

**Connections for Women:
Noncommutative Algebraic Geometry and
Representation Theory**

January 24 to January 25, 2013

MSRI, Berkeley, CA, USA

Organizers:

Georgia Benkart (University of Wisconsin)

Ellen Kirkman* (Wake Forest University)

Susan Sierra (Princeton University & University of Edinburgh)

**REPORT ON THE MSRI WORKSHOP
“CONNECTIONS FOR WOMEN:
NONCOMMUTATIVE ALGEBRAIC GEOMETRY AND
REPRESENTATION THEORY”
JANUARY 24-25, 2013**

Organizers:

- Georgia Benkart (University of Wisconsin-Madison)
- Ellen Kirkman (Wake Forest University)
- Susan Sierra (University of Edinburgh)

1 Scientific description

The Connections for Women Workshop had three overarching goals: (1) to provide an accessible introduction to the main themes of the MSRI semester-long program “Noncommutative Algebraic Geometry and Representation Theory” (NAGRT); (2) to bring together researchers in this program as well as in the year-long program in commutative algebra and the fall program in cluster algebras; and (3) to connect junior researchers, especially women and minorities, to senior researchers. The workshop preceded the five-day “Introductory Workshop” for the NAGRT program that was held at MSRI January 28-February 1, 2013.

Noncommutative algebra impacts virtually every area of algebra and combinatorics as well as geometry, mathematical physics, and statistical mechanics, and has played a crucial role in solving open problems in these areas. The Connections Workshop featured eight hour-long lectures, which focused on fundamental ideas and open problems in noncommutative algebra, geometry, and representation theory. There were four poster sessions, each featuring the work of three or four early-career researchers. Each poster presenter gave a 3-4 minute introduction to their poster to the entire conference audience. A panel discussion focused on issues especially relevant to junior researchers, women, and minorities. Scheduled breaks and a conference dinner for female participants fostered further interaction and connections.

In the opening lecture of the workshop, *Open Questions in Noncommutative Algebra and Noncommutative Algebraic Geometry*, James Zhang outlined general ideas and questions that he regards as basic to a better

understanding of noncommutative algebras and noncommutative algebraic geometry. His “star” rating indicated the anticipated difficulty of the questions, with a single star for questions that might not be too difficult to answer, to five-star open problems that are likely to be quite difficult to answer now. The questions below illustrate the range and difficulty of the problems posed in the talk:

(1) Increase our understanding of the different notions of dimension for noncommutative rings. *** In particular, if A is (right and left) Noetherian, is the Gelfand-Kirillov dimension of A ($\text{GKdim } A$) finite? *** If $\text{GKdim } A$ is finite and A is Noetherian, must the $\text{GKdim } A$ be an integer? (This is true when $\text{GKdim } A \leq 3$.)

(2) What should an automorphism (symmetry) of a noncommutative space be? ** Find all the Hopf actions on $k_q[x_1, \dots, x_n]$.

(3) *** Find new constructions of noncommutative algebras.

(4) * Find new invariants of algebras that help to understand the structure of the algebra. Find homological identities that relate various homological invariants (for example the Nakayama automorphism is related to other invariants).

(5) **** Is every Noetherian noncommutative local regular ring a domain?

(6) ***** Construct all Noetherian connected graded algebras A with $\text{GKdim } A$ finite.

(7) **** Classify the Artin Schelter (AS) regular algebras of dimension 4.

(8) ** Is every AS regular algebra Noetherian? If the field is finite, is a Noetherian AS regular algebra necessarily finitely generated as an algebra over its center?

Zhang concluded by mentioning that Artin’s conjectures on the structure of noncommutative surfaces are important basic problems, and work on these conjectures is a very active area of research.

In the study of Lie algebras, the Poincaré-Birkhoff-Witt (PBW) basis of the universal enveloping algebra plays an essential role. The second lecture, *Poincaré-Birkhoff-Witt Theorems*, by Sarah Witherspoon discussed the usefulness of having a PBW basis in diverse problems; for example, in computing cohomology. She cited work by Ginzburg and Kumar in 1993 which showed that $H^*(U_q(\mathfrak{g})) = \text{Ext}_{U_q(\mathfrak{g})}^*(\mathbb{C}, \mathbb{C})$ is finitely generated by us-

ing a PBW basis of the quantum group $U_q(\mathfrak{g})$. Every finite-dimensional pointed Hopf algebra A with an abelian group of group-like elements has a PBW basis, and this result was used by Mastnak, Pevtsova, Schauenberg, and Witherspoon (2010) to show that $H^*(A)$ is finitely generated. Related open problems include: “Prove or find a counterexample to a 2004 conjecture of Etingof and Ostrik: if A is a finite-dimensional Hopf algebra (or more generally a tensor category), then $H^*(A)$ is finitely generated.” Investigations of various noncommutative deformations of skew group algebras (e.g. Hecke algebras, symplectic reflection algebras, graded Hecke algebras, and Drinfeld orbifold algebras) often involve finding a PBW basis and using it to determine important structural information about the algebra.

The third lecture, *Kazhdan-Lusztig Polynomials, Geometry and Categorification*, by Catharina Stroppel focused on the classical representation theory of complex simple Lie algebras \mathfrak{g} , but from a geometric and categorical perspective. The problem of determining all irreducible modules is beyond reach except for small examples; in particular a fairly complete description has been achieved only for \mathfrak{sl}_2 . Instead, an approach that has been adopted is to determine the annihilators of the irreducible modules, the so-called primitive ideals. This has led to the well-known result of Duflo which says these ideals are the annihilators of highest weight modules. Stroppel asked, “Do new categorification techniques help?” She explained how the representation theory of the Hecke algebra of the associated Weyl group, the Kazhdan-Lusztig basis, and the Kazhdan-Lusztig polynomials can shed light on representations of \mathfrak{g} .

In the final lecture of the first workshop day, Graham Leuschke discussed the question *What should noncommutative resolutions of singularities be?* A variety Y is a resolution of singularities of a variety X if there is a map $\pi : Y \rightarrow X$ with (1) π birational (2) π proper, and (3) Y nonsingular. He suggested that algebra might replace geometry in studying such resolutions, but commutative algebra seems inadequate for this task. Instead he proposed using noncommutative algebras. If R is a Gorenstein local ring, Λ is an R -order (that is a module-finite R -algebra with $\Lambda \otimes_R K \cong \text{Mat}_n(K)$), and Λ and R have the same finite global dimension, then Λ can be regarded as a noncommutative resolution of singularities. These conditions are related to the notion (due to Van den Bergh) of a noncommutative crepant resolution of a Gorenstein ring R . He concluded with a discussion of open questions, including a conjecture of Bondal and Orlov that states “Two crepant resolutions of singularities of the same variety have equivalent bounded derived

categories” (which is known to hold for X of dimension 3 by work of Van den Bergh). A related question is “Are all crepant resolutions, both the commutative and noncommutative ones, derived equivalent?”

The second day’s lectures started with the talk *What are the Noncommutative Projective Surfaces?* by Susan Sierra. She discussed the problem of classifying connected graded domains of Gelfand-Kirillov dimension 3, including Artin’s conjecture on the birational classification. She reported on progress that she and others have made on this problem, and posed several open questions. If R is a connected graded noetherian domain of GKdim 3, one forms its *function skewfield* $D(R)$ by taking degree 0 elements in the graded quotient ring $Q_{gr}(R)$. In 1995 Artin conjectured, roughly, that function skewfields of connected graded domains of GKdim 3 fall into three broad families: algebras that are finite over their centres; skew polynomial extensions $K(t; \sigma, \delta)$, where K is a field of transcendence degree 1; and the *Sklyanin function field* $D(E, \sigma)$, obtained as a localization of the 3-dimensional Sklyanin algebra $A(E, \sigma)$. To date, there has been little progress on the conjecture, although conjecturally there are potential approaches through deformation theory, through valuations, and through studying point schemes. Sierra posed questions relating to all of these approaches. Sierra reported that there has been more progress on classifying algebras falling within various cases of the conjecture. Birationally commutative algebras of GKdim 3 (that is, those whose function skewfield is commutative) were classified by Rogalski-Stafford and Sierra. Chan proved an algebra with a 2-dimensional parameter space of “fat points” must be birationally PI, although the finer classification of birationally PI algebras remains open. There are some initial results on algebras birational to the Sklyanin function field by Rogalski, Stafford, and Sierra. Finally, the “ q -ruled” case, where $D = K(t; \sigma, \delta)$ may be amenable to more functorial techniques developed by Chan and Nyman.

In her talk, *The Interplay of Algebra and Geometry in the Setting of AS-regular Algebras*, Michaela Vancliff focused on the problem of classifying Artin-Schelter regular algebras. Since AS-regular algebras are noncommutative analogues of commutative polynomials, they should have a geometry, and she described the geometry that appeared in the work of Artin, Tate, and Van den Bergh. Generic AS-algebras of dimension 3 were classified by Artin, Tate and Van den Bergh using the geometry of the point scheme, but this classification does not extend to dimension 4, where she believes a line scheme may also be necessary. Vancliff described her work using graded skew Clifford algebras to reclassify most of the quadratic algebras of dimen-

sion 3, and some of the quadratic algebras of dimension 4. She concluded with a list of problems related to graded skew Clifford algebras and the classification of AS-regular algebras of dimension 4 using a line scheme and a point scheme.

Cherednik algebras, and more generally symplectic reflection algebras, are noncommutative deformations of skew group rings of complex reflection groups. In his lecture, *Some Geometry and Combinatorics Around the Representations of the Cherednik Algebras*, Iain Gordon discussed some of the geometry and combinatorics related to these algebras and groups. A reflection group G acting on a vector space V induces an action on the cotangent bundle $T^*V = V \otimes V^*$, which is a symplectic space, and understanding the geometry of the induced orbit space, which is always a singular variety but has mild “symplectic singularities,” is a problem of current interest. If there is a symplectic resolution X , (which is related to the existence of a crepant resolution), there is an equivalence between the derived categories $D^b(\mathbb{C}[T^*V] \rtimes G)$ and $D^b(X)$. Hence any two such symplectic resolutions X_1 and X_2 have equivalent derived categories. But it was shown by Bellamy in 2009 that such a symplectic resolution exists only in type A. Attached to a complex reflection group G are the bigraded q -Catalan and rational q -Catalan “numbers” of G , which are actually Laurent polynomials. They were introduced by Garcia and Haiman to understand the $n!$ conjecture (now the $n!$ theorem proved by Haiman). Setting the parameter t equal to 0 in the bigrading leads to a noncommutative crepant resolution. Rational Cherednik algebras reveal new properties of Hecke algebras and the combinatorics of the Hilbert scheme related to the rational q -Catalan numbers. A current exciting goal is to understand “deformation quantization of symplectic varieties and localization”, which involves viewing the rational Cherednik algebras as sheaves of algebras on symplectic resolutions.

In the final conference talk, *An Introduction to Cluster Algebras*, Lauren Williams gave an introductory overview of how cluster algebras work. Cluster algebras were the theme of the MSRI fall semester program, and Williams’ lecture served to tie that topic to the spring semester topic of noncommutative algebra. Cluster algebras are a class of commutative rings introduced by Fomin and Zelevinsky in the early 2000s to study dual canonical bases and positivity questions in quantum group theory. They are generated by cluster variables and mutation relations. Cluster algebras of finite type can be classified by the finite Dynkin diagrams. Cluster algebras provide a unifying algebraic and combinatorial framework for investigating a wide array

of mathematical topics such as Grassmannians, tropical calculus, invariant theory, polyhedral combinatorics, and Poisson geometry.

2 Poster Presentations

Fourteen early-career participants presented posters, which were displayed during the coffee breaks. Each presenter gave a 3-4 minute summary of their topic and main results just prior to having their poster on display. Several participants commented that this format was very effective in giving presenters an opportunity to introduce their work. The posters presenters and their titles are as follows:

- Martina Balagovic, York University, *Representations of Rational Cherednik Algebras in Positive Characteristic*
- Olga Bershtein, Tallinn University of Technology, Tallinn, Estonia and Institute for Low Temperature Physics and Engineering, Kharkov, Ukraine, *Geometrical Realizations of Quantum Harish-Chandra Modules*
- Jiarui Fei, University of California, Riverside, *Moduli of Representations*
- Johanna Hennig, University of California San Diego, *A Generalization of Lie's Theorem*
- Mee Seong Im, University of Illinois at Urbana-Champaign, *Invariants and Semi-invariants of Arbitrary Filtered Quiver Varieties*
- Martina Lanini, The University of Melbourne, *The Stable Moment Graph and Periodic Structures in the Affine Category \mathcal{O}*
- Joanna Meinel, Max Planck Institute for Mathematics, Bonn, *Primitive Ideals and Primitive Quotients of Generalizations of Weyl Algebras*
- Manizheh Nafari, University of Toledo, *Regular Graded Skew Clifford Algebras that are Twists of Regular Graded Clifford Algebras*
- Emily Norton, Boston College, *Symplectic Reflection Algebras of Elementary Abelian p -Groups Viewed as Ore Extensions*

- Natasha Rozhkovskaya, Kansas State University, *Commutative Subalgebras coming from Duality of Actions*
- Špela Špenko, Institute of Mathematics, Physics and Mechanics, Ljubljana, Slovenia, *On the Image of a Noncommutative Polynomial*
- Amy Stout, University of San Diego, *Non-regular Algebras of Dimension 3*
- Mary Clair Thompson, Auburn University, *Asymptotic Results in Non-compact Semisimple Lie Groups*
- Padmini P. Veerapen, University of Texas, Arlington, *Point Modules over Regular Graded Skew Clifford Algebras*

3 Panel

The panel discussion, “Maintaining Momentum”, was moderated by Ellen Kirkman, and the panelists were

- Lourdes Juan (Professor, Texas Tech) (Differential Galois Theory, Algebraic Groups, Computer Applications)
- Gail Letzter (NSA) (Representation Theory of Lie Algebras and Quantum Groups)
- Anne Shepler (Assoc. Professor, North Texas) (Cohomology and Representation Theory)
- Monica Vazirani (Assoc. Professor, UC-Davis) (Algebraic Combinatorics)
- Chelsea Walton (Moore Instructor/NSF Postdoctoral Fellow – MIT) (Noncommutative Algebra)

By design, the panelists were chosen to represent different stages of their careers, different career trajectories, and different family situations. Panelists discussed the following questions:

1. What advice would you give to women beginning a career in mathematics?
2. What obstacles have you experienced in maintaining an active research program – and what solutions have you discovered?

3. Have you found productive collaborations – if yes, how did these collaborations begin? Are there problems to avoid in establishing collaborations?
4. How have you found new questions and areas of interest beyond your thesis research?

There were about 15 minutes of comments and questions from the floor. Discussions continued over the dinner for female participants, where participants were asked to sit next to someone they didn't know.

4 Comments

The organizers received many positive comments regarding the workshop, including the following comments from a female graduate student who had attended the workshop:

"In my opinion, that workshop was one of the most helpful things I've ever participated in during my graduate career, and I just want to say thank you for organizing it and for providing encouragement to bewildered young mathematicians like myself.

I especially liked the selection of questions you posed during the panel – I have seen panels before on this topic which were not quite as helpful, and I think it was because there wasn't such a good set of questions/topics which could lead the discussion. I am wondering if you still have the list of questions which you posed? It might help me if I ever organize a similar event in the future, if that is okay with you."

Organizers

First Name	Last Name	Institution
Georgia	Benkart	University of Wisconsin
Ellen	Kirkman	Wake Forest University
Susan	Sierra	University of Edinburgh

Speakers

First Name	Last Name	Institution
Iain	Gordon	University of Edinburgh
Graham	Leuschke	Syracuse University
Catharina	Stroppel	Universität Bonn
Michaela	Vancliff	University of Texas at Arlington
Lauren	Williams	University of California, Berkeley
Sarah	Witherspoon	Texas A&M University
James	Zhang	University of Washington
Susan	Sierra	University of Edinburgh



**Connections for Women:
Noncommutative Algebraic Geometry and Representation Theory**

January 24 - 25, 2013

Schedule

Thursday, January 24, 2013			
9:00AM - 9:15AM	Simons Auditorium		Welcome
9:15AM - 10:05AM	Simons Auditorium	James Zhang	Open Questions in Noncommutative Algebra and Noncommutative Algebraic Geometry
10:15AM - 10:30AM	Simons Auditorium	Martina Lanini, Joanna Meinel, Emily Norton	Poster Previews
10:30AM - 11:00AM	Atrium		Tea
11:00AM - 11:50AM	Simons Auditorium	Sarah Witherspoon	Poincaré-Birkhoff-Witt Theorems
12:00PM - 1:30PM	Atrium		Lunch
1:30PM - 2:20PM	Simons Auditorium	Catharina Stroppel	Kazhdan-Lusztig polynomials, geometry and categorification
2:30PM - 2:45PM	Simons Auditorium	Jiarui Fei, Mee Seong Im, Natalia Rojkovskaia	Poster Previews
2:45PM - 3:15PM	Atrium		Tea
3:15PM - 4:05PM	Simons Auditorium	Graham Leuschke	What Should a Non-commutative Resolution of Singularities Be?
4:15PM - 5:15PM	Atrium	Lourdes Juan, Gail Letzter, Anne Shepler, Monica Vazirani, Chelsea Walton	Panel Discussion: Building and Sustaining Momentum (Moderated by Ellen Kirkman)
6:00PM - 8:00PM	Taste of the Himalayas		Dinner

Friday, January 25, 2013			
9:00AM - 9:50AM	Simons Auditorium	Susan Sierra	What Are the Noncommutative Projective Surfaces?
10:00AM - 10:15AM	Simons Auditorium	Olga Bershteyn, Spela Spenko, Mary Clair Thompson	Poster Previews
10:15AM - 10:45AM	Atrium		Tea
10:45AM - 11:35AM	Simons Auditorium	Michaela Vancliff	The Interplay of Algebra and Geometry in the Setting of AS-Regular Algebras
11:45AM - 12:00PM	Simons Auditorium	Johanna Hennig, Manizheh Nafari, Amy Stout, Padmini Veerapen	Poster Previews
12:00PM - 12:10PM	MSRI Entrance		Photo Session
12:10PM - 1:40PM	Atrium		Lunch
1:40PM - 2:30PM	Simons Auditorium	Iain Gordon	Some Geometry and Combinatorics around the Representations of Cherednik Algebras
2:30PM - 3:00PM	Atrium		Tea
3:00PM - 3:50PM	Simons Auditorium	Lauren Williams	An Introduction to Cluster Algebras

Participants

First Name	Last Name	Institution
Martina	Balagovic	University of York
Charlie	Beil	Simons Center for Geometry and Physics, Stony Brook University
Georgia	Benkart	University of Wisconsin
Olga	Bershteyn	Tallinn Technical University
Florian	Block	University of California
Ragnar-Olaf	Buchweitz	University of Toronto
Kenneth	Chan	MSRI - Mathematical Sciences Research Institute
Maria	Chlouveraki	Université Versailles/Saint Quentin-en-Yvelines
Hailong	Dao	University of Kansas
Galyna	Dobrovolska	University of Chicago
Emilie	Dufresne	MSRI - Mathematical Sciences Research Institute
Eleonore	Faber	University of Toronto
Banafsheh	Farang-Hariri	Institut mathématique Elie Cartan
Jiarui	Fei	University of California
Sian	Fryer	University of Manchester
Emanuele	Ghedini	University of Oxford
Iain	Gordon	University of Edinburgh
Natalia	Gorfinkel	Moscow State University
Jessica	Hamm	Temple University
Pamela	Harris	University of Wisconsin
Johanna	Hennig	University of California, San Diego
Reiner	Hermann	Universität Bielefeld
Mee Seong	Im	University of Illinois at Urbana-Champaign
Andrew	Jaramillo	University of California
Jack	Jeffries	University of Utah
Lourdes	Juan	Texas Tech University
Tina	Kanstrup	Aarhus University
Gizem	Karaali	Pomona College
Youngsu	Kim	Purdue University
Ellen	Kirkman	Wake Forest University
Martina	Lanini	University of Melbourne
Gail	Letzter	NSA - National Security Agency
Graham	Leuschke	Syracuse University
Matilde	Marcolli	California Institute of Technology
Joanna	Meinel	Max-Planck-Institut für Mathematik
Claudia	Miller	Syracuse University
Maria	Monks	UC Berkeley Math Faculty
Manizheh	Nafari	University of Toledo
Van	Nguyen	Texas A & M University
Emily	Norton	Boston College
Bregje	Pauwels	University of California
Aleksandr	Pavlov	University of Toronto
Jeremy	Pecharich	MSRI - Mathematical Sciences Research Institute
Manuel	Reyes	Bowdoin College
Alice	Rizzardo	International School for Advanced Studies (SISSA/ISAS)
Natasha	Rozhkovskaya	Kansas State University
Steven	Sam	University of California
Antonio	Sartori	Universität Bonn
Lisa	Schneider	University of California

Liana	Sega	University of Missouri
Anne	Shepler	University of North Texas
Peri	Shereen	University of California
Susan	Sierra	University of Edinburgh
Gregory	Smith	Queen's University
Spela	Spenko	University of Ljubljana
Suresh	Srinivasamurthy	Kansas State University
Friederike	Steglich	Friedrich-Alexander-Universität Erlangen-Nürnberg
Amy	Stout	University of San Diego
Catharina	Stroppel	Universität Bonn
Ryo	Takahashi	Nagoya University
Mary Clair	Thompson	Auburn University
Matthew	Tucker-Simmons	University of California
Bolor	Turmunkh	University of Illinois at Urbana-Champaign
Michaela	Vancliff	University of Texas at Arlington
Monica	Vazirani	University of California
Padmini	Veerapen	University of Texas
Friedrich	Wagemann	Universite de Nantes
Chelsea	Walton	Massachusetts Institute of Technology
Linhong	Wang	Southeastern Louisiana University
Lauren	Williams	University of California, Berkeley
Sarah	Witherspoon	Texas A&M University
Emily	Witt	University of Minnesota Twin Cities
James	Zhang	University of Washington

Officially Registered Participant Information

Participants		73
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Gender		73
Male	32.88%	24
Female	67.12%	49
Declined to state	0.00%	0

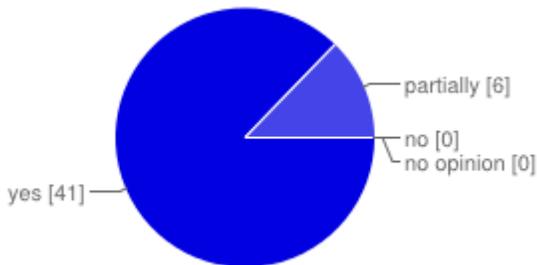
Ethnicity*		73
White	67.12%	49
Asian	17.81%	13
Hispanic	4.11%	3
Pacific Islander	0.00%	0
Black	1.37%	1
Native American	0.00%	0
Mixed	5.48%	4
Declined to state	4.11%	3

* ethnicity specifications are not exclusive

Summary [See complete responses](#)

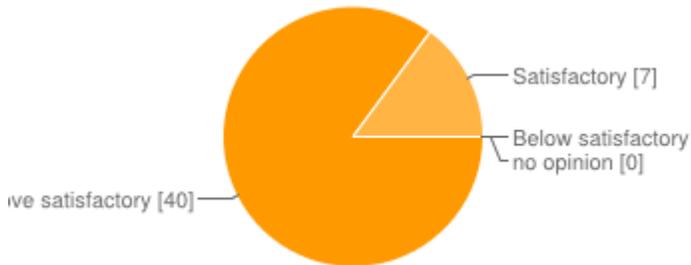
Topic presentation and organization

Did the various topics within the workshop integrate into a coherent picture?



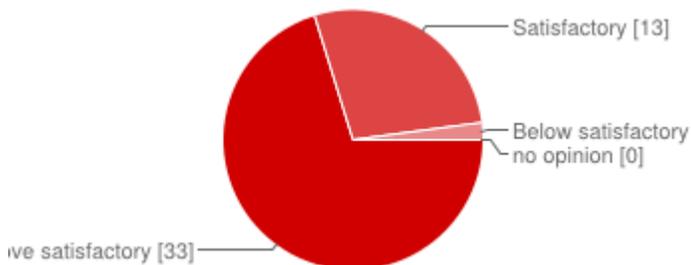
yes	41	87%
partially	6	13%
no	0	0%
no opinion	0	0%

Were the speakers generally clear and well organized in their presentation?



Above satisfactory	40	85%
Satisfactory	7	15%
Below satisfactory	0	0%
no opinion	0	0%

Was there adequate time between lectures for discussion?



Above satisfactory	33	70%
Satisfactory	13	28%
Below satisfactory	1	2%
no opinion	0	0%

Additional comments on the topic presentation and organization 16 of 22

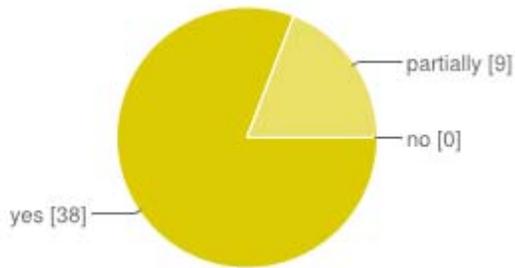
Excellent talks! Too many talks

A bit more time for the posters would have been nice

I really liked the poster

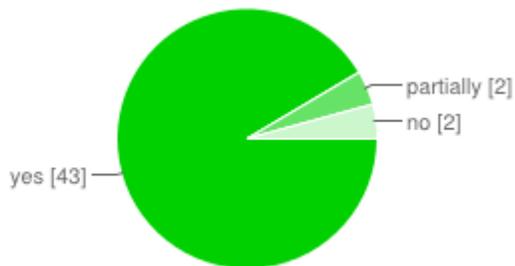
Personal assessment

Was your background adequate to access a reasonable portion of the material?



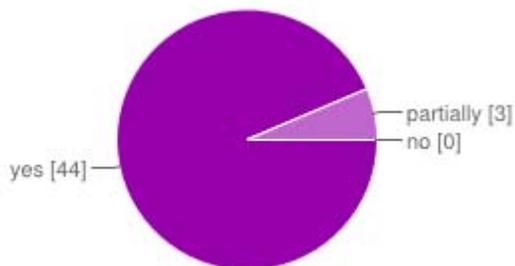
yes	38	81%
partially	9	19%
no	0	0%

Did the workshop increase your interest in the subject?



yes	43	91%
partially	2	4%
no	2	4%

Was the workshop worth your time and effort?

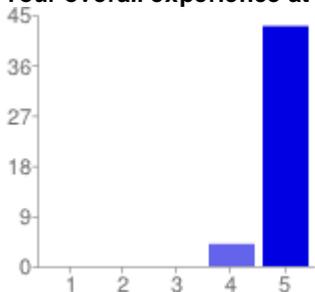


yes	44	94%
partially	3	6%
no	0	0%

Additional comments on your personal assessment

I am so happy I went! The poster previews gave participants a chance to "meet" the early-career mathematicians, and having 3-4 posters up at a time during the breaks gave the other participants a chance to ...

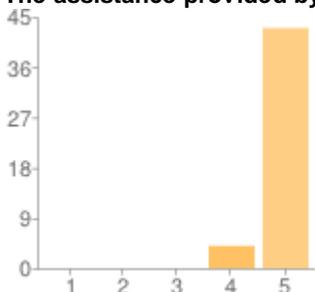
Your overall experience at MSRI



1 - Not satisfactory	0	0%
2	0	0%
3	0	0%
4	4	9%
5 - Above satisfactory	43	91%

Not satisfactory Above satisfactory

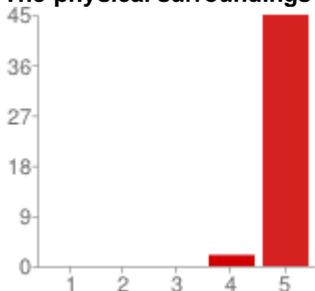
The assistance provided by MSRI staff



1 - Not satisfactory	0	0%
2	0	0%
3	0	0%
4	4	9%
5 - Above satisfactory	43	91%

Not satisfactory Above satisfactory

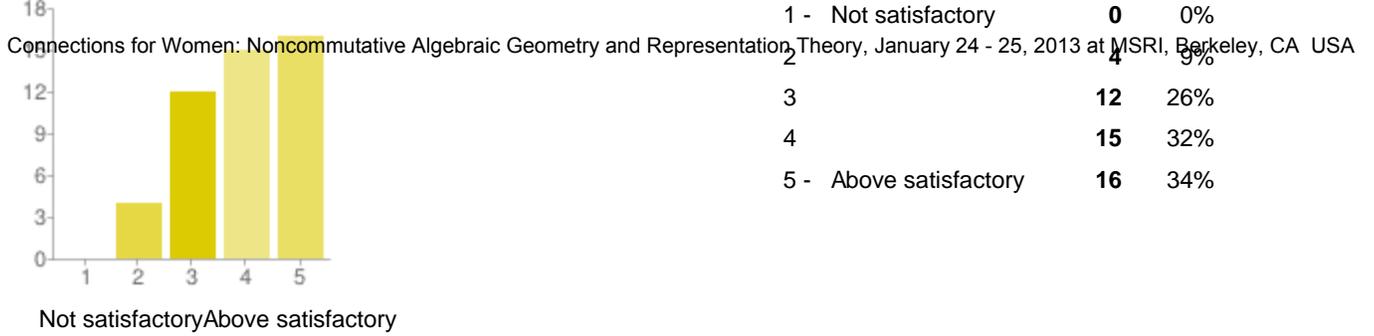
The physical surroundings



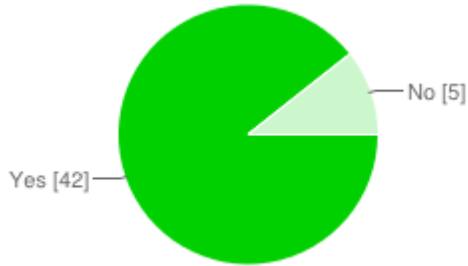
1 - Not satisfactory	0	0%
2	0	0%
3	0	0%
4	2	4%
5 - Above satisfactory	45	96%

Not satisfactory Above satisfactory

The food provided during the workshop

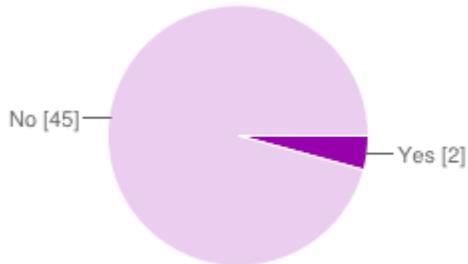


Did you use MSRI's wireless network?



Yes	42	89%
No	5	11%

Did you experience any difficulties with the network?



Yes	2	4%
No	45	96%

If you did experience difficulties with the network, please explain:

The IP address assigned to my laptop seemed to change regularly; this made it difficult to SSH into my home university's servers, as their security protocol grants access to IP addresses individually ...

Additional comments on the venue

no cell phone signal The venue is very nice! It is just a bit difficult to reach MSRI coming from downtown Berkeley, (signposting for) a footpath would be great! Amazing and beautiful. I wish the cha ...

Thank you for completing this survey

The organizers did a wonderful

job.

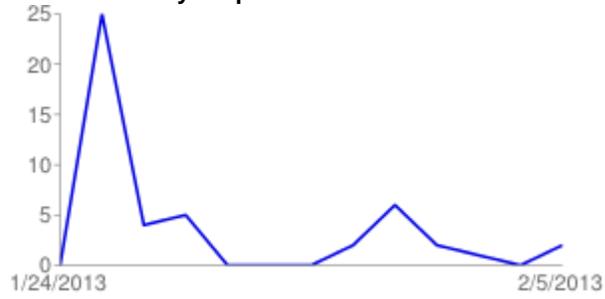
Please have name tags without safety pins.

Use clip-ons or lanyards instead.

I spent time during tea breaks and meals meeting and talking to many

experts in the area ...

Number of daily responses



Connections for Women Workshop

Noncommutative Algebraic Geometry and Representation Theory

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Additional Survey Responses

Additional comments on the topic presentation and organization

- Excellent talks!
- Too many talks
- A bit more time for the posters would have been nice
- I really liked the poster preview 5-minute verbal presentations. They made the poster sessions more interesting for me.
- I like to have this workshop once a year.
- would it be online for later revisit as a video or audio file?
- Amazing program--the topics and the speakers were all wonderful.
- Speakers made a special effort to give background and to discuss possible open problems. There was a good selection of topics presented.
- Everything was very good.
- Appreciated time in between talks to meet with others and discuss mathematics; topics organized very well; excellent organization; ecstatic at the chance to meet young and senior women in mathematics!

Additional comments on your personal assessment

- I am so happy I went!
- The poster previews gave participants a chance to "meet" the early-career mathematicians, and having 3-4 posters up at a time during the breaks gave the other participants a chance to learn more about the work of these graduate students and postdocs. The panel gave good insights into strategies for starting and maintaining a successful career.
- I was a speaker, so not really the target audience
- Lot of new project idea arose as a result of this conference

Additional comments on the venue

- no cell phone signal
- The venue is very nice! It is just a bit difficult to reach MSRI coming from downtown Berkeley, (signposting for) a footpath would be great!
- Amazing and beautiful. I wish the chalkboards came a little lower--shorter speakers had a tough time reaching them.
- The busses could be more frequent
- Regarding the food: I requested information beforehand about availability of vegan food but heard nothing back; some labelling/information would be useful. The coffee is also generally a bit weak!
- Long erasers don't work nearly as well as the normal-size ones.
- The erasers in the Simons Hall are a problem: By the last talk of the day the blackboards are so covered with chalk dust that one can hardly read what is written onto them.

We welcome any additional comments or suggestions you may have to improve the overall experience for future participants.

- The organizers did a wonderful job.
- Please have name tags without safety pins. Use clip-ons or lanyards instead.

- I spent time during tea breaks and meals meeting and talking to many experts in the area. I have skimmed and/or read various experts' papers before coming to MSRI and discussing their results with them helped me to understand their papers better. Not only that, I have spent time with people in the evenings and we discussed how Cherednik algebras and spherical subalgebras are connected to quantum Hamiltonian reductions. I had many other meaningful mathematics discussions all throughout my time here at MSRI. It was good meeting familiar faces and discussing mathematics with new faces.
- Great workshop!