

Contents

1 Logic and foundations

<i>Rod Downey</i>	
Algorithmic randomness and computability	1
<i>Itay Neeman</i>	
Determinacy and large cardinals	27
<i>Michael Rathjen</i>	
The art of ordinal analysis	45
<i>Thomas Scanlon</i>	
Analytic difference rings	71
<i>Simon Thomas</i>	
Borel superrigidity and the classification problem for the torsion-free abelian groups of finite rank	93

2 Algebra

<i>William Crawley-Boevey</i>	
Quiver algebras, weighted projective lines, and the Deligne–Simpson problem	117
<i>Marcus du Sautoy* and Fritz Grunewald*</i>	
Zeta functions of groups and rings	131
<i>Bernhard Keller</i>	
On differential graded categories	151
<i>Raphaël Rouquier</i>	
Derived equivalences and finite dimensional algebras	191
<i>Mark Sapir</i>	
Algorithmic and asymptotic properties of groups	223
<i>Ákos Seress</i>	
A unified approach to computations with permutation and matrix groups	245
<i>Agata Smoktunowicz</i>	
Some results in noncommutative ring theory	259

3 Number theory

<i>Manjul Bhargava</i>	
Higher composition laws and applications	271

*In case of several authors, invited speakers are marked with an asterisk.

<i>Ching-Li Chai</i>	
Hecke orbits as Shimura varieties in positive characteristic	295
<i>Henri Darmon</i>	
Heegner points, Stark–Heegner points, and values of L -series	313
<i>Kazuhiro Fujiwara</i>	
Galois deformations and arithmetic geometry of Shimura varieties	347
<i>Ben Green</i>	
Generalising the Hardy–Littlewood method for primes	373
<i>G�rard Laumon</i>	
Aspects g�om�triques du Lemme Fondamental de Langlands-Shelstad	401
<i>Philippe Michel* and Akshay Venkatesh</i>	
Equidistribution, L -functions and ergodic theory: on some problems of Yu. Linnik	421
<i>Wiesława Nizioł</i>	
p -adic motivic cohomology in arithmetic	459
<i>Christopher Skinner* and Eric Urban*</i>	
Vanishing of L -functions and ranks of Selmer groups	473
<i>Vinayak Vatsal</i>	
Special values of L -functions modulo p	501

4 Algebraic and complex geometry

<i>Valery Alexeev</i>	
Higher-dimensional analogues of stable curves	515
<i>Jean-Beno�t Bost</i>	
Evaluation maps, slopes, and algebraicity criteria	537
<i>Tom Bridgeland</i>	
Derived categories of coherent sheaves	563
<i>Lawrence Ein* and Mircea Musta�a</i>	
Invariants of singularities of pairs	583
<i>Tom Graber</i>	
Rational curves and rational points	603
<i>Jun-Muk Hwang</i>	
Rigidity of rational homogeneous spaces	613
<i>Tomohide Terasoma</i>	
Geometry of multiple zeta values	627
<i>Yuri Tschinkel</i>	
Geometry over nonclosed fields	637
<i>Jarosław Włodarczyk</i>	
Algebraic Morse theory and the weak factorization theorem	653

5 Geometry

<i>Christoph Böhm and Burkhard Wilking*</i>	
Manifolds with positive curvature operators are space forms	683
<i>Simon Brendle</i>	
Elliptic and parabolic problems in conformal geometry	691
<i>Ko Honda</i>	
The topology and geometry of contact structures in dimension three	705
<i>Michael Kapovich</i>	
Generalized triangle inequalities and their applications	719
<i>Bruce Kleiner</i>	
The asymptotic geometry of negatively curved spaces: uniformization, geometrization and rigidity	743
<i>François Lalonde</i>	
Lagrangian submanifolds: from the local model to the cluster complex	769
<i>Xiaobo Liu</i>	
Gromov–Witten invariants and moduli spaces of curves	791
<i>Toshiki Mabuchi</i>	
Extremal metrics and stabilities on polarized manifolds	813
<i>Grigory Mikhalkin</i>	
Tropical geometry and its applications	827
<i>William P. Minicozzi II</i>	
Embedded minimal surfaces	853
<i>Yong-Geun Oh* and Kenji Fukaya</i>	
Floer homology in symplectic geometry and in mirror symmetry	879
<i>Antonio Ros</i>	
Properly embedded minimal surfaces with finite topology	907
<i>Chuu-Lian Terng</i>	
Applications of loop group factorization to geometric soliton equations	927

6 Topology

<i>Ian Agol</i>	
Finiteness of arithmetic Kleinian reflection groups	951
<i>Martin R. Bridson</i>	
Non-positive curvature and complexity for finitely presented groups	961
<i>Mikhail Khovanov</i>	
Link homology and categorification	989
<i>Yair N. Minsky</i>	
Curve complexes, surfaces and 3-manifolds	1001

<i>Fabien Morel</i>	
\mathbb{A}^1 -algebraic topology	1035
<i>Kaoru Ono</i>	
Development in symplectic Floer theory	1061
<i>Peter Ozsváth* and Zoltán Szabó*</i>	
Heegaard diagrams and Floer homology	1083
<i>Karen Vogtmann</i>	
The cohomology of automorphism groups of free groups	1101
7 Lie groups and Lie algebras	
<i>Roman Bezrukavnikov</i>	
Noncommutative counterparts of the Springer resolution	1119
<i>Alexander Braverman</i>	
Spaces of quasi-maps into the flag varieties and their applications	1145
<i>Guy Henniart</i>	
On the local Langlands and Jacquet–Langlands correspondences	1171
<i>Nicolas Monod</i>	
An invitation to bounded cohomology	1183
<i>Bao-Châu Ngô</i>	
Fibration de Hitchin et structure endoscopique de la formule des traces	1213
<i>Eric M. Opdam</i>	
Hecke algebras and harmonic analysis	1227
<i>Peter Schneider</i>	
Continuous representation theory of p -adic Lie groups	1261
<i>Yehuda Shalom</i>	
The algebraization of Kazhdan’s property (T)	1283
<i>David Soudry</i>	
Rankin–Selberg integrals, the descent method, and Langlands functoriality	1311
<i>Birgit Speh</i>	
Representation theory and the cohomology of arithmetic groups	1327
<i>Tonny A. Springer</i>	
Some results on compactifications of semisimple groups	1337

8 Analysis

<i>Mario Bonk</i>	
Quasiconformal geometry of fractals	1349

<i>Steve Hofmann</i>	
Local Tb theorems and applications in PDE	1375
<i>Sergey V. Konyagin</i>	
Almost everywhere convergence and divergence of Fourier series	1393
<i>Linda Preiss Rothschild</i>	
Iterated Segre mappings of real submanifolds in complex space and applications	1405
<i>Stanislav Smirnov</i>	
Towards conformal invariance of 2D lattice models	1421
<i>Emil J. Straube</i>	
Aspects of the L^2 -Sobolev theory of the $\bar{\partial}$ -Neumann problem	1453
<i>Vladimir N. Temlyakov</i>	
Greedy approximations with regard to bases	1479
<i>Xavier Tolsa</i>	
Analytic capacity, rectifiability, and the Cauchy integral	1505

9 Operator algebras and functional analysis

<i>Franck Barthe</i>	
The Brunn–Minkowski theorem and related geometric and functional inequalities	1529
<i>Bo'az Klartag</i>	
Isomorphic and almost-isometric problems in high-dimensional convex geometry	1547
<i>Narutaka Ozawa</i>	
Amenable actions and applications	1563
<i>Mikael Rørdam</i>	
Structure and classification of C^* -algebras	1581
<i>Stanislaw J. Szarek</i>	
Convexity, complexity, and high dimensions	1599
<i>Guoliang Yu</i>	
Higher index theory of elliptic operators and geometry of groups	1623

10 Ordinary differential equations and dynamical systems

<i>Oleg N. Ageev</i>	
On spectral invariants in modern ergodic theory	1641
<i>Vitaly Bergelson</i>	
Ergodic Ramsey theory: a dynamical approach to static theorems	1655
<i>Nikolai Chernov and Dmitry Dolgopyat*</i>	
Hyperbolic billiards and statistical physics	1679

<i>Rafael de la Llave</i>	
Some recent progress in geometric methods in the instability problem in Hamiltonian mechanics	1705
<i>Manfred Einsiedler and Elon Lindenstrauss*</i>	
Diagonalizable flows on locally homogeneous spaces and number theory	1731
Author index	1761