CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

LONDON MATHEMATICAL SOCIETY LECTURE NOTE SERIES

Managing Editor: Professor Endre Süli, Mathematical Institute, University of Oxford,
Woodstock Road, Oxford OX2 6GG, United Kingdom

The titles below are available from booksellers, or from Cambridge University Press at
www.cambridge.org/mathematics

367 Random matrices: High dimensional phenomena, G. BLOWER
368 Geometry of Riemann surfaces, F.P. GARDINER, G. GONZÁLEZ-DIEZ & C. KOUROUNIOTIS (eds)
369 Epidemics and rumours in complex networks, M. DRAIEF & L. MASSOULIÉ
370 Theory of *p*-adic distributions, S. ALBEVERIO, A.YU. KHRENNIKOV & V.M. SHELKOVICH
371 Conformal fractals, F. PRZYTYCKI & M. URBAŃSKI
372 Moonshine: The first quarter century and beyond, J. LEPOWSKY, J. MCKAY & M.P. TUITE (eds)
373 Smoothness, regularity and complete intersection, J. MAJADAS & A. G. RODICIO
374 Geometric analysis of hyperbolic differential equations: An introduction, S. ALINHAC
375 Triangulated categories, T. HOLM, P. JØRGENSEN & R. ROUQUIER (eds)
376 Permutation patterns, S. LINTON, N. RUŠKUC & V. VATTER (eds)
377 An introduction to Galois cohomology and its applications, G. BERHUY
378 Probability and mathematical genetics, N. H. BINGHAM & C. M. GOLDIE (eds)
379 Finite and algorithmic model theory, J. ESPARZA, C. MICHAUX & C. STEINHORN (eds)
380 Real and complex singularities, M. MANOEL, M.C. ROMERO FUSTER & C.T.C WALL (eds)
381 Symmetries and integrability of difference equations, D. LEVI, P. OLVER, Z. THOMOVA & P. WINTERNITZ (eds)
382 Forcing with random variables and proof complexity, J. KRAJÍČEK
383 Motivic integration and its interactions with model theory and non-Archimedean geometry I, R. CLUCKERS, J. NICAISE & J. SEBAG (eds)
384 Motivic integration and its interactions with model theory and non-Archimedean geometry II, R. CLUCKERS, J. NICAISE & J. SEBAG (eds)
385 Entropy of hidden Markov processes and connections to dynamical systems, B. MARCUS, K. PETERSEN & T. WEISSMAN (eds)
386 Independence-friendly logic, A.L. MANN, G. SANDU & M. SEVENSTER
387 Groups St Andrews 2009 in Bath I, C.M. CAMPBELL *et al* (eds)
388 Groups St Andrews 2009 in Bath II, C.M. CAMPBELL *et al* (eds)
389 Random fields on the sphere, D. MARINUCCI & G. PECCATI
390 Localization in periodic potentials, D.E. PELINOVSKY
391 Fusion systems in algebra and topology, M. ASCHBACHER, R. KESSAR & B. OLIVER
392 Surveys in combinatorics 2011, R. CHAPMAN (ed)
393 Non-abelian fundamental groups and Iwasawa theory, J. COATES *et al* (eds)
394 Variational problems in differential geometry, R. BIELAWSKI, K. HOUSTON & M. SPEIGHT (eds)
395 How groups grow, A. MANN
396 Arithmetic differential operators over the *p*-adic integers, C.C. RALPH & S.R. SIMANCA
397 Hyperbolic geometry and applications in quantum chaos and cosmology, J. BOLTE & F. STEINER (eds)
398 Mathematical models in contact mechanics, M. SOFONEA & A. MATEI
399 Circuit double cover of graphs, C.-Q. ZHANG
400 Dense sphere packings: a blueprint for formal proofs, T. HALES
401 A double Hall algebra approach to affine quantum Schur–Weyl theory, B. DENG, J. DU & Q. FU
402 Mathematical aspects of fluid mechanics, J.C. ROBINSON, J.L. RODRIGO & W. SADOWSKI (eds)
403 Foundations of computational mathematics, Budapest 2011, F. CUCKER, T. KRICK, A. PINKUS & A. SZANTO (eds)
404 Operator methods for boundary value problems, S. HASSI, H.S.V. DE SNOO & F.H. SZAFRANIEC (eds)
405 Torsors, étale homotopy and applications to rational points, A.N. SKOROBOGATOV (ed)
406 Appalachian set theory, J. CUMMINGS & E. SCHIMMERLING (eds)
407 The maximal subgroups of the low-dimensional finite classical groups, J.N. BRAY, D.F. HOLT & C.M. RONEY-DOUGAL
408 Complexity science: the Warwick master's course, R. BALL, V. KOLOKOLTSOV & R.S. MACKAY (eds)
409 Surveys in combinatorics 2013, S.R. BLACKBURN, S. GERKE & M. WILDON (eds)
410 Representation theory and harmonic analysis of wreath products of finite groups, T. CECCHERINI-SILBERSTEIN, F. SCARABOTTI & F. TOLLI
411 Moduli spaces, L. BRAMBILA-PAZ, O. GARCÍA-PRADA, P. NEWSTEAD & R.P. THOMAS (eds)
412 Automorphisms and equivalence relations in topological dynamics, D.B. ELLIS & R. ELLIS
413 Optimal transportation, Y. OLLIVIER, H. PAJOT & C. VILLANI (eds)
414 Automorphic forms and Galois representations I, F. DIAMOND, P.L. KASSAEI & M. KIM (eds)
415 Automorphic forms and Galois representations II, F. DIAMOND, P.L. KASSAEI & M. KIM (eds)
416 Reversibility in dynamics and group theory, A.G. O'FARRELL & I. SHORT
417 Recent advances in algebraic geometry, C.D. HACON, M. MUSTAŢĂ & M. POPA (eds)
418 The Bloch–Kato conjecture for the Riemann zeta function, J. COATES, A. RAGHURAM, A. SAIKIA & R. SUJATHA (eds)

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

419 The Cauchy problem for non-Lipschitz semi-linear parabolic partial differential equations, J.C. MEYER & D.J. NEEDHAM
420 Arithmetic and geometry, L. DIEULEFAIT *et al* (eds)
421 O-minimality and Diophantine geometry, G.O. JONES & A.J. WILKIE (eds)
422 Groups St Andrews 2013, C.M. CAMPBELL *et al* (eds)
423 Inequalities for graph eigenvalues, Z. STANIĆ
424 Surveys in combinatorics 2015, A. CZUMAJ *et al* (eds)
425 Geometry, topology and dynamics in negative curvature, C.S. ARAVINDA, F.T. FARRELL & J.-F. LAFONT (eds)
426 Lectures on the theory of water waves, T. BRIDGES, M. GROVES & D. NICHOLLS (eds)
427 Recent advances in Hodge theory, M. KERR & G. PEARLSTEIN (eds)
428 Geometry in a Fréchet context, C.T.J. DODSON, G. GALANIS & E. VASSILIOU
429 Sheaves and functions modulo *p*, L. TAELMAN
430 Recent progress in the theory of the Euler and Navier–Stokes equations, J.C. ROBINSON, J.L. RODRIGO, W. SADOWSKI & A. VIDAL-LÓPEZ (eds)
431 Harmonic and subharmonic function theory on the real hyperbolic ball, M. STOLL
432 Topics in graph automorphisms and reconstruction (2nd Edition), J. LAURI & R. SCAPELLATO
433 Regular and irregular holonomic D-modules, M. KASHIWARA & P. SCHAPIRA
434 Analytic semigroups and semilinear initial boundary value problems (2nd Edition), K. TAIRA
435 Graded rings and graded Grothendieck groups, R. HAZRAT
436 Groups, graphs and random walks, T. CECCHERINI-SILBERSTEIN, M. SALVATORI & E. SAVA-HUSS (eds)
437 Dynamics and analytic number theory, D. BADZIAHIN, A. GORODNIK & N. PEYERIMHOFF (eds)
438 Random walks and heat kernels on graphs, M.T. BARLOW
439 Evolution equations, K. AMMARI & S. GERBI (eds)
440 Surveys in combinatorics 2017, A. CLAESSON *et al* (eds)
441 Polynomials and the mod 2 Steenrod algebra I, G. WALKER & R.M.W. WOOD
442 Polynomials and the mod 2 Steenrod algebra II, G. WALKER & R.M.W. WOOD
443 Asymptotic analysis in general relativity, T. DAUDÉ, D. HÄFNER & J.-P. NICOLAS (eds)
444 Geometric and cohomological group theory, P.H. KROPHOLLER, I.J. LEARY, C. MARTÍNEZ-PÉREZ & B.E.A. NUCINKIS (eds)
445 Introduction to hidden semi-Markov models, J. VAN DER HOEK & R.J. ELLIOTT
446 Advances in two-dimensional homotopy and combinatorial group theory, W. METZLER & S. ROSEBROCK (eds)
447 New directions in locally compact groups, P.-E. CAPRACE & N. MONOD (eds)
448 Synthetic differential topology, M.C. BUNGE, F. GAGO & A.M. SAN LUIS
449 Permutation groups and cartesian decompositions, C.E. PRAEGER & C. SCHNEIDER
450 Partial differential equations arising from physics and geometry, M. BEN AYED *et al* (eds)
451 Topological methods in group theory, N. BROADDUS, M. DAVIS, J.-F. LAFONT & I. ORTIZ (eds)
452 Partial differential equations in fluid mechanics, C.L. FEFFERMAN, J.C. ROBINSON & J.L. RODRIGO (eds)
453 Stochastic stability of differential equations in abstract spaces, K. LIU
454 Beyond hyperbolicity, M. HAGEN, R. WEBB & H. WILTON (eds)
455 Groups St Andrews 2017 in Birmingham, C.M. CAMPBELL *et al* (eds)
456 Surveys in combinatorics 2019, A. LO, R. MYCROFT, G. PERARNAU & A. TREGLOWN (eds)
457 Shimura varieties, T. HAINES & M. HARRIS (eds)
458 Integrable systems and algebraic geometry I, R. DONAGI & T. SHASKA (eds)
459 Integrable systems and algebraic geometry II, R. DONAGI & T. SHASKA (eds)
460 Wigner-type theorems for Hilbert Grassmannians, M. PANKOV
461 Analysis and geometry on graphs and manifolds, M. KELLER, D. LENZ & R.K. WOJCIECHOWSKI
462 Zeta and *L*-functions of varieties and motives, B. KAHN
463 Differential geometry in the large, O. DEARRICOTT *et al* (eds)
464 Lectures on orthogonal polynomials and special functions, H.S. COHL & M.E.H. ISMAIL (eds)
465 Constrained Willmore surfaces, Á.C. QUINTINO
466 Invariance of modules under automorphisms of their envelopes and covers, A.K. SRIVASTAVA, A. TUGANBAEV & P.A. GUIL ASENSIO
467 The genesis of the Langlands program, J. MUELLER & F. SHAHIDI
468 (Co)end calculus, F. LOREGIAN
469 Computational cryptography, J.W. BOS & M. STAM (eds)
470 Surveys in combinatorics 2021, K.K. DABROWSKI *et al* (eds)
471 Matrix analysis and entrywise positivity preservers, A. KHARE
472 Facets of algebraic geometry I, P. ALUFFI *et al* (eds)
473 Facets of algebraic geometry II, P. ALUFFI *et al* (eds)
474 Equivariant topology and derived algebra, S. BALCHIN, D. BARNES, M. KEDZIOREK & M. SZYMIK (eds)
475 Effective results and methods for Diophantine equations over finitely generated domains, J.-H. EVERTSE & K. GYŐRY
476 An indefinite excursion in operator theory, A. GHEONDEA
477 Elliptic Regularity Theory by Approximation Methods, E.A. PIMENTEL

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

London Mathematical Society Lecture Note Series: 478

Recent Developments in Algebraic Geometry

To Miles Reid for his 70th Birthday

Edited by

HAMID ABBAN
Loughborough University

GAVIN BROWN
University of Warwick

ALEXANDER KASPRZYK
University of Nottingham

SHIGEFUMI MORI
Kyoto University

CAMBRIDGE
UNIVERSITY PRESS

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre,
New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781009180856
DOI: 10.1017/9781009180849

© Cambridge University Press 2022

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press.

First published 2022

Printed in the United Kingdom by TJ Books Limited, Padstow Cornwall

A catalogue record for this publication is available from the British Library.

Library of Congress Cataloging-in-Publication Data
Names: Abban, Hamid, 1983– author. | Brown, Gavin, 1968– author. | Kasprzyk, Alexander, 1980– author. | Mori, Shigefumi, author.
Title: Recent developments in algebraic geometry : to Miles Reid for his 70th birthday / edited by Hamid Abban, Loughborough University, Gavin Brown, University of Warwick, Alexander Kasprzyk, University of Nottingham, Shigefumi Mori, Kyoto University.
Description: Cambridge, United Kingdom ; New York, NY, USA : Cambridge University Press, 2022. | Includes bibliographical references and index.
Identifiers: LCCN 2022009684 | ISBN 9781009180856 (paperback) | ISBN 9781009180849 (ebook)
Subjects: LCSH: Reid, Miles (Miles A.) – Influence. | Geometry, Algebraic.
Classification: LCC QA564 .A198 2022 | DDC 516.3/5–dc23/eng20220716
LC record available at https://lccn.loc.gov/2022009684

ISBN 978-1-009-18085-6 Paperback

Cambridge University Press has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

70 Miles

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

Contents

List of Contributors *page* ix

Happy Birthday
Hamid Abban, Gavin Brown, Alexander Kasprzyk and Shigefumi Mori 1

On Stable Cohomology of Central Extensions of Elementary Abelian Groups
Fedor Bogomolov, Christian Böhning and Alena Pirutka 4

On Projective 3-Folds of General Type with $p_g = 2$
Meng Chen, Yong Hu and Matteo Penegini 20

15-Nodal Quartic Surfaces. Part I: Quintic del Pezzo Surfaces and Congruences of Lines in $\mathbb{P}^3$
Igor V. Dolgachev 66

Mori Flips, Cluster Algebras and Diptych Varieties Without Unprojection
Tom Ducat 116

The Mirror of the Cubic Surface
Mark Gross, Paul Hacking, Sean Keel and Bernd Siebert 150

Semi-Orthogonal Decomposition of a Derived Category of a 3-Fold With an Ordinary Double Point
Yujiro Kawamata 183

Duality and Normalization, Variations on a Theme of Serre and Reid
János Kollár 216

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

Rationality of $\mathbb{Q}$-Fano Threefolds of Large Fano Index
Yuri Prokhorov 253

An Exceptional Locus in the Perfect Compactification of A_g
N. I. Shepherd-Barron 275

Variation of Stable Birational Types of Hypersurfaces
Evgeny Shinder 296

Triangle Varieties and Surface Decomposition of Hyper-Kähler Manifolds
Claire Voisin 314

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

Contributors

Hamid Abban
Department of Mathematical Sciences, Loughborough University

John Armstrong
Department of Mathematics, King's College London

Fedor Bogomolov
Courant Institute of Mathematical Sciences, New York University

Christian Böhning
Mathematics Institute, University of Warwick

Gavin Brown
Mathematics Institute, University of Warwick

Meng Chen
School of Mathematical Sciences, Fudan University

Hailong Dao
Department of Mathematics, University of Kansas

Igor V. Dolgachev
Department of Mathematics, University of Michigan

Tom Ducat
Mathematical Sciences, Durham University

Mark Gross
The Department of Pure Mathematics and Mathematical Statistics, University of Cambridge

Paul Hacking
Department of Mathematics and Statistics, University of Massachusetts

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-009-18085-6 — Recent Developments in Algebraic Geometry
Edited by Hamid Abban , Gavin Brown , Alexander Kasprzyk , Shigefumi Mori
Frontmatter
More Information

Yong Hu
School of Mathematics, Korea Institute for Advanced Study

Alexander Kasprzyk
School of Mathematical Sciences, University of Nottingham

Yujiro Kawamata
Graduate School of Mathematical Sciences, University of Tokyo
Department of Mathematical Sciences, The Korea Advanced Institute of Science and Technology
National Center for Theoretical Sciences, Mathematics Division, National Taiwan University

Sean Keel
Department of Mathematics, 1 University Station Austin

János Kollár
Princeton University

Shigefumi Mori
Kyoto University Institute for Advanced Study, Kyoto University

Matteo Penegini
Università degli Studi di Genova, Dipartimento di Matematica

Alena Pirutka
Courant Institute of Mathematical Sciences, New York University

Yuri Prokhorov
Steklov Mathematical Institute of Russian Academy of Sciences
Department of Algebra, Moscow Lomonosov University
National Research University Higher School of Economics

N. I. Shepherd-Barron
Department of Mathematics, King's College London

Evgeny Shinder
School of Mathematics and Statistics, University of Sheffield
National Research University Higher School of Economics

Bernd Siebert
Department of Mathematics, 1 University Station Austin

Claire Voisin
Collège de France

© in this web service Cambridge University Press & Assessment www.cambridge.org