Recent Advances and New Directions in the Interplay of Noncommutative Algebra and Geometry

June 20-24, 2022

University of Washington, Seattle, WA, USA

A conference in honor of S. Paul Smith on the occasion of his 65th birthday

Welcome to Seattle, and thank you all for participating in the conference. We really appreciate that you are making great efforts to come to Seattle during this difficult time with lots of uncertainties. In addition to a celebration of Paul's birthday, this conference is one of several celebrations of our own research field (and one of several major conferences in this field this year around the world). We would like to encourage you to talk to each other, to collaborate, to inspire our graduate students and junior members of this community.

Seattle is a beautiful city. If you are free on the afternoon of Wednesday June 22, you may consider a visit to the downtown area. One option is to take the light rail from the U-district to downtown (there are several light rail stations in the downtown area: Westlake Station, Pioneer Square, and International District/Chinatown stations). If you do plan to visit downtown, there are a lot of different attractions (museums, sports, foods, etc). Locally, there are two attractions on campus: Burke Museum of Natural History and Culture (in a brand new building) and the Henry Art Gallery, both a short walk from Alder Hall. Here is a link to UW campus map

https://universityofwashington.myuvn.com/campus-map/

There are many different kinds of restaurants in this neighborhood, most within walking distance, many along University Way (which is also called "The Ave"). There are more (and more expensive ones) in the downtown area. We recommend searching online (and you can see the ratings, etc, etc), see for example

https://seattle.eater.com/maps/where-to-eat-u-district-university-of-washington-seattle

Please note that Monday June 20 is a state and federal holiday, so that various services (banks) will be closed, as well as the UW itself. Also note that the front door to our lecture hall is facing south on NE 40th street.

In case of emergency, please call the police (911) and contact James Zhang at 425-599-7444. If you have any questions, please feel free to ask us. We hope you have a pleasant time during the conference.

Co-organizers: Ken Brown (Ken.Brown@glasgow.ac.uk), Tim Hodges, Ron Irving, Michaela Vancliff, James Zhang (zhang@math.washington.edu)

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June 20-24, 2022

Alder Hall Auditorium[1], University of Washington

A Conference in Honor of S. Paul Smith on the occasion of his 65th Birthday

(register; location map; room description)

Monday June 20, 2022

9:10-10:00 am
Tensor Triangular Geometry in Representation Theory
Julia Pevtsova, University of Washington

10:00-10:30 am break

10:30-10:55 am
Belavin-Drinfeld Quantum Groups
Timothy Hodges, University of Cincinnati

11:10-Noon
Artin-Schelter Regular Algebras
Dan Rogalski, UC San Diego

Noon-2:00 pm lunch break

2:00-2:50 pm
The Invariant Theory of Artin-Schelter Regular Algebras
Ellen Kirkman, Wake Forest University

3:00-3:25 pm
Dual Reflection Groups
W. Frank Moore, Wake Forest University

3:35-4:00 pm
A Certain 4-dimensional Artin-Schelter Regular Algebra from Non-commutative Invariant Theory
Peter Goetz, Cal Poly Humboldt

4:00-5:40 pm
Poster Session

[1] Speakers should assume there is no whiteboard/chalkboard in the lecture room; i.e., talk should be prepared for use with an overhead projector and computer. Preferably, speakers should bring their own laptop, as the room is not provided with a computer.

Tuesday June 21, 2022

9:00-9:25 am
Quantizing the Maximal Spectrum
Manuel Reyes, UC Irvine

9:35-9:45 am 10-minute talk
9:45-9:55 am 10-minute talk

9:55-10:30 am break

10:30-10:40 am 10-minute talk
10:40-10:50 am 10-minute talk

11:10-Noon
Drinfeld Hecke Algebras and Group-Twisted Alexander-Whitney and Eilenberg-Zilber Maps
Anne V. Shepler, University of North Texas

Noon-2:00 pm lunch break

2:00-2:50 pm
Support Varieties for Finite Tensor Categories
Sarah Witherspoon, Texas A&M University

3:00-3:10 pm 10-minute talk
3:10-3:20 pm 10-minute talk

3:20-3:35 pm break

3:35-3:45 pm 10-minute talk
3:45-3:55 pm 10-minute talk

4:10-5:00 pm
Recent Results about the Dixmier-Moeglin Equivalence
Jason P. Bell, University of Waterloo

6:00-7:00 pm
Conference pre-dinner drinks and cocktails
(registration required using conference registration form – thank you!)

7:00-9:00 pm
Conference dinner
(registration required using conference registration form – thank you!)

Wednesday June 22, 2022

9:00-9:50 am
Invariant Holonomic Systems for Symmetric Spaces
J. Toby Stafford, University of Manchester

10:00 am
Conference photograph in Alder Auditorium

10:10-10:30 am break

10:30-10:55 am
Parabolic Adjoint Action, Weierstrass Sections and Components of the Nilfibre in Type A
Yasmine Fittouhi, University of Haifa

11:10-Noon
On the Geometry of Algebras Related to the Weyl Groupoid
Ian M. Musson, University of Wisonsin Milwaukee

Noon-2:00 pm lunch break

No events are scheduled for Wednesday afternoon.

Thursday June 23, 2022

9:00-9:50 am
Spectra of Quantum Algebras
Ken Goodearl, UC Santa Barbara

9:50-10:30 am break

10:30-10:55 am
A Cogroupoid Associated to Preregular Forms
Charlotte Ure, University of Virginia

11:10-Noon
Enveloping Algebras of Infinite-dimensional Lie Algebras: a survey
Sue Sierra, University of Edinburgh

Noon-2:00 pm lunch break

2:00-2:50 pm
Maps to Noncommutative Projective Spaces
Adam Nyman, Western Washington University

2:50-3:25 pm break

3:25-3:50 pm
Twists of Algebras and 2-cocycle Twists of Certain Hopf Algebras
Padmini Veerapen, Tennessee Technological University

4:10-5:00 pm
Career Forum with panel
Moderator: Dan Rogalski

Friday June 24, 2022

9:00-9:50 am
Local Forms of Noncommutative Functions
Michael Wemyss, University of Glasgow

9:50-10:30 am break

10:30-10:55 am
Quivers and Superpotentials for Semisimple Hopf Actions
Simon Crawford, University of Manchester

11:10-Noon
On the Spectrum and Support Theory of a Finite Tensor Category
Milen Yakimov, Northeastern University

Noon-2:00 pm lunch break

2:00-2:25 pm
Twists of Graded Poisson Algebras and Applications
Xingting Wang, Howard University

2:40-3:30 pm
Curved Deformations and Higher Operations
Raf Bocklandt, University of Amsterdam

Useful links:

- primary conference website
- secondary conference website
- registration form (submission needed for attending the dinner by all guests)
- location map
- room description

Ten-minute talks

June 21, 2022

SCHEDULE

Time: 9:35-9:45 am
Speaker: Lucas Buzaglo, University of Edinburgh
Title: Universal enveloping algebras of Krichever-Novikov algebras

Time: 9:45-9:55 am
Speaker: Kent Vashaw, MIT
Title: Balmer spectra and Drinfeld centers

Time: 10:30-10:40 am
Speaker: Zahra Nazemian, University of Graz
Title: Noetherian rings with Auslander dualizing complex are bounded factorization

Time: 10:40-10:50 am
Speaker: Dillon Hanson, University of North Texas
Title: Invariant Mixed Forms of Modular Reflection Groups

Time: 3:00-3:10 pm
Speaker: Pablo Ocal, UCLA
Title: Towards a relative support theory

Time: 3:10-3:20 pm
Speaker: Colin Lawson, University of North Texas
Title: Deformation Cohomology for Cyclic Group Actions

Time: 3:35-3:45 pm
Speaker: Be'eri Greenfeld, UCSD
Title: Gaps and approximations in the space of growth functions

Time: 3:45-3:55 pm
Speaker: Hongdi Huang, Rice University
Title: Universal Quantum Semigroupoids

ABSTRACT

Universal enveloping algebras of Krichever-Novikov algebras

Lucas Buzaglo

University of Edinburgh

Universal enveloping algebras of finite-dimensional Lie algebras are fundamental examples of well-behaved noncommutative rings. On the other hand, enveloping algebras of infinite-dimensional Lie algebras remain mysterious. For example, it is widely believed that they are never noetherian, but there are very few examples whose noetherianity is known. In this talk, I will introduce a class of infinite-dimensional Lie algebras known as Krichever-Novikov algebras and talk about a recent proof that their enveloping algebras are not noetherian, providing a new family of non-noetherian universal enveloping algebras.

Balmer spectra and Drinfeld centers

Kent Vashaw

MIT

The Balmer spectrum of a monoidal triangulated category is an important geometric construction which is closely related to the problem of classifying thick tensor ideals. We prove that the forgetful functor associated to the Drinfeld center of a finite tensor category induces a continuous map between the Balmer spectra of corresponding stable categories. In the finite-dimensional Hopf algebra setting, we give conditions under which it is injective, surjective, or a homeomorphism. We apply this general theory to prove that Balmer spectra associated to finite-dimensional cosemisimple quasitriangular Hopf algebras coincide with the Balmer spectra associated to their Drinfeld doubles, and that the thick ideals of both categories are in bijection. An analogous theorem is proven for certain Benson-Witherspoon smash coproduct Hopf algebras, which are not quasitriangular in general.

Noetherian rings with Auslander dualizing complex are bounded factorization

Zahra Nazemian

University of Graz

Beside several techniques to find examples of noetherian domains with bounded factorization (BF) property, we see that noetherian domains possessing a particular finite partitive function from finitely generated modules to a set of ordinal numbers are *BF*. This implies that noetherian rings with Auslander dualizing complex are BF. Some examples of these rings are all known noetherian Hopf algebra (including the group ring kG, where k is a field and G is a polycyclic-by-finite group) and Weyl algebras $A_n(k)$, where k is field of characteristic zero. This is selected from a section of a preprint joint with J. Bell, K. Brown and D. Smertnig.

Invariant Mixed Forms of Modular Reflection Groups

Dillon Hanson

University of North Texas

We consider the action of a finite reflection group acting linearly on a vector space of arbitrary characteristic. This action is extended to the set of mixed forms; these are derivations whose coefficients are differential forms rather than polynomials. An analogue of Saito's freeness criterion for invariant mixed forms distinguishes the modular case, when the characteristic of the field divides the order of the group, i.e., when the group contains transvections. We provide the structure for the invariant mixed forms for a class of groups which includes the special linear groups and general linear groups over finite fields.

Towards a relative support theory

Pablo Ocal

UCLA

The Balmer spectrum of a tensor triangulated category is a topological tool analogous to the usual spectrum of a commutative ring. It provides a universal theory of support, giving a categorical framework to (among others) the support varieties that had been used to great effect in modular representation theory. In this talk I will present progress towards the construction of a support theory in the context of relative homological algebra. This will include an unpretentious introduction to relative homological algebra, the description of a long exact sequence for Tor that splits in 2 out of 3 terms, and a relative Künneth theorem. As an application, our work reconciles several interpretations of relative free and flat modules.

Deformation Cohomology for Cyclic Group Actions

Colin Lawson

University of North Texas

The Hochschild cohomology of an algebra records information about the deformations of the algebra. In this talk, we will highlight the Hochschild cohomology governing the graded deformations of skew group algebras for cyclic groups acting on polynomial rings. For skew group algebras, a description of the Hochschild cohomology is known in the nonmodular setting (i.e. when the characteristic of the field and the order of the group are coprime), but much less is know in the modular setting (i.e. when the characteristic of the field divides the order of the group).

Gaps and approximations in the space of growth functions

Beeri Greenfeld

UCSD

We present positive and negative results on the space of growth rates of finitely generated algebras. The growth of any (finitely generated, infinite-dimensional) algebra is an increasing and submultiplicative function, so these are the 'natural candidates' for growth rates of algebras. Except for Bergman's gap theorem, no other gap was known for such functions. While any natural candidate is indeed realizable, up to a linear error term, as the growth of an algebra, we prove the existence of arbitrarily rapid natural candidates which are not equivalent to the growth of any algebra, resolving a question of Alahmadi-Alsulami-Jain-Zelmanov.

Universal Quantum Semigroupoids

Hongdi Huang

Rice University

In this talk, we introduce the concept of a universal quantum semigroupoid (UQSGd), which is a weak bialgebra that coacts on a (not necessarily connected) graded algebra A universally while preserving grading. This is a generalized version of universal quantum semigroups introduced by Manin in 1988. We proved that if A is the path algebra $\Bbbk Q$ of a finite quiver Q, then each of the various UQSGds introduced here is isomorphic to the face algebra attached to Q.

A shared temporary UW NetID has been created. Any person who receives this UW NetID should be made aware of the following items:

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Wireless Info

Event/Conference Name:	noncommutative algebra and geometry
Event/Conference Location:	Alder Hall
Number of Attendees:	55
UW NetID:	**event0522**
Password:	**48Gk=93Yz=42Rq**
Expires:	06/26/2022
Assigned by:	jjzhang
Contact Person:	jjzhang

Using Wireless

Additional information on accessing/using the UW's wireless networks can be found at http://www.washington.edu/computing/wireless/