, 589\$ on food, and 800\$ on space rental. In addition, we made a last-minute payment (on March 27th) to P. Hajac, of 700\$, for a total of 7,065.66\$ on travel.

Thus we are well within budget and are happy to return what remains of the AARMS contribution to AARMS. We thank AARMS for the financial support.