

**The Commutative Algebra of Singularities in
Birational Geometry:**

**Multiplier Ideals, Jets, Valuations, and
Positive Characteristic Methods**

May 6 - May 10, 2013

MSRI, Berkeley, CA, USA

Organizers:

Craig Huneke (University of Virginia)

Yujiro Kawamata (University of Tokyo)

Mircea Mustata (University of Michigan)

Karen Smith (University of Michigan)

Kei-Ichi Watanabe (Nihon University)

**THE COMMUTATIVE ALGEBRA OF SINGULARITIES IN
BIRATIONAL GEOMETRY: MULTIPLIER IDEALS, JETS,
VALUATIONS, AND POSITIVE CHARACTERISTIC METHODS,
MAY 6–10, 2013**

1. ORGANIZERS

- Craig Huneke (University of Virginia)
- Yujiro Kawamata (University of Tokyo)
- Mircea Mustața (University of Michigan)
- Karen Smith (University of Michigan)
- Kei-ichi Watanabe (Nihon University)

2. SCIENTIFIC PROGRAM

Connections between algebraic geometry and prime characteristic commutative algebra have long been theorized. Already in the seventies, Hochster and Roberts used Frobenius techniques to control the singularities of rings of invariants, and Kunz proved that smooth varieties can be characterized as those for which the Frobenius map is flat. A decade later, Mehta and Ramanathan formally introduced the concept of F -split projective varieties, while simultaneously and independently Hochster and Huneke developed the theory of tight closure for local rings. Each of these developments was remarkably powerful, but only in more recent years have they begun to be recognized as aspects of the same deep ideas.

The main focus of the workshop was on the recent developments in commutative algebra in positive characteristic (in particular, in connection with the study of singularities in this setting) and its connections with other fields, such as

- Birational geometry (especially the study of invariants of singularities that appear in this setting);
 - Valuation theory;
- and
- Spaces of arcs and motivic integration.

3. THE PRESENTATIONS

Since the audience consisted of both commutative algebraists and people working in various areas of algebraic geometry (especially birational geometry), we had several survey-style lectures, with the goal of introducing different topics to a diverse group of participants.

Two impressive commutative algebra talks were given by Bhargav Bhatt (IAS) and Karl Schwede (Penn State). Bhatt presented his joint work with de Jong, proving an improvement of Grothendieck's version of the local Lefschetz property which was conjectured by Kollár. The result fitted very well in the main theme of our workshop: while mainly a result in characteristic zero, the proof was by reduction to positive characteristic, making use of the results of Hochster and Huneke on absolute integral closures of rings. Schwede discussed his work with Patakfalvi and Zhang on the behavior in families of some classes of singularities that appear in positive characteristic. The new insight is that while invariants of singularities such as test ideals do not restrict well to the fibers of a family of varieties, the situation dramatically improves after a pull-back by Frobenius (which would not change the fibers). This result has interesting applications to the study of singularities and to the positivity of direct images of canonical sheaves.

Another talk that has attracted quite a bit of attention was by Holger Brenner (Universität Osnabrück). This concerned a famous open problem in the field, that of finding an example of an irrational Hilbert-Kunz multiplicity. Brenner discussed several general generalizations of this invariant, and building on geometric methods of Cutkosky, he showed that some of these more general invariants are indeed irrational. Another successful talk on Hilbert-Kunz multiplicities was delivered by Trivedi Vijaylaxmi (TIFR), who considered their behavior in families over the integers, as the characteristic varies. Kevin Tucker gave an exceptionally clear talk on his important result on the existence of F -signature, an invariant intimately related to the Hilbert-Kunz multiplicity; the main point was the uniform convergence of certain limits which could also have important consequences for Hilbert-Kunz multiplicities.

Some of the talks treated the subtle connections between singularities and global properties of algebraic varieties via reduction to positive characteristic. An important question concerns the relation between varieties of Fano type (or Calabi-Yau type) in characteristic zero and the so-called globally F -regular type (respectively, globally F -split type) varieties, defined by reduction to positive characteristic. A relation between these two notions has been conjectured by Schwede and Smith and a very interesting talk by Shunsuke Takagi (University of Tokyo) presented a proof of this conjecture, joint with Gonyo, of the two-dimensional case of this conjecture. Another intriguing talk on this connection was given by Nobuo Hara (Tohoku University), who connected the concept with F -blowups. In particular, Professor Kawamata was

impressed that the iteration of the Frobenius morphisms in positive characteristic can be a substitute of a resolution of singularities in characteristic zero. Vasudevan Srinivas (Tata Institute) discussed a conjecture relating some invariants of singularities in characteristic zero (the multiplier ideals) with similar invariants (the test ideals) defined using the Frobenius morphism in positive characteristic. He presented his joint work with Mustaa, reducing a conjecture relating these invariants via reduction mod p to a conjecture predicting the ordinarity of infinitely many reductions to positive characteristic for a smooth projective variety defined over a number field.

Some of the recent talks concerning birational geometry were related to the spectacular advances in this field over the past few years. The first talk in the workshop, given by János Kollár (Princeton University), presented an application of the Minimal Model Program to invariants of isolated singularities associated via a resolution of singularities. More precisely, work of many people has shown that the homotopy type of a certain regular cell complex associated to a resolution of an isolated singularity is an invariant of the singularity. In joint work with de Fernex and Xu, Kollár has shown that for nice singularities (more precisely, for log terminal singularities) this complex is contractible, a result that has attracted a lot of interest among the experts in the field.

James M^cKernan (MIT) gave a talk on a web of conjectures, going back to Shokurov, that would allow proving one of the remaining open problems in birational geometry, namely Termination of Flips. In a recent breakthrough, M^cKernan with Hacon and Xu proved a conjecture of Shokurov concerning the ACC property of an invariant of singularities in characteristic zero, the log canonical threshold. M^cKernan's talk discussed similar properties for related invariants, that would be closer related to the termination of sequences of flips.

Two related talks about singularities in characteristic zero have been given by Shihoko Ishii (University of Tokyo) and Lawrence Ein (UIC). These covered some versions of invariants of singularities that can be defined in a very general setting, by replacing the usual discrepancy in birational geometry by a version going back to the work of Mather. Masayuki Kawakita (RIMS) gave a talk on a conjecture of Shokurov on the index of canonical singularities, proving the conjecture for 3-folds.

There were two talks on connections to valuation theory, given by Charles Favre (École Polytechnique) and Bernard Teissier (Inst. Math. Jussieu). Favre discussed his work with Boucksom and Jonsson on a uniform version of a theorem of Izumi, that over the years generated a lot of work in commutative algebra. Teissier presented some recent progress on his approach towards the Local Uniformization theorem (a key step in resolution of singularities) in positive characteristic. The talk gave a general overview of this approach based on toric methods, and on how this can be applied in the case of Abhyankar valuations.

While many of the talks in the workshop had an important didactic component, there were a few of the talks whose goal was to introduce some particular topic to a wide audience. Claudia Polini (University of Notre Dame) gave a beautiful introduction to an algebraic notion, the core of an ideal, emphasizing its connections with geometric concepts, such as multiplier ideals. Gennady Lyubeznik (University of Minnesota) gave an overview of recent results related to local cohomology, with emphasis on positive characteristic. Tommaso de Fernex (University of Utah) surveyed a topic that has recently attracted a lot of attention, the Nash problem concerning the connections between families of arcs and divisors on a resolution of singularities. In particular, de Fernex discussed the recent solution of the problem in dimension 2, due to Fernández de Bobadilla and Pe Pereira, as well as the counterexamples in higher dimensions due to Ishii and Kollar (in dimension ≥ 4) and to himself (in dimension 3). Mehta (IIT, Bombay) gave a beautiful overview of the applications of Frobenius splitting to the study of moduli of vector bundles on curves, including an exposition of some of the relevant GIT theory connecting these results to, for example, the Hochster-Roberts theorem on Cohen-Macaulayness of invariant rings. Willem Veys (University of Leuven) gave a nice introduction to the Monodromy Conjecture for Igusa's p -adic zeta function, discussing the connections between classical invariants of singularities (such as the monodromy action on the Milnor fiber) and invariants associated to p -adic, topological, and motivic zeta functions.

On Wednesday afternoon, younger mathematicians were given the opportunity to present their work in two parallel sessions. These talks were well-attended, well-received and in general of high quality. In particular, a number of conversations were sparked that have led to new collaborations or improved results. The speakers were: Angelica Benito (Madrid/UMich), Wenbo Niu (Purdue University), Jenna Rajchgot (UMich), Akiyoshi Sannai (Nagoya University), Takafumi Shibuta (Kyushu University), Adela Vraciu (University of South Carolina), Emily Witt (Univ. Minnesota), and Yuchen Zhang (University of Utah).

In summary, the organizers were extremely pleased by the results of the workshop. The talks were of high quality, beautiful results were presented connecting the fields, collaborations developed, and new conjectures and opportunities wait to be explored.

Organizers

First Name	Last Name	Institution
Craig	Huneke	University of Virginia
Yujiro	Kawamata	University of Tokyo
Mircea	Mustata	University of Michigan
Karen	Smith	University of Michigan
Kei-ichi	Watanabe	Nihon University

Speakers

First Name	Last Name	Institution
Angelica	Benito	University of Michigan
Bhargav	Bhatt	Institute for Advanced Study
Holger	Brenner	Universitat Osnabrueck
Steven	Cutkosky	University of Missouri
Tommaso	de Fernex	University of Utah
Lawrence	Ein	University of Illinois at Chicago
Charles	Favre	Ecole Polytechnique
Nobuo	Hara	Tohoku University
Shihoko	Ishii	University of Tokyo
Masayuki	Kawakita	Kyoto University
Janos	Kollar	Princeton University
Gennady	Lyubeznik	University of Minnesota Twin Cities
James	McKernan	Massachusetts Institute of Technology
Vikram	Mehta	Dept. of mathematics, IIT, Bombay
Wenbo	Niu	Purdue University
Claudia	Polini	University of Notre Dame
Jenna	Rajchgot	MSRI - Mathematical Sciences Research Institute
Akiyoshi	Sannai	Nagoya University
Karl	Schwede	Pennsylvania State University
Takafumi	Shibuta	Kyushu University
Vasudevan	Srinivas	Tata Institute of Fundamental Research
Shunsuke	Takagi	University of Tokyo
Bernard	Teissier	Centre National de la Recherche Scientifique (CNRS)
Vijaylaxmi	Trivedi	Tata Institute of Fundamental Research
Kevin	Tucker	Princeton University
Willem	Veys	Katholieke Universiteit Leuven
Adela	Vraciu	University of South Carolina
Emily	Witt	University of Minnesota Twin Cities
Yuchen	Zhang	University of Utah



**The Commutative Algebra of Singularities in Birational Geometry:
Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods**

May 6 to May 10, 2013

Schedule

Monday, May 6, 2013			
9:00 AM - 9:30 AM	Simons Auditorium		Welcome
9:30 AM - 10:20 AM	Simons Auditorium	János Kollár	Resolutions of dlt pairs
10:30 AM - 11:00 AM	Atrium		Tea
11:00 AM - 11:50 AM	Simons Auditorium	Gennady Lyubeznik	Recent results on the grading of local cohomology modules
12:00 PM - 2:00 PM	Atrium		Lunch
2:00 PM - 2:50 PM	Simons Auditorium	Claudia Polini	the core of an ideal
3:00 PM - 3:30 PM	Atrium		Tea
3:30 PM - 4:20 PM	Simons Auditorium	James McKernan	ACC for the log canonical threshold and termination of flips

Tuesday, May 7, 2013			
9:00 AM - 9:50 AM	Simons Auditorium	Steven Cutkosky	Multiplicities of graded families of linear series
10:00 AM - 10:30 AM	Atrium		Tea
10:30 AM - 11:20 AM	Simons Auditorium	Vasudevan Srinivas	Ordinary varieties and the comparison between multiplier ideals and test ideals
11:30 AM - 12:20 PM	Simons Auditorium	Karl Schwede	F-singularities in families
12:30 PM - 2:00 PM	Atrium		Lunch
2:00 PM - 2:50 PM	Simons Auditorium	Bernard Teissier	On the local uniformization of Abhyankar valuations using toric maps
3:00 PM - 3:30 PM	Atrium		Tea
3:30 PM - 4:20 PM	Simons Auditorium	Bhargav Bhatt	A local Lefschetz theorem
4:30 PM - 6:20 PM	Atrium		Reception

Wednesday, May 8, 2013			
9:00 AM - 9:50 AM	Simons Auditorium	Tommaso de Fernex	The Nash problem on families of arcs
10:00 AM - 10:30 AM	Atrium		Tea
10:30 AM - 11:20 AM	Simons Auditorium	Kevin Tucker	F-Signature and Relative Hilbert-Kunz Multiplicity
11:30 AM - 12:20 PM	Simons Auditorium	Vijaylaxmi Trivedi	Some computations of Hilbert-Kunz functions
12:30 PM - 2:00 PM	Atrium		Lunch
2:00 PM - 2:25 PM	SSL Addition Conference Room (Room 105)	Yuchen Zhang	Pluri-canonical maps in positive characteristic
2:00 PM - 2:25 PM	Baker Board Room	Emily Witt	F-pure thresholds of quasi-homogeneous polynomials
2:30 PM - 2:55 PM	SSL Addition Conference Room (Room 105)	Wenbo Niu	Generic linkage and regularity of algebraic varieties
2:30 PM - 2:55 PM	Baker Board Room	Adela Vraciu	Degrees of relations, the Weak Lefschetz Property, and top socle degrees in positive characteristic
3:00 PM - 3:30 PM	Atrium		Tea
3:30 PM - 3:55 PM	SSL Addition Conference Room (Room 105)	Angelica Benito	Asymptotic test ideals and their possible applications to resolution problems
3:30 PM - 3:55 PM	Baker Board Room	Takafumi Shibuta	Multiplier ideals and test ideals of complete intersection binomial ideals
4:00 PM - 4:25 PM	SSL Addition Conference Room (Room 105)	Jenna Rajchgot	Frobenius splitting of orbit closures associated to type A quivers
4:00 PM - 4:25 PM	Baker Board Room	Akiyoshi Sannai	Dual F-signature

Thursday, May 9, 2013			
9:00 AM - 9:50 AM	Simons Auditorium	Shunsuke Takagi	Globally F-regular and Frobenius split surfaces
10:00 AM - 10:30 AM	Atrium		Tea
10:30 AM - 11:20 AM	Simons Auditorium	Masayuki Kawakita	The index of a threefold canonical singularity
11:30 AM - 12:20 PM	Simons Auditorium	Charles Favre	Uniform Izumi's theorem
12:30 PM - 2:00 PM	Atrium		Lunch
2:00 PM - 2:50 PM	Simons Auditorium	Shihoko Ishii	Singularities with respect to Mather-Jacobian discrepancies
3:00 PM - 3:30 PM	Atrium		Tea
3:30 PM - 4:20 PM	Simons Auditorium	Willem Veys	The monodromy conjecture for motivic and related zeta functions

Friday, May 10, 2013			
9:30 AM - 10:20 AM	Simons Auditorium	Lawrence Ein	Mather multiplier ideals
10:30 AM - 11:00 AM	Atrium		Tea
11:00 AM - 11:50 AM	Simons Auditorium	Holger Brenner	Something is irrational in Hilbert-Kunz theory
12:00 PM - 2:00 PM	Atrium		Lunch
2:00 PM - 2:50 PM	Simons Auditorium	Vikram Mehta	The Singularities of the Moduli Spaces of Vector Bundles over Curves in characteristic p
3:00 PM - 3:30 PM	Atrium		Tea
3:30 PM - 4:20 PM	Simons Auditorium	Nobuo Hara	Stabilization of the Frobenius push-forward and the F-blowup sequence

Participants

First Name	Last Name	Institution
Paolo	Aluffi	Florida State University
Josep	Alvarez-Montaner	Universitat Politecnica de Catalunya
Yuri	Bazlov	University of Manchester
Angelica	Benito	University of Michigan
David	Benson	University of Aberdeen
Arkady	Berenstein	University of Oregon
Bhargav	Bhatt	Institute for Advanced Study
Manuel	Blickle	Johannes Gutenberg-Universitat Mainz
Mats	Boij	Royal Institute of Technology (KTH)
Jacob	Boswell	Purdue University
Holger	Brenner	Universitat Osnabrueck
Morgan	Brown	University of Michigan
Ragnar-Olaf	Buchweitz	University of Toronto
Kenneth	Chan	University of Washington
C-Y.	Chan	Central Michigan University
Huachen	Chen	Ohio State University
Catalin	Ciuperca	North Dakota State University
Helena	Cobo	University of Sevilla
Steven	Cutkosky	University of Missouri
Hailong	Dao	University of Kansas
Omprokash	Das	University of Utah
Tommaso	de Fernex	University of Utah
Alessandro	De Stefani	University of Virginia
Emilie	Dufresne	MSRI - Mathematical Sciences Research Institute
Taylor	Dupuy	University of New Mexico
Lawrence	Ein	University of Illinois at Chicago
David	Eisenbud	University of California
Juan	Elias	University of Barcelona
Florian	Enescu	Georgia State University
Neil	Epstein	George Mason University
Eleonore	Faber	University of Toronto
Andrea	Fanelli	Imperial College, London
Charles	Favre	Ecole Polytechnique
Louiza	Fouli	New Mexico State University
Juan	Fra-as-Medina	University of Michoacan (UMSNH)
Yoshinori	Gongyo	Imperial College, London
Elizabeth	Gross	University of Illinois
Kangjin	Han	Korea Institute for Advanced Study (KIAS)
Nobuo	Hara	Tohoku University
Ines	Henriques	University of California
Daniel	Hernandez	University of Minnesota Twin Cities
TRUONG	HOANG	University of Meiji
Jen-Chieh	Hsiao	Purdue University
Craig	Huneke	University of Virginia
Yoonsuk	Hyun	Korea Institute for Advanced Study (KIAS)

Shihoko	Ishii	University of Tokyo
Srikanth	Iyengar	University of Nebraska
Mark	Johnson	University of Arkansas
Mordechai	Katzman	University of Sheffield
Masayuki	Kawakita	Kyoto University
Yujiro	Kawamata	University of Tokyo
Youngsu	Kim	Purdue University
Janos	Kollar	Princeton University
Miroslav	Kures	Technical University of Brno (VUT)
CHINGJUI	LAI	Purdue University
Chung Ching	Lau	University of Utah
Graham	Leuschke	Syracuse University
Jinjia	Li	University of Louisville
Xia	Liao	Florida State University
Tiankai	Liu	Massachusetts Institute of Technology
Gennady	Lyubeznik	University of Minnesota Twin Cities
Linquan	Ma	University of Michigan
Paolo	Mantero	University of California
Matilde	Marcolli	California Institute of Technology
James	McKernan	Massachusetts Institute of Technology
Vikram	Mehta	Dept. of mathematics, IIT, Bombay
Lance	Miller	University of Utah
Claudia	Miller	Syracuse University
Rosa M.	Miro-Roig	University of Barcelona
Jonathan	Montano	Purdue University
Serena	Murru	University of Sheffield
Mircea	Mustata	University of Michigan
Yusuke	Nakamura	University of Tokyo
Trung	Ngo	Institute of Mathematics
Van	Nguyen	Texas A & M University
Wenbo	Niu	Purdue University
Howard	Nuer	Rutgers University
Luis	Nunez	University of Michigan
Luke	Oeding	University of California
Juan	Perez	University of Michigan
Claudia	Polini	University of Notre Dame
Jeffrey	Poskin	University of Wisconsin
Jenna	Rajchgot	MSRI - Mathematical Sciences Research Institute
Alice	Rizzardo	International School for Advanced Studies (SISSA/ISAS)
sarang	sane	University of Kansas
Akiyoshi	Sannai	Nagoya University
Soumya	Sanyal	University of Missouri
Tobias	Schedlmeier	Johannes Gutenberg-Universitat Mainz
Bernd	Schober	Universitat Regensburg
Karl	Schwede	Pennsylvania State University
Takafumi	Shibuta	Kyushu University
Anurag	Singh	University of Utah

Ilya	Smirnov	University of Kansas
Gregory	Smith	Queen's University
Karen	Smith	University of Michigan
Frank	Sottile	Texas A & M University
Vasudevan	Srinivas	Tata Institute of Fundamental Research
Suresh	Srinivasamurthy	Kansas State University
Hema	Srinivasan	University of Missouri
Axel	Stabler	Johannes Gutenberg-Universitat Mainz
Roberto	Svaldi	Massachusetts Institute of Technology
Peter	Symonds	University of Manchester
Shunsuke	Takagi	University of Tokyo
Hiromu	Tanaka	Kyoto University
Bernard	Teissier	Centre National de la Recherche Scientifique (CNRS)
Pedro	Teixeira	Knox College
Howard	Thompson	University of Michigan
Vijaylaxmi	Trivedi	Tata Institute of Fundamental Research
Kevin	Tucker	Princeton University
Adam-Christiaan	van Roosmalen	University of Regina
Willem	Veys	Katholieke Universiteit Leuven
Adela	Vraciu	University of South Carolina
Hans	Walther	Purdue University
Kei-ichi	Watanabe	Nihon University
Alan Marc	Watson	University of Utah
Emily	Witt	University of Minnesota Twin Cities
Chenyang	Xu	University of Utah
Keyvan	Yaghmayi	University of Utah
Yongwei	Yao	Georgia State University
Santiago	Zarzuela	University of Barcelona
Yuchen	Zhang	University of Utah
Wenliang	Zhang	University of Nebraska
Yi	Zhang	MSRI - Mathematical Sciences Research Institute
Xudong	Zheng	University of Illinois at Chicago
Zhixian	Zhu	University of Michigan

Officially Registered Participant Information

Participants		126
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Gender		126
Male	76.19%	96
Female	18.25%	23
Declined to state	5.56%	7

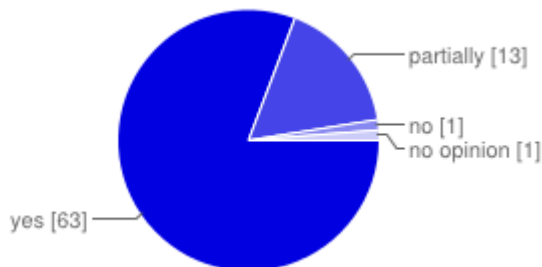
Ethnicity*		126
White	43.65%	55
Asian	36.51%	46
Hispanic	3.97%	5
Pacific Islander	0.00%	0
Black	1.59%	2
Native American	0.79%	1
Mixed	0.79%	1
Declined to state	12.70%	16

* ethnicity specifications are not exclusive

Summary [See complete responses](#)

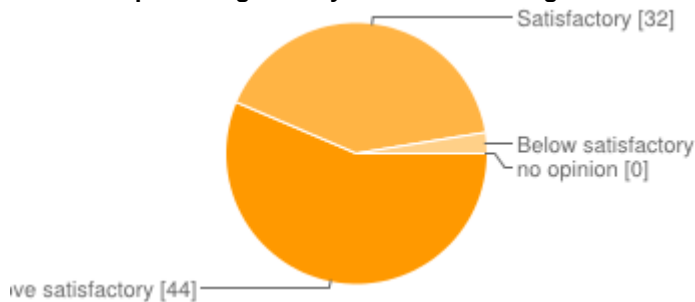
Topic presentation and organization

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



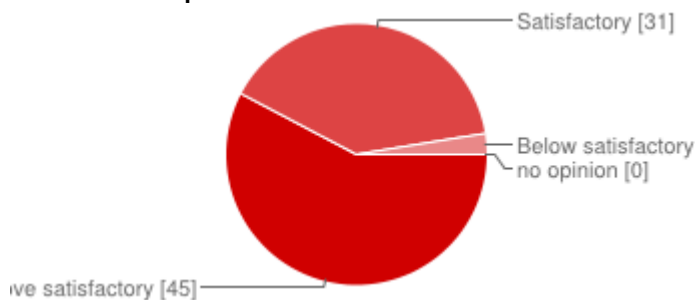
yes	63	81%
partially	13	17%
no	1	1%
no opinion	1	1%

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



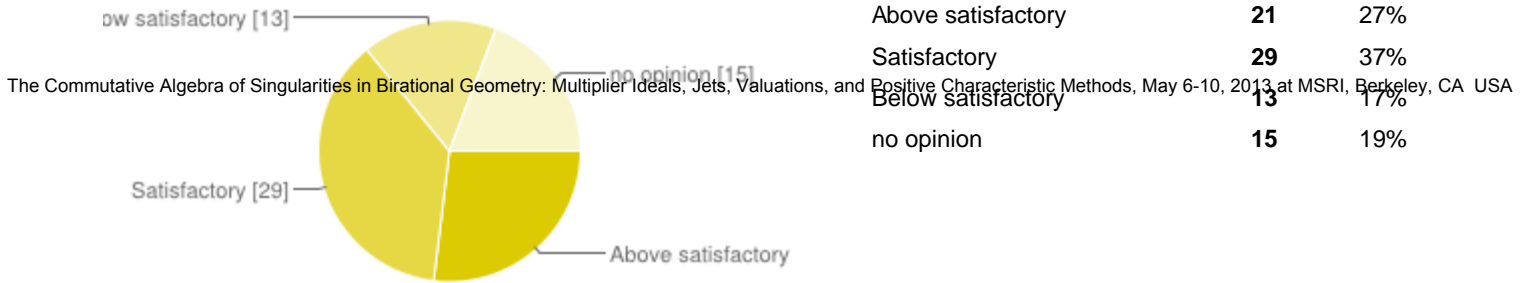
Above satisfactory	44	56%
Satisfactory	32	41%
Below satisfactory	2	3%
no opinion	0	0%

Was there adequate time between lectures for discussion?



Above satisfactory	45	58%
Satisfactory	31	40%
Below satisfactory	2	3%
no opinion	0	0%

How beneficial were the parallel sessions?

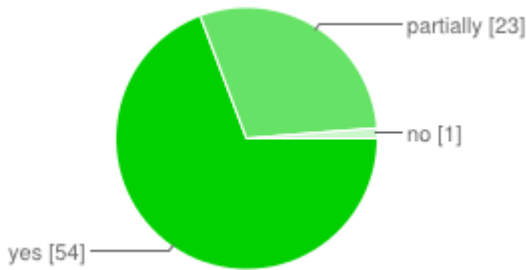


Additional comments on the topic presentation and organization

Eliminate the parallel sessions; the conflict with the music concert was painful. The parallel sessions should be taken place in the same building. In my experience, it is hard to do a very good job i ...

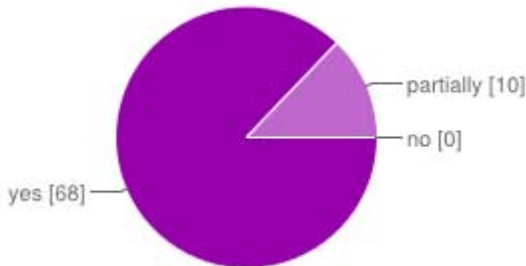
Personal assessment

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



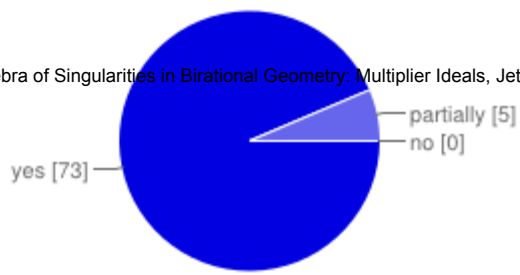
Response	Count	Percentage
yes	54	69%
partially	23	29%
no	1	1%

Did the workshop increase your interest in the subject?



Response	Count	Percentage
yes	68	87%
partially	10	13%
no	0	0%

Was the workshop worth your time and effort?



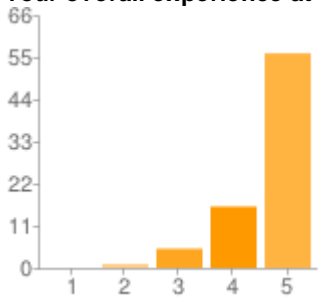
yes **73** 94%
 partially **5** 6%
 no **0** 0%

Additional comments on your personal assessment

No parallel sessions, it's great the idea of short talks, but not at the same time I am very enthusiastic about this workshop! It was really useful and interesting The number of lectures was not so la ...

Venue

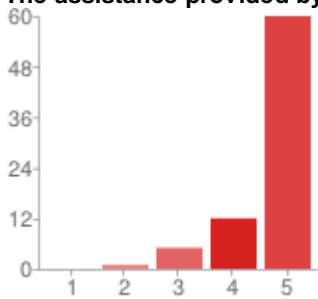
Your overall experience at MSRI



1 - Not satisfactory **0** 0%
 2 **1** 1%
 3 **5** 6%
 4 **16** 21%
 5 - Above satisfactory **56** 72%

Not satisfactory Above satisfactory

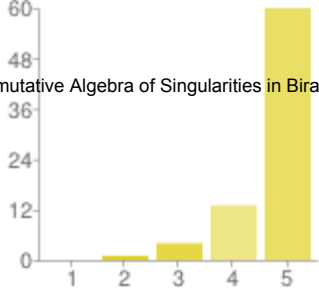
The assistance provided by MSRI staff



1 - Not satisfactory **0** 0%
 2 **1** 1%
 3 **5** 6%
 4 **12** 15%
 5 - Above satisfactory **60** 77%

Not satisfactory Above satisfactory

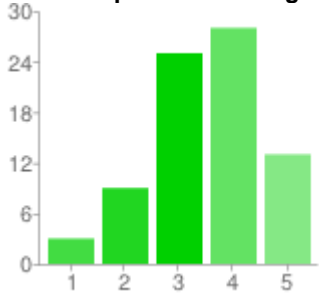
The physical surroundings



Not satisfactory Above satisfactory

1 - Not satisfactory	0	0%
2	1	1%
3	4	5%
4	13	17%
5 - Above satisfactory	60	77%

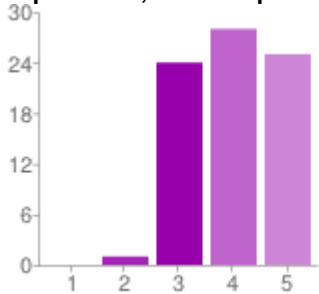
The food provided during the workshop



Not satisfactory Above satisfactory

1 - Not satisfactory	3	4%
2	9	12%
3	25	32%
4	28	36%
5 - Above satisfactory	13	17%

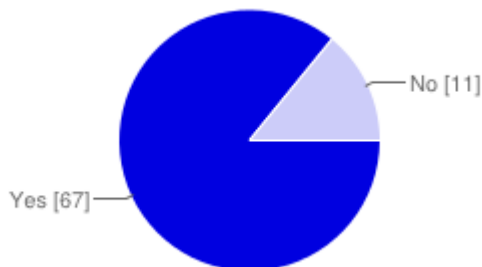
In particular, the food provided during the reception



Not satisfactory Above satisfactory

1 - Not satisfactory	0	0%
2	1	1%
3	24	31%
4	28	36%
5 - Above satisfactory	25	32%

Did you use MSRI's wireless network?

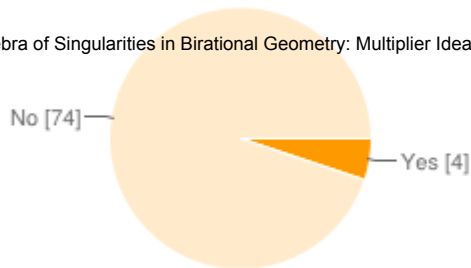


Yes	67	86%
No	11	14%

Did you experience any difficulties with the network?

Yes 4 5%

The Commutative Algebra of Singularities in Birational Geometry: Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods, 9/5/6-10, 2013 at MSRI, Berkeley, CA USA



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

website is surprisingly awkward to use In some moments the Internet connection was blinking and this made that the communication with Skype was difficult, but in general no big problems. On the first ...

Additional comments on the venue

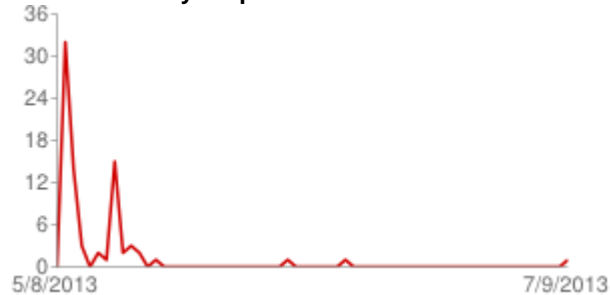
great bagels. wish there could have been food in morning, too, before the first talks. The rooms for the parallel sessions were below satisfactory. There was not enough room in either location, and ...

Thank you for completing this survey

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

more bagel days for morning
tea Thank
you for organizing this wonderful workshop! Please provide better
coffee. Keep doing what you are doing.

Number of daily responses



The Commutative Algebra of Singularities in Birational Geometry: Multiplier Ideals, Jets, Valuations, and Positive Characteristic Methods May 6 - 10, 2013

Additional Survey Responses

Additional comments on the topic presentation and organization

- Eliminate the parallel sessions; the conflict with the music concert was painful.
- The parallel sessions should be taken place in the same building.
- In my experience, it is hard to do a very good job in trying to build connections. I probably never saw a really successful result. This workshop did well, at least I have learned new topics that may relate to my work. I am less sure how much the younger part of the participants got involved in new topics.
- Please no parallel sessions!
- very good
- The parallel sessions were really good and I liked them, the problem was to split them and have to decide missing some I was interested in
- Very well organized, nice and interesting talks. Everything was perfect!
- parallel sessions should be avoided!
- Thank you for organizing a workshop on interactions in algebra and geometry in positive characteristic methods. Very helpful.
- The presence of so many experts in one place and the opportunities to consult with them are invaluable

Additional comments on your personal assessment

- No parallel sessions, it's great the idea of short talks, but not at the same time
- I am very enthusiastic about this workshop! It was really useful and interesting
- The number of lectures was not so large as to make it impossible to attend most of them. This is not always the case at meetings, and I appreciate the balance chosen between structured activities and free time for discussion.
- I started working on many problems, related to the various themes of the conference.
- Thank you for holding a session the interactions in Positive Characteristic methods
- It was VERY beneficial for me

Additional comments on the venue

- great bagels. wish there could have been food in morning, too, before the first talks.
- The rooms for the parallel sessions were below satisfactory. There was not enough room in either location, and the location outside of MSRI was far too small and did not have any working markers! I was even told by a colleague that they missed a talk because it was too crowded. I find it to be in bad taste to have an event in Simons (despite it being a nice, important event) during the workshop, at the workshop
- The location is very beautiful and inspiring!
- The hill line sometimes left the bus stop several minutes before scheduled.
- Please use name tags without safety pins.
- Food during reception gone quick usually

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

- more bagel days for morning tea
- Thank you for organizing this wonderful workshop!
- Please provide better coffee.
- Keep doing what you are doing.