

# Journal of ALGEBRAIC GEOMETRY

Sébastien Boucksom, Jean-Pierre Demailly, Mihai Păun, and Thomas Peternell, <i>The pseudo-effective cone of a compact Kähler manifold and varieties of negative Kodaira dimension</i> .....	201
Hideaki Ikoma, <i>Boundedness of the successive minima on arithmetic varieties</i> .....	249
Kefeng Liu, Xiaofeng Sun, and Xiaokui Yang, <i>Positivity and vanishing theorems for ample vector bundles</i> .....	303
Jaehyun Hong and Ngaiming Mok, <i>Characterization of smooth Schubert varieties in rational homogeneous manifolds of Picard number 1</i> .....	333
Dima Arinkin, <i>Autoduality of compactified Jacobians for curves with plane singularities</i> .....	363
Christopher D. Hacon and James McKernan, <i>The Sarkisov program</i> ..	389

# JOURNAL OF ALGEBRAIC GEOMETRY

## Editors

- |  |   |
|--|---|
| M. BRION   | K. KATO   |
| Université de Grenoble I<br>UFR de Mathématiques<br>MR 5582 du CNRS<br>Institut Fourier, BP 74<br>38402 Saint-Martin d'Hères<br>FRANCE | Department of Mathematics<br>University of Chicago<br>5734 University Avenue<br>Chicago, IL 60637<br>U.S.A. |
| J. COATES  | J. LI   |
| Department of Pure Mathematics<br>University of Cambridge<br>16 Mill Lane<br>Cambridge CB2 1SB<br>ENGLAND                              | Department of Mathematics<br>Stanford University<br>Stanford, CA 94305<br>U.S.A.                            |
| M. GROSS   | S. MUKAI  |
| Department of Mathematics<br>University of California, San Diego<br>9500 Gilman Drive #0112<br>La Jolla, CA 92093-0112<br>U.S.A.       | Research Institute<br>for Mathematical Sciences<br>Kyoto University<br>Kyoto 606-8502<br>JAPAN              |
| C. HACON   | C. SOULÉ  |
| Department of Mathematics<br>University of Utah<br>155 South 1400 East, JWB 233<br>Salt Lake City, UT 84112<br>U.S.A.                  | Institut des Hautes Etudes Scientifiques<br>35 Route de Chartres<br>F-91440 Bures-sur-Yvette<br>FRANCE      |
| B. HASSETT   | S. S.-T. YAU (Managing Editor)  |
| Department of Mathematics-MS136<br>Rice University<br>6100 S. Main Street<br>Houston, TX 77251-1892<br>U.S.A.                          | Department of Mathematical Sciences<br>Tsinghua University<br>Beijing 100084<br>P. R. China                 |

## Associate Editors

- |  |   |
|--|---|
| S. K. DONALDSON  | J. HARRIS   |
| Department of Mathematics<br>Huxley Building<br>Imperial College of Science,<br>Technology and Medicine<br>180 Queen's Gate<br>London SW7 2BZ<br>ENGLAND | Department of Mathematics<br>Harvard University<br>Cambridge, MA 02138<br>U.S.A.                          |
| G. FALTINGS  | I. M. SINGER  |
| Max Planck Institute for Mathematics<br>Vivatsgasse 7<br>53111 Bonn, GERMANY   | Department of Mathematics 2-174<br>Massachusetts Institute of Technology<br>Cambridge, MA 02139<br>U.S.A. |

---

The *Journal of Algebraic Geometry*, published quarterly by University Press, Inc., is devoted to the publication of research papers in algebraic geometry, singularity theory, and related subjects such as number theory, commutative algebra, projective geometry, complex geometry, and geometric topology.

Starting with the 2002 subscription, the *Journal of Algebraic Geometry* is available in both electronic and paper delivery. List price is US\$393 for electronic + paper delivery, US\$363 for electronic only; the price for individuals is US\$165 for electronic + paper delivery, US\$145 for electronic only. If ordering the paper version, add US\$5 for delivery within the United States; US\$12 for delivery outside the United States. Subscription renewals are subject to late fees. See [www.ams.org/journal-faq](http://www.ams.org/journal-faq) for more information.

Subscriptions and orders should be addressed to the American Mathematical Society, P.O. Box 845904, Boston, MA 02284-5904 USA. Telephone 1-800-321-4267, Fax (401)-331-3842. All orders must be accompanied by payment, and checks should be made payable to the American Mathematical Society. General correspondence and changes of address should be sent to the American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

Instructions for submission of manuscripts are given on the inside back cover of this issue.

© 2013 by University Press, Inc. All rights reserved

Copyright of individual articles reverts to the public domain 28 years after publication. This journal is indexed in *Science Citation Index<sup>TM</sup>-Expanded*, *ISI Alerting Services<sup>SM</sup>*, *CompuMath Citation Index<sup>®</sup>*, *Current Contents<sup>®</sup>/Physical, Chemical & Earth Sciences*.

ISSN 1056-3911 (print); ISSN 1534-7486 (online)

Printed in the United States of America.

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

## INFORMATION FOR AUTHORS

**Submission of Manuscripts.** All manuscripts should be electronically prepared in  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ . A PDF file of the manuscript should be sent via email to the Managing Editor or to any member of the Editorial Board. Authors are encouraged to submit manuscripts written in English. An abstract of at least one complete sentence and at most 300 words is required for every paper. The *Journal of Algebraic Geometry* offers free worldwide access to the electronic abstracts. All author names must be in First-Middle-Surname order. A manuscript accepted for publication must be typeset by the author(s) in  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$ .

Authors should supply email addresses if available and current postal addresses, along with their affiliations, on the last page of the manuscript. To help avoid delays in publication, authors are encouraged to send changes in postal and email addresses to [jag-query@ams.org](mailto:jag-query@ams.org), especially before proof has been sent to authors. Articles are posted after proof is returned from authors and before appearing in an issue. Once an article is posted, author information, such as postal and email addresses, cannot be updated.

To eliminate unnecessary delay or difficulties in printing, authors may be guided by the book *Mathematics into Type*, updated edition, Amer. Math. Soc., 1999.

Footnotes, except a possible acknowledgment of assistance or financial support on the first page, should be avoided by being incorporated into the text, perhaps parenthetically.

References will be published as submitted. For the best presentation, the list of references must be submitted in alphabetical-chronological order; abbreviations of names of journals and references to books should follow the standard form established by Mathematical Reviews. Abbreviations used in bibliographies are accessible from [www.ams.org/msnhtml/serials.pdf](http://www.ams.org/msnhtml/serials.pdf). The following references are two typical examples:

- [1] R. Hartshorne, *Algebraic geometry*, Graduate Texts in Mathematics 52, Springer-Verlag, New York, Heidelberg, Berlin, 1977.
- [2] N. Hochster and J. L. Roberts, *Rings of invariants of reductive groups acting on regular rings are Cohen-Macaulay*, *Adv. Math.* **13** (1974) 115–175.

An  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  author package has been prepared for the convenience of the author. The author package includes instructions for preparing electronic manuscripts, the *AMS Author Handbook*, samples, and a style file. Authors who make use of these style files from the beginning of the writing process will reduce their own effort. Comprehensive instructions on preparing graphics are available starting from [www.ams.org/jourhtml/authors.html](http://www.ams.org/jourhtml/authors.html).

Authors may retrieve an author package for *Journal of Algebraic Geometry* from [www.ams.org/jag/jagauthorpac.html](http://www.ams.org/jag/jagauthorpac.html) or via FTP to [ftp.ams.org](ftp://ftp.ams.org) (login as `anonymous`, enter your complete email address as password, and type `cd pub/author-info`). The *AMS Author Handbook* and the *Instruction Manual* are available in PDF format from the author package link. The author package can also be obtained free of charge by sending email to [tech-support@ams.org](mailto:tech-support@ams.org) or from the Publication Division, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When requesting an author package, please specify  $\mathcal{A}\mathcal{M}\mathcal{S}\text{-}\mathcal{L}\mathcal{A}\mathcal{T}\mathcal{E}\mathcal{X}$  and the publication in which your paper will appear. Please be sure to include your complete email address.

Immediately after a paper has been accepted for publication, the electronically prepared manuscripts (.tex files) should be submitted via the web at [www.ams.org/submit-book-journal/](http://www.ams.org/submit-book-journal/), sent via email to [pub-submit@ams.org](mailto:pub-submit@ams.org), or sent on CD to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When submitting electronic manuscripts via email or CD, please include a message indicating that the paper has been accepted for publication in the *Journal of Algebraic Geometry*. The author should also send one hard copy of the final version of the paper to the Managing Editor.

**Proofs.** Authors receive only one set of proofs for corrections and will be responsible for the expense of making excessive alterations to the original manuscript during the proof-reading. Authors will be responsible for adjustments made to artwork not provided in camera-ready form.

**Offprints.** Offprints are provided free of charge in electronic format. A downloadable and printable PDF version of the published article will be available on the AMS website at [www.ams.org/myoffprints](http://www.ams.org/myoffprints) immediately following each issue's publication date.



1056-3911(201304)22:2;1-7