## JOURNAL

A M E R I C A N M A T H E M A T I C A L S O C I E T Y

## EDITORS

Brian Conrad
Simon Donaldson
Pavel Etingof
Sergey Fomin
Maryam Mirzakhani
Assaf Naor
Igor Rodnianski

## ASSOCIATE EDITORS

Ian Agol
Denis Auroux
Andrea Bertozzi
Roman Bezrukavnikov
Sun-Yung Alice Chang
Dmitry Dolgopyat
Alice Guionnet
Lawrence Guth
Lars Hesselholt
Richard Kenyon
Michael J. Larsen
Ciprian Manolescu
William P. Minicozzi II
Anand Pillay
Peter Sarnak
Peter Scholze
Amit Singer
Benjamin Sudakov
Burt Totaro
Karen Vogtmann

PROVIDENCE, RHODE ISLAND USA

## Journal of the American Mathematical Society

This journal is devoted to research articles of the highest quality in all areas of pure and applied mathematics.

Submission information. See Information for Authors at the end of this issue.
Publication on the AMS website. Articles are published on the AMS website individually after proof is returned from authors and before appearing in an issue.

Subscription information. The Journal of the American Mathematical Society is published quarterly and is also accessible electronically from www.ams.org/journals/. Subscription prices for Volume 30 (2017) are as follows: for paper delivery, US\$409 list, US $\$ 327.20$ institutional member, US $\$ 368.10$ corporate member, US $\$ 245.40$ individual member; for electronic delivery, US $\$ 360$ list, US $\$ 288$ institutional member, US $\$ 324$ corporate member, US $\$ 216$ individual member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. If ordering the paper version, add US $\$ 5.25$ for delivery within the United States; US $\$ 20$ for surface delivery outside the United States. Subscription renewals are subject to late fees. See www.ams.org/journal-faq for more journal subscription information.

Back number information. For back issues see www.ams.org/backvols.
Subscriptions and orders should be addressed to the American Mathematical Society, P.O. Box 845904 , Boston, MA 02284-5904 USA. All orders must be accompanied by payment. Other correspondence should be addressed to 201 Charles Street, Providence, RI 02904-2294 USA.

Copying and reprinting. Individual readers of this publication, and nonprofit libraries acting for them, are permitted to make fair use of the material, such as to copy an article for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews, provided the customary acknowledgment of the source is given.

Republication, systematic copying, or multiple reproduction of any material in this publication is permitted only under license from the American Mathematical Society. Permissions to reuse portions of AMS publication content are handled by Copyright Clearance Center's RightsLink ${ }^{\circledR}$ service. For more information, please visit: http ://www.ams.org/ rightslink.

Translation rights and licensed reprint requests should be sent to reprint-permission @ams.org.

Excluded from these provisions is material for which the author holds copyright. In such cases, requests for permission to reuse or reprint material 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.

The Journal of the American Mathematical Society (ISSN 0894-0347 (print); ISSN 1088-6834 (online)) is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2294 USA and is mailed from Providence, Rhode Island. Periodicals postage is paid at Providence, Rhode Island. Postmaster: Send address changes to Journal of the AMS, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.
(c) 2017 by the American Mathematical Society. All rights reserved. This journal is indexed in Mathematical Reviews, Zentralblatt MATH, Science Citation Index ${ }^{\circledR}$, Science Citation Index ${ }^{\mathrm{TM}}-E x p a n d e d$, ISI Alerting Services ${ }^{\mathrm{SM}}$, CompuMath Citation Index ${ }^{\circledR}$, and Current Contents ${ }^{\circledR} /$ Physical, Chemical \& Earth Sciences. This journal is archived in Portico and in CLOCKSS. Printed in the United States of America.
© The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

Melanie Matchett Wood, The distribution of sandpile groups of random
graphs ............................................................................................
Sándor J Kovács and Zsolt Patakfalvi, Projectivity of the moduli space of stable log-varieties and subadditivity of log-Kodaira dimension 959
Geordie Williamson, with a joint appendix with Alex Kontorovich and Peter J. McNamara, Schubert calculus and torsion explosion . ..... 1023
Andrew Suk, On the Erdős-Szekeres convex polygon problem ..... 1047
Aaron Brown and Federico Rodriguez Hertz, Measure rigidity for random dynamics on surfaces and related skew products ..... 1055
Kazuhiko Yamaki, Non-density of small points on divisors on abelian varieties and the Bogomolov conjecture ..... 1133
Robert J. Berman and Bo Berndtsson, Convexity of the $K$-energy on the space of Kähler metrics and uniqueness of extremal metrics ..... 1165

## INDEX TO VOLUME 30 (2017)

Abe, N., G. Henniart, F. Herzig, and M.-F. Vignéras. A classification of irreducible admissible mod $p$ representations of p-adic reductive groups, 495
Berman, Robert J., and Bo Berndtsson. Convexity of the $K$-energy on the space of Kähler metrics and uniqueness of extremal metrics, 1165
Berndtsson, Bo. See Berman, Robert J.
Bhargava, Manjul, Benedict H. Gross, and Xiaoheng Wang, with an appendix by Tim Dokchitser and Vladimir Dokchitser. A positive proportion of locally soluble hyperelliptic curves over $\mathbb{Q}$ have no point over any odd degree extension, 451
Bourgain, J. Decoupling, exponential sums and the Riemann zeta function, 205
Breuer, Jonathan, and Maurice Duits. Central limit theorems for biorthogonal ensembles and asymptotics of recurrence coefficients, 27
Brown, Aaron, and Federico Rodriguez Hertz. Measure rigidity for random dynamics on surfaces and related skew products, 1055
Darmon, Henri, and Victor Rotger. Diagonal cycles and Euler systems II: The Birch and SwinnertonDyer conjecture for Hasse-Weil-Artin L-functions, 601
Darvas, Tamás, and Yanir A. Rubinstein. Tian's properness conjectures and Finsler geometry of the space of Kähler metrics, 347
Dokchitser, Tim. See Bhargava, Manjul
Dokchitser, Vladimir. See Bhargava, Manjul
Duits, Maurice. See Breuer, Jonathan
Frantzikinakis, Nikos, and Bernard Host. Higher order Fourier analysis of multiplicative functions and applications, 67
Gross, Benedict H. See Bhargava, Manjul
Guillarmou, Colin. Lens rigidity for manifolds with hyperbolic trapped sets, 561
Henniart, G. See Abe, N.
Hertz, Federico Rodriguez. See Brown, Aaron
Herzig, F. See Abe, N.
Host, Bernard. See Frantzikinakis, Nikos
Kisin, Mark. Mod p points on Shimura varieties of abelian type, 819
Kontorovich, Alex. See Williamson, Geordie
Kovács, Sándor J, and Zsolt Patakfalvi. Projectivity of the moduli space of stable log-varieties and subadditivity of log-Kodaira dimension, 959
Kowalczyk, Michał, Yvan Martel, and Claudio Muñoz. Kink dynamics in the $\phi^{4}$ model: Asymptotic stability for odd perturbations in the energy space, 769
Markovic, Vladimir. Harmonic maps and the Schoen conjecture, 799
Martel, Yvan. See Kowalczyk, Michał
McNamara, Peter J. See Williamson, Geordie
Mulmuley, Ketan D. Geometric complexity theory V: Efficient algorithms for Noether normalization, 225
Muñoz, Claudio. See Kowalczyk, Michał
Pandharipande, R., and A. Pixton. Gromov-Witten/Pairs correspondence for the quintic 3-fold, 389
Patakfalvi, Zsolt. See Kovács, Sándor J
Pixton, A. See Pandharipande, R.
Rotger, Victor. See Darmon, Henri
Rubinstein, Yanir A. See Darvas, Tamás
Sam, Steven V, and Andrew Snowden. Gröbner methods for representations of combinatorial categories, 159
Schwede, Stefan. Equivariant properties of symmetric products, 673
Serfaty, Sylvia. Mean field limits of the Gross-Pitaevskii and parabolic Ginzburg-Landau equations, 713
Snowden, Andrew. See Sam, Steven V
Suk, Andrew. On the Erdős-Szekeres convex polygon problem, 1047
Sun, Binyong. The nonvanishing hypothesis at infinity for Rankin-Selberg convolutions, 1
Tosatti, Valentino, and Ben Weinkove. The Monge-Ampère equation for ( $n-1$ )-plurisubharmonic functions on a compact Kähler manifold, 311
Vignéras, M.-F. See Abe, N.
Wang, Xiaoheng. See Bhargava, Manjul

## INDEX TO VOLUME 30 (2017)

Weinkove, Ben. See Tosatti, Valentino
Williamson, Geordie, with a joint appendix with Alex Kontorovich and Peter J. McNamara. Schubert calculus and torsion explosion, 1023
Wood, Melanie Matchett. The distribution of sandpile groups of random graphs, 915
Yamaki, Kazuhiko. Non-density of small points on divisors on abelian varieties and the Bogomolov conjecture, 1133

## JOURNAL

A M E R I C A N M A T H E M A T I C A L S O C I E T Y

## EDITORS

Brian Conrad
Simon Donaldson
Pavel Etingof
Sergey Fomin
Maryam Mirzakhani
Assaf Naor
Igor Rodnianski

## ASSOCIATE EDITORS

Ian Agol
Denis Auroux
Andrea Bertozzi
Roman Bezrukavnikov
Sun-Yung Alice Chang
Dmitry Dolgopyat
Alice Guionnet
Lawrence Guth
Lars Hesselholt
Richard Kenyon
Michael J. Larsen
Ciprian Manolescu
William P. Minicozzi II
Anand Pillay
Peter Sarnak
Peter Scholze
Amit Singer
Benjamin Sudakov
Burt Totaro
Karen Vogtmann

## Journal of the American Mathematical Society

This journal is devoted to research articles of the highest quality in all areas of pure and applied mathematics.

Submission information. See Information for Authors at the end of this issue.
Publication on the AMS website. Articles are published on the AMS website individually after proof is returned from authors and before appearing in an issue.

Subscription information. The Journal of the American Mathematical Society is published quarterly and is also accessible electronically from www.ams.org/journals/. Subscription prices for Volume 30 (2017) are as follows: for paper delivery, US\$409 list, US $\$ 327.20$ institutional member, US $\$ 368.10$ corporate member, US $\$ 245.40$ individual member; for electronic delivery, US $\$ 360$ list, US $\$ 288$ institutional member, US $\$ 324$ corporate member, US $\$ 216$ individual member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. If ordering the paper version, add US $\$ 5.25$ for delivery within the United States; US $\$ 20$ for surface delivery outside the United States. Subscription renewals are subject to late fees. See www.ams.org/journal-faq for more journal subscription information.

Back number information. For back issues see www.ams.org/backvols.
Subscriptions and orders should be addressed to the American Mathematical Society, P.O. Box 845904 , Boston, MA 02284-5904 USA. All orders must be accompanied by payment. Other correspondence should be addressed to 201 Charles Street, Providence, RI 02904-2294 USA.

Copying and reprinting. Individual readers of this publication, and nonprofit libraries acting for them, are permitted to make fair use of the material, such as to copy an article for use in teaching or research. Permission is granted to quote brief passages from this publication in reviews, provided the customary acknowledgment of the source is given.

Republication, systematic copying, or multiple reproduction of any material in this publication is permitted only under license from the American Mathematical Society. Permissions to reuse portions of AMS publication content are handled by Copyright Clearance Center's RightsLink ${ }^{\circledR}$ service. For more information, please visit: http ://www.ams.org/ rightslink.

Translation rights and licensed reprint requests should be sent to reprint-permission @ams.org.

Excluded from these provisions is material for which the author holds copyright. In such cases, requests for permission to reuse or reprint material 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.

The Journal of the American Mathematical Society (ISSN 0894-0347 (print); ISSN 1088-6834 (online)) is published quarterly by the American Mathematical Society at 201 Charles Street, Providence, RI 02904-2294 USA and is mailed from Providence, Rhode Island. Periodicals postage is paid at Providence, Rhode Island. Postmaster: Send address changes to Journal of the AMS, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.
(c) 2017 by the American Mathematical Society. All rights reserved. This journal is indexed in Mathematical Reviews, Zentralblatt MATH, Science Citation Index ${ }^{\circledR}$, Science Citation Index ${ }^{\mathrm{TM}}-E x p a n d e d$, ISI Alerting Services ${ }^{\mathrm{SM}}$, CompuMath Citation Index ${ }^{\circledR}$, and Current Contents ${ }^{\circledR} /$ Physical, Chemical \& Earth Sciences. This journal is archived in Portico and in CLOCKSS. Printed in the United States of America.
© The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

# JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY CONTENTS 

Vol. 30, No. 1January 2017
Binyong Sun, The nonvanishing hypothesis at infinity for Rankin-Selberg convolutions ..... 1
Jonathan Breuer and Maurice Duits, Central limit theorems for biorthogonal ensembles and asymptotics of recurrence coefficients ..... 27
Nikos Frantzikinakis and Bernard Host, Higher order Fourier analysis of multiplicative functions and applications ..... 67
Steven V Sam and Andrew Snowden, Gröbner methods for representa- tions of combinatorial categories ..... 159
J. Bourgain, Decoupling, exponential sums and the Riemann zeta function ..... 205
Ketan D. Mulmuley, Geometric complexity theory V: Efficient algorithms for Noether normalization ..... 225
Vol. 30, No. 2April 2017
Valentino Tosatti and Ben Weinkove, The Monge-Ampère equation for ( $n-1$ )-plurisubharmonic functions on a compact Kähler manifold ..... 311
Tamás Darvas and Yanir A. Rubinstein, Tian's properness conjectures and Finsler geometry of the space of Kähler metrics ..... 347
R. Pandharipande and A. Pixton, Gromov-Witten/Pairs correspondence for the quintic 3 -fold ..... 389
Manjul Bhargava, Benedict H. Gross, and Xiaoheng Wang, with an appendix by Tim Dokchitser and Vladimir Dokchitser, A posi- tive proportion of locally soluble hyperelliptic curves over $\mathbb{Q}$ have no point over any odd degree extension ..... 451
N. Abe, G. Henniart, F. Herzig, and M.-F. Vignéras, A classification of irreducible admissible mod $p$ representations of $p$-adic reductive groups ..... 495
Colin Guillarmou, Lens rigidity for manifolds with hyperbolic trapped sets ..... 561
Henri Darmon and Victor Rotger, Diagonal cycles and Euler systems II: The Birch and Swinnerton-Dyer conjecture for Hasse-Weil-Artin $L$-functions ..... 601
Stefan Schwede, Equivariant properties of symmetric products ..... 673
Sylvia Serfaty, Mean field limits of the Gross-Pitaevskii and parabolic Ginzburg-Landau equations ..... 713
Michał Kowalczyk, Yvan Martel, and Claudio Muñoz, Kink dynamics in the $\phi^{4}$ model: Asymptotic stability for odd perturbations in the energy space ..... 769
Vladimir Markovic, Harmonic maps and the Schoen conjecture ..... 799
Mark Kisin, Mod $p$ points on Shimura varieties of abelian type ..... 819
Melanie Matchett Wood, The distribution of sandpile groups of random graphs ..... 915
Sándor J Kovács and Zsolt Patakfalvi, Projectivity of the moduli space of stable log-varieties and subadditivity of log-Kodaira dimension ..... 959
Geordie Williamson, with a joint appendix with Alex Kontorovich and Peter J. McNamara, Schubert calculus and torsion explosion ..... 1023
Andrew Suk, On the Erdős-Szekeres convex polygon problem ..... 1047
Aaron Brown and Federico Rodriguez Hertz, Measure rigidity for random dynamics on surfaces and related skew products ..... 1055
Kazuhiko Yamaki, Non-density of small points on divisors on abelian varieties and the Bogomolov conjecture ..... 1133
Robert J. Berman and Bo Berndtsson, Convexity of the $K$-energy on the space of Kähler metrics and uniqueness of extremal metrics ..... 1165

## Editors

Brian Conrad
Department of Mathematics
Stanford University
Stanford, CA 94305 USA
conrad@math.stanford.edu

Pavel Etingof
Department of Mathematics
Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, MA 02139 USA
etingof@math.mit.edu
Maryam Mirzakhani
Department of Mathematics
Stanford University
Stanford, CA 94305 USA
mm_editorial@stanford.edu

Simon Donaldson
Simons Center for Geometry and Physics
Stony Brook University
Stony Brook, NY 11794 USA
sdonaldson@scgp.stonybrook.edu

Sergey Fomin
Department of Mathematics
University of Michigan
530 Church Street
Ann Arbor, MI 48109-1043 USA
fomin@umich.edu

Assaf Naor
Department of Mathematics
Princeton University
Fine Hall, Washington Road
Princeton, NJ 08544 USA
naor@math.princeton.edu

Igor Rodnianski
Department of Mathematics
Princeton University
Fine Hall, Washington Road
Princeton, NJ 08544 USA
irod@math.princeton.edu

## Associate Editors

Ian Agol, University of California, Berkeley
Denis Auroux, University of California, Berkeley
Andrea Bertozzi, University of California, Los Angeles
Roman Bezrukavnikov, Massachusetts Institute of Technology
Sun-Yung Alice Chang, Princeton University
Dmitry Dolgopyat, University of Maryland
Alice Guionnet, Massachusetts Institute of Technology
Lawrence Guth, Massachusetts Institute of Technology
Lars Hesselholt, Nagoya University
Richard Kenyon, Brown University
Michael J. Larsen, Indiana University
Ciprian Manolescu, University of California, Los Angeles
William P. Minicozzi II, Massachusetts Institute of Technology
Anand Pillay, University of Notre Dame
Peter Sarnak, The Institute for Advanced Study and Princeton University
Peter Scholze, Universität Bonn
Amit Singer, Princeton University
Benjamin Sudakov, ETH Zürich
Burt Totaro, University of California, Los Angeles
Karen Vogtmann, University of Warwick

## Editorial Information

Information on the backlog for this journal can be found on the AMS website starting from http://www.ams.org/jams.

In an effort to make articles available as quickly as possible, articles are electronically published on the AMS website individually after proof is returned from authors and before appearing in an issue.

A Consent to Publish is required before we can begin processing your paper. After a paper is accepted for publication, the Providence office will send a Consent to Publish and Copyright Agreement to all authors of the paper. By submitting a paper to this journal, authors certify that the manuscript has not been submitted to nor is it under consideration for publication by another journal, conference proceedings, or similar publication.

## Information for Authors

Initial submission. All articles submitted to this journal are peer-reviewed. The AMS has a single blind peer-review process in which the reviewers know who the authors of the manuscript are, but the authors do not have access to the information on who the peer reviewers are. The AMS uses Centralized Manuscript Processing for initial submission. Authors should submit a PDF file using the Initial Manuscript Submission form found at www.ams.org/submission/jams or should send one copy of the manuscript to the following address: Centralized Manuscript Processing, JOURNAL OF THE AMS, 201 Charles Street, Providence, RI 02904-2294 USA. If a paper copy is being forwarded to the AMS, indicate that it is for the Journal of the AMS and include the name of the corresponding author, contact information such as email address or mailing address, and the name of an appropriate Editor to review the paper (see the list of Editors above).

The first page must contain a descriptive title that is short, but informative; useless or vague phrases such as "some remarks about" or "concerning" should be avoided. Although an abstract is not required upon initial submission, upon acceptance authors will be requested to supply an abstract for the electronic version of this journal. The AMS offers free worldwide access to the electronic abstracts. An abstract should be at least one complete sentence and at most 300 words. No abstracts appear in the printed journal starting in 1998. Included with the footnotes to the paper should be the 2010 Mathematics Subject Classification representing the primary and secondary subjects of the article. The classifications are accessible from www. ams.org $/ \mathrm{msc} /$. The Mathematics Subject Classification footnote may be followed by a list of key words and phrases describing the subject matter of the article and taken from it. Journal abbreviations used in bibliographies are listed in the latest Mathematical Reviews annual index. The series abbreviations are also accessible from www.ams.org/msnhtml/serials.pdf. To help in preparing and verifying references, the AMS offers MR Lookup, a Reference Tool for Linking, at www.ams.org/mrlookup/.

Electronically prepared manuscripts. Manuscripts should be electronically prepared in $\mathcal{A}_{\mathcal{M}} \mathcal{S}$-EATEX. To this end, the Society has prepared $\mathcal{A}_{\mathcal{M}} \mathcal{S}$ - $\mathrm{E}^{\mathrm{A}} \mathrm{T}_{\mathrm{E}} \mathrm{X}$ author packages for each AMS publication. Author packages include instructions for preparing electronic manuscripts, samples, and a style file that generates the particular design specifications of that publication series. Articles properly prepared using the $\mathcal{A}_{\mathcal{M}} \mathcal{S}$-E $\mathrm{T}_{\mathrm{E}} \mathrm{X}$ style file and the $\backslash$ label and $\backslash$ ref commands automatically enable extensive intra-document linking to the bibliography and other elements of the article for searching electronically on the Web.

Authors may retrieve an author package for Journal of the AMS starting from www.ams.org/jams/jamsauthorpac.html or via FTP to 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 or from the Publication Division, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA. When requesting an author package, please specify the publication in which your paper will appear. Please be sure to include your complete email address.

After acceptance. The source files for the final version of the electronic manuscript should be sent to the Providence office immediately after the paper has been accepted for publication. The author should also submit a PDF of the final version of the paper to the Editor, who will forward a copy to the Providence office. Accepted electronically prepared manuscripts can be submitted via the Web at www.ams.org/submit-book-journal/, sent via email to 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 sending a manuscript electronically via email or CD, please be sure to include a message indicating in which publication the paper has been accepted. Complete instructions on how to send files are included in the author package.

Electronic graphics. Comprehensive instructions on preparing graphics are available from www.ams.org/authors/journals.html. A few of the major requirements are given here.

Submit files for graphics as EPS (Encapsulated PostScript) files. This includes graphics originated via a graphics application as well as scanned photographs or other computergenerated images. If this is not possible, TIFF files are acceptable as long as they can be opened in Adobe Photoshop or Illustrator.

Authors using graphics packages for the creation of electronic art should also avoid the use of any lines thinner than 0.5 points in width. Many graphics packages allow the user to specify a "hairline" for a very thin line. Hairlines often look acceptable when proofed on a typical laser printer. However, when produced on a high-resolution laser imagesetter, hairlines become nearly invisible and will be lost entirely in the final printing process.

Screens should be set to values between $15 \%$ and $85 \%$. Screens which fall outside of this range are too light or too dark to print correctly. Variations of screens within a graphic should be no less than $10 \%$.

Any graphics created in color will be rendered in grayscale for the printed version unless color printing is authorized by the Managing Editor and the Publisher. In general, color graphics will appear in color in the online version.

AMS policy on making changes to articles after publication. Articles are published on the AMS website individually after proof is returned from authors and before appearing in an issue. To preserve the integrity of electronically published articles, once an article is individually published to the AMS website, changes cannot be made in place in the paper. The AMS does not keep author-related information such as affiliation, current address, and email address up to date after a paper is electronically published.

Corrections of critical errors may be made to the paper by submitting an errata article to the Editor. The errata article will be published electronically, will appear in a future print issue, and will link back and forth on the Web with the original article.

Secure manuscript tracking on the Web. Authors can track their manuscripts through the AMS journal production process using the personal AMS ID and Article ID printed in the upper right-hand corner of the Consent to Publish form sent to each author who publishes in AMS journals. Access to the tracking system is available from www.ams.org/mstrack/. An explanation of each production step is provided on the Web through links from the manuscript tracking screen. Questions can be sent to jams-query@ams.org.

Inquiries. Any inquiries concerning a paper that has been accepted for publication that cannot be answered via the manuscript tracking system mentioned above should be sent to jams-query@ams.org or directly to the Electronic Prepress Department, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294 USA.

## JOURNAL OF THE AMERICAN MATHEMATICAL SOCIETY CONTENTS

Vol. 30, No. 4

October 2017
Melanie Matchett Wood, The distribution of sandpile groups of random graphs ..... 915
Sándor J Kovács and Zsolt Patakfalvi, Projectivity of the moduli space of stable $\log$-varieties and subadditivity of log-Kodaira dimension ..... 959
Geordie Williamson, with a joint appendix with Alex Kontorovich and Peter J. McNamara, Schubert calculus and torsion explosion ..... 1023
Andrew Suk, On the Erdős-Szekeres convex polygon problem ..... 1047
Aaron Brown and Federico Rodriguez Hertz, Measure rigidity for random dynamics on surfaces and related skew products ..... 1055
Kazuhiko Yamaki, Non-density of small points on divisors on abelian varieties and the Bogomolov conjecture ..... 1133
Robert J. Berman and Bo Berndtsson, Convexity of the $K$-energy on the space of Kähler metrics and uniqueness of extremal metrics ..... 1165

