

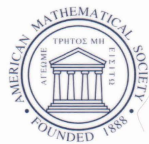
CONTEMPORARY MATHEMATICS

386

Recent Progress in Arithmetic and Algebraic Geometry

Barrett Lecture Series Conference
April 25–27, 2002
University of Tennessee
Knoxville, Tennessee

Yasuyuki Kachi
S. B. Mulay
Pavlos Tzermias
Editors



Recent Progress in Arithmetic and Algebraic Geometry

CONTEMPORARY MATHEMATICS

386

Recent Progress in Arithmetic and Algebraic Geometry

Barrett Lecture Series Conference
April 25–27, 2002
University of Tennessee
Knoxville, Tennessee

Yasuyuki Kachi
S. B. Mulay
Pavlos Tzermias
Editors



American Mathematical Society
Providence, Rhode Island

Editorial Board

Dennis DeTurck, managing editor

George Andrews Carlos Berenstein Andreas Blass Abel Klein

This volume consists of the thirty-first annual John H. Barrett Memorial Lecture Series, held April 25–27, 2002 at the University of Tennessee, Knoxville, with financial support from the University of Tennessee, the Science Alliance, and the Haines-Morris Foundation.

2000 *Mathematics Subject Classification*. Primary 14–XX.

Library of Congress Cataloging-in-Publication Data

Barrett Lecture Series Conference (31st : 2002 : University of Tennessee, Knoxville)

Recent progress in arithmetic and algebraic geometry : Barrett Lecture Series Conference, April 25–27, 2002, University of Tennessee, Knoxville, Tennessee / Yasuyuki Kachi, S. B. Mulay, Pavlos Tzermias, editors.

p. cm. — (Contemporary mathematics, ISSN 0271-4132 ; 386)

Includes bibliographical references.

ISBN 0-8218-3401-0 (alk. paper)

1. Geometry, Algebraic—Congresses. 2. Arithmetic—Congresses. I. Kachi, Yasuyuki, 1969– II. Mulay, S. B., 1956– III. Tzermias, Pavlos, 1968– IV. Title. V. Contemporary mathematics (American Mathematical Society) ; v. 386.

QA564.B36 2002

516.3'5—dc22

2005052406

Copying and reprinting. Material in this book may be reproduced by any means for educational and scientific purposes without fee or permission with the exception of reproduction by services that collect fees for delivery of documents and provided that the customary acknowledgment of the source is given. This consent does not extend to other kinds of copying for general distribution, for advertising or promotional purposes, or for resale. Requests for permission for commercial use of material should be addressed to the Acquisitions Department, American Mathematical Society, 201 Charles Street, Providence, Rhode Island 02904-2294, USA. Requests can also be made by e-mail to reprint-permission@ams.org.

Excluded from these provisions is material in articles for which the author holds copyright. In such cases, requests for permission to use or reprint should be addressed directly to the author(s). (Copyright ownership is indicated in the notice in the lower right-hand corner of the first page of each article.)

© 2005 by the American Mathematical Society. All rights reserved.

The American Mathematical Society retains all rights
except those granted to the United States Government.

Copyright of individual articles may revert to the public domain 28 years
after publication. Contact the AMS for copyright status of individual articles.

Printed in the United States of America.

∞ The paper used in this book is acid-free and falls within the guidelines
established to ensure permanence and durability.

Visit the AMS home page at <http://www.ams.org/>

10 9 8 7 6 5 4 3 2 1 10 09 08 07 06 05

Contents

Compact Kähler threefolds of π_1 -general type F. CAMPANA AND Q. ZHANG	1
Completions of valuation rings STEVEN DALE CUTKOSKY AND LAURA GHEZZI	13
A new construction of maximal curves ABIGAIL EBIN, DEBORAH HUR, AARON KATZ AND VLADISLAV SHCHOGOLEV	35
Strong non-isotriviality and rigidity SÁNDOR J. KOVÁCS	47
Spectral sequences associated to morphisms of locally free sheaves SÁNDOR J. KOVÁCS	57
Holomorphic forms on threefolds TIE LUO AND QI ZHANG	87
A note on toroidalization: The problem of resolution of singularities of morphisms in the logarithmic category KENJI MATSUKI	95
Jacobians of quotients of Artin-Schreier curves RACHEL J. PRIES	145
Gluing schemes and a scheme without closed points KARL SCHWEDE	157

Preface

This volume consists of the proceedings of the thirty-first annual John H. Barrett Memorial Lecture Series, held April 25-27, 2002 at The University of Tennessee, Knoxville. The lecture series was on the twin research areas : Algebraic Geometry / Arithmetic Algebraic Geometry. There were three one-hour plenary lectures by two Principal Lecturers. For the Algebraic Geometry part, Yujiro Kawamata of University of Tokyo was the Principal Lecturer. For the Arithmetic Algebraic Geometry part, Yasutaka Ihara of the Kyoto University Research Institute for Mathematical Sciences was the Principal Lecturer. In addition to the six plenary lectures, there were twelve forty-minute talks delivered by the participating guest lecturers coming from various other universities.

We would like to thank the Principal Lecturers for gracing the conference with their inspiring plenary lectures and also like to thank all the participants for making the lecture series a stimulating event. We would like to thank all the contributors to this volume. Our sincere thanks are due to The University of Tennessee, The Science Alliance and the Haines-Morris Foundation for their financial support of the lecture series. We would like to thank John B. Conway, the program director of NSF, and Robert J. Daverman, the Secretary of AMS, for their consistent support.

We would like to thank the AMS Acquisitions, the Managing Editor Dennis DeTurck for the approval, the Associate Publisher Sergei Gelfand for helping the timely publication, and the Editorial Assistant Christine M. Thivierge for the exclusive encouragement, assistance and cooperation, with much patience.

Yasuyuki Kachi

S. B. Mulay

Pavlos Tzermias

John H. Barrett (1922–1969)

John H. Barrett was born in 1922 and grew up on a farm in Kansas. He received his A. B. in 1944 from Fort Hays Kansas State College. He did his graduate work at the University of Texas and was an instructor there from 1946–1951. His thesis was on differential equations of non-integer order and under the direction of H. J. Ettliger. He was an assistant professor at Delaware from 1951–1956, an associate professor at Utah from 1956–1961, and professor at Tennessee from 1961–1969. He also spent the year 1955–1956 visiting Yale and the year 1959–1960 visiting the Research Center at Wisconsin. In January, 1969, he died from complications following a kidney transplant. His wife, Lida, was also a faculty member at Tennessee, where she was head from 1973 to 1980. They had three children.

John was well known for his work on oscillation and disconjugacy theory of linear differential equations as well as the study of boundary value problems. One of his best known contributions was the extension of the classical Prüfer transformation for 2nd order scalar differential equations to systems of differential equations. He had several Ph. D. students. In a time when a common teaching load was three courses, he regularly ran a seminar on differential equations in addition. Typically it would meet very early on a Tuesday or Thursday morning with John as the most frequent lecturer. Through his efforts and influence, an active group in differential equations evolved at the University of Tennessee. This tradition has continued since that time. The Barrett Lecture series is a fitting reminder of his many contributions to the university and community.

(A tribute delivered by Don Hinton, March 22, 1995)

List of Invited Speakers

Yasutaka Ihara (Plenary Speaker)
Kyoto University

Yujiro Kawamata (Plenary Speaker)
University of Tokyo

Steven Dale Cutkosky
University of Missouri

Jordan Ellenberg
Princeton University

Farshid Hajir
California State University at San
Marcos

Minhyong Kim
University of Arizona

Sándor J. Kovács
University of Washington

Tie Luo
University of Texas at Arlington

Kenji Matsuki
Purdue University

William McCallum
University of Arizona

Keiji Oguiso
University of Tokyo

Rachel J. Pries
Columbia University

Romyar Sharifi
Harvard University

Qi Zhang
University of Missouri

This proceedings volume resulted from the John H. Barrett Memorial Lecture Series held at the University of Tennessee (Knoxville). The articles reflect recent developments in algebraic geometry. It is suitable for graduate students and researchers interested in algebra and algebraic geometry.

ISBN 0-8218-3401-0



9 780821 834015

CONM/386

AMS on the Web
www.ams.org