

Commutative Algebra and Geometry

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1 Workshop Topics

The workshop was intended to focus on the interaction between commutative algebra, algebraic geometry and combinatorics with a special emphasis on Grbner basis theory, and to give an overview on recent developments and possible future applications. The first lectures by Hibi, Bruns and Conca were of introductory nature and gave surveys on Groebner basis techniques in commutative algebra, on determinantal ideals and lattice polytopes. Most recent results on minors of products of matrices were reported by Miller. New techniques in computing Castelnuovo Mumford regularity with applications to powers of ideals have been presented by Eisenbud, while Cox introduced new computational methods to determine the defining equations of curves and surfaces avoiding elimination theory. Iarrobino and Boij discussed the nature of Hilbert functions of level and Gorenstein algebras. The structure of multigraded and injective resolutions have been the content of the lectures by Charalambous and Huang.

Real algebraic geometry and related subjects have also been one of the main topics of the workshop with lectures by Brenner, Scheiderer, Russell, and Sottile.

The lecture by Zelevinsky on Cluster algebras was one of the highlights of the workshop. There were also quite exciting lectures by Carrell, Khovanskii and Mustata.

2 Participation

Among the participants there were several postdocs and junior speakers (Blickle, Boij, Brenner, Maclagan, Sidman, Miller, Yanagawa). One afternoon of the workshop was devoted to give some of the junior participants the possibility to present their research in 50 minutes talks. For all the younger participants the workshop was an excellent opportunity to inform themselves about the newest trends in their field and to discuss with leading researchers.

Among the participants of the workshop we had four women. Two of them, Hara Charalambous and Jessica Sidman, gave a talk. All of them, Charalambous, Dickenstein, Maclagan and Sidman were invited because of their recent scientific contributions in the area of research related to this workshop. Originally two more women were invited but had to cancel their participation by personal reasons.

3 Outcome

Since the workshop concentrated on a very specific aspects of algebra and algebraic geometry it turned out to be quite efficient in terms of exchange and presentation of new ideas. On the other hand, the invited people represented quite different directions of research, varying from commutative and non-commutative algebra to computational algebra, combinatorics and algebraic geometry, so that different viewpoints on the same subjects could be presented. Also our concept to invite young researchers and first-rate mathematicians turned out to be inspiring for participants.

We decided to have a limited number of talks (at most five a day) to give enough opportunity for scientific discussions. We also decided that the talks should be at least 50 minutes each, so that the speaker not only has the possibility to present his results but also to explain some background and the principle ideas of his approaches. Altogether we had 24 lectures and 37 participants.

The funding was adequate as it covered all local expenses.