

Curriculum Vitae
IDDO TZAMERET

Computer Science Department
Royal Holloway, University of London
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<http://www.cs.rhul.ac.uk/home/tzameret/>
June 2018

Academic & Research Positions

- 2014 – **Senior Lecturer**
Computer Science Department, Royal Holloway, University of London,
United Kingdom
(2014–2016: lecturer; 2017– senior lecturer)
- 2011 – 2014 **Assistant Professor**
The Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua
University, Beijing
- 2010 – 2011 **Postdoctoral researcher**
Institute for Theoretical Computer Science, Tsinghua University, Beijing
(host: *Andrew Yao*)
- 2008 – 2010 **Postdoctoral researcher, EČC fellow**
Eduard Čech Center, Mathematical Institute, Academy of Science of the
Czech Republic, Prague (host: *Pavel Pudlák*)

Education

- 2008 Ph.D. Computer Science, Tel Aviv University
Title: *Studies in algebraic and propositional proof complexity*
Advisors: Ran Raz (Weizmann Inst.) and Nachum Dershowitz (Tel Aviv)
- 2003 M.Sc Computer Science, Tel Aviv University, *summa cum laude*
- 2000 B.A. Computer Science (with an additional major in Philosophy), Tel Aviv
University, *magna cum laude*

Research Interests

Foundations of computer science, computational complexity, limitations on concrete computational models (i.e., lower bounds), the interplay between algebra and computation, applications of logic in computer science. In particular, satisfiability, proof complexity, algebraic complexity and theory and practice of SAT-solving.

Scientific/Academic Honors and Grants

- 2014 – 2017 The National Natural Science Foundation of China Grant (61373002).
660,000 Yuan (\$110,000). *New Approaches to the Limits of Efficient
Propositional Reasoning: Foundations, Algorithms and Approxima-
tions*. (Principal Investigator)

- 2014 CNRS *Young Experienced Researcher* (CR1) - French National Competitive Recruitment in Computer Science (Section 06)—**top 3** out of more than 100 international candidates (unfortunately had to decline)
- 2013 Finalist for the Tsinghua Young Academic Researcher Award
- 2010 – Supported by NSF China Grant and the National Basic Research Program of China Grant (participant)
- 2008 – 2010 Eduard Čech Center for Algebra and Geometry Research Fellowship
- 2008, 2010 The John Templeton Foundation grant
- 2008 Industrial Affiliates Conference (IAP), Tel Aviv University; Third prize.
Title of poster: *On the Length of Algebraic Proofs*
- 2005 – 2007 The Israel Science Foundation research grant (grant no. 250/05)
- 2003 – 2005 The Israel Science Foundation research grant (grant no. 254/01)
- 2003 – 2004 Excellence prize for Ph.D. students (Tel Aviv University)
- 2002 – 2003 Excellence prize for M.Sc. students (Tel Aviv University)
- 2001 – 2002 Excellence prize for M.Sc. students (Tel Aviv University)

Publications

Most papers can be downloaded from my webpage at: <http://www.cs.rhul.ac.uk/home/tzameret/Pub.html>

SUBMITTED FOR PUBLICATION, UNDER REVIEW AND MANUSCRIPTS TO BE SUBMITTED

- [1] **Resolution with Counting: Lower Bounds over Different Moduli.** Fedor Part and Iddo Tzameret, May 2018.
- [2] **Uniform, Integral and Efficient Proofs for the Determinant Identities.** Iddo Tzameret and Stephen A. Cook. 2017. Preprint (60 pages). [Invited to Journal of the ACM \(JACM\)](#).
- [3] **Sparser Random 3-SAT Refutation Algorithms and the Interpolation Problem.** Iddo Tzameret. 2014. *Full version to be submitted to a journal publication.*

SURVEYS

- [4] **Recent Progress in Algebraic Proof Complexity.** Tonnian Pitassi and Iddo Tzameret. *ACM SIGLOG News (SIGLOG)*, **3** (3) (July 2016), pp. 21–43, ACM New York.

JOURNAL PUBLICATIONS

- [5] **Characterizing Propositional Proof as Non-Commutative Formulas.** Fu Li, Iddo Tzameret and Zhengyu Wang. *SIAM Journal on Computing (SICOMP)*, **47**(4), pp. 1424–1462, 2018.
- [6] **Witnessing Matrix Identities and Proof Complexity.** Fu Li and Iddo Tzameret. *International Journal of Algebra and Computation (IJAC)* **28**(2), pp. 217–256. World Scientific, 2018.

- [7] **Proof Complexity Lower Bounds from Algebraic Circuit Complexity.** Michael Forbes, Amir Shpilka, Iddo Tzameret, Avi Wigderson. Invited to *Theory of Computation (ToC)* (Special issue on CCC'16). DOI:10.4086/toc.2017.v013a001.
- [8] **Short Proofs for the Determinant Identities.** Pavel Hrubeš and Iddo Tzameret. *SIAM Journal on Computing (SICOMP)* **44** (2) (2015), pp. 340–383.
- [9] **Short Propositional Refutations for Dense Random 3CNF Formulas.** Sebastian Müller and Iddo Tzameret. *Annals of Pure and Applied Logic (APAL)* **165** (2014), pp. 1864–1918.
- [10] **Kolmogorov Complexity, Circuits, and the Strength of Formal Theories of Arithmetic.** Eric Allender, George Davie, Luke Friedman, Sam Hopkins and Iddo Tzameret. *Chicago Journal of Theoretical Computer Science (CJTCS)* (5) (2013), pp. 1–15.
- [11] **Algebraic Proofs over Noncommutative Formulas.** Iddo Tzameret. *Information and Computation*, **209** (10), (2011), pp. 1269–1292.
- [12] **Complexity of Propositional Proofs Under a Promise.** Nachum Dershowitz and Iddo Tzameret. *ACM Transactions on Computational Logic (ToCL)*, **11**(3) (2010), pp. 1–30.
- [13] **Resolution over Linear Equations and Multilinear Proofs.** Ran Raz and Iddo Tzameret. *Annals of Pure and Applied Logic (APAL)*, **155**(3) (2008), pp. 194–224. doi:10.1016/j.apal.2008.04.001.
- [14] **The Strength of Multilinear Proofs.** Ran Raz and Iddo Tzameret. *Computational Complexity (CC)*, **17**(3), (2008), pp. 407–457.
- [15] **Gap Embedding for Well-Quasi-Orderings.** Nachum Dershowitz and Iddo Tzameret. *Electronic Notes in Theoretical Computer Science*, Vol. 84 (2003).

CONFERENCE PUBLICATIONS

- [16] **Uniform, Integral and Efficient Proofs for the Determinant Identities.** Iddo Tzameret and Stephen A. Cook. In *Proceedings of the 32th Annual ACM/IEEE Symposium on Logic In Computer Science (LICS)*, 2017, pp. 1–12. [Invited to Journal of the ACM \(JACM\)](#)
- [17] **Proof Complexity Lower Bounds from Algebraic Circuit Complexity.** Michael Forbes, Amir Shpilka, Iddo Tzameret, Avi Wigderson. In *Proceedings of the 31th Annual Computational Complexity Conference (CCC)*, 2016, pp. 32:1–32:17. [Invited to the special issue on CCC'16 \(Theory Comput. ToC\)](#)
- [18] **Non-Commutative Formulas and Frege Lower Bounds: a New Characterization of Propositional Proofs.** Fu Li, Iddo Tzameret and Zhengyu Wang. In *Proceedings of the 30th Annual Computational Complexity Conference (CCC)*, 2015, pp. 412432. [Invited to the special issue on CCC'15 \(Comput. Complexity\)](#)

- [19] **Sparser Random 3-SAT Refutation Algorithms and the Interpolation Problem.** Iddo Tzameret. *Proceedings of the 41st International Colloquium on Automata, Languages and Programming (ICALP)* track A, 2014.
- [20] **Refuting Random 3CNF Formulas in Propositional Logic.** Sebastian Müller and Iddo Tzameret. In Johan van Benthem and Fenrong Liu, eds, *Logic Across the University: Foundations and Application—Proceedings of the Tsinghua Logic Conference: 201–208*. Beijing, 14-16 October 2013. Volume 47: *Studies in Logic*. College Publications, London.
- [21] **Short Proofs for the Determinant Identities.** Pavel Hrubeš and Iddo Tzameret. In *Proceedings of the 44th Annual ACM Symposium on the Theory of Computing (STOC)*, 2012, pp. 193–212.
- [22] **Short Propositional Refutations for Dense Random 3CNF Formulas.** Sebastian Müller and Iddo Tzameret. In *Proceedings of the 27th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS)*, 2012, pp. 501–510.
- [23] **Algebraic Proofs over Noncommutative Formulas.** Iddo Tzameret. Invited to *The 7th Annual Conference on Theory and Applications of Models of Computation*, June 7-11, 2010. Volume 6108 of *Lecture Notes in Comput. Sci.*, pages 60–71. Springer, Berlin.
- [24] **The Proof Complexity of Polynomial Identities.** Pavel Hrubeš and Iddo Tzameret. In *Proceedings of the 24th Annual IEEE Conference on Computational Complexity (CCC)*, 2009, pp. 41–51.
- [25] **Complexity of Propositional Proofs Under a Promise.** Nachum Dershowitz and Iddo Tzameret. *Proceedings of the 34th International Colloquium on Automata, Languages and Programming (ICALP)* track A, 2007, 9–13.
- [26] **Gap Embedding for Well-Quasi-Orderings.** Nachum Dershowitz and Iddo Tzameret. *Proceedings of the 10th Workshop on Logic, Language, Information and Computation (WOLLIC)*, 2003.
- [27] **Quasi-Ordered Gap Embedding.** Nachum Dershowitz and Iddo Tzameret. *Proceedings of the 6th International Workshop on Termination, (WST)*, 2003, A. Rubio, ed., pp. 30–34.

WORKING PAPERS

- [28] **Algebraic vs. Semi-Algebraic Proof Systems: Can a Natural Number be Negative?** Edward Hirsch and Iddo Tzameret, April 2018.

NOTES

- [29] **Håstad’s Separation of Constant-Depth Circuits Using Sipser Functions.** 15 pages, 2009–2012.

UNPUBLISHED MANUSCRIPTS

- [30] **On the Structure and Complexity of Symbolic Proofs of Polynomial Identities.** Iddo Tzameret. Manuscript, 35 pages, May 2008. Subsumed and improved in the above paper with P. Hrubeš.

DISSERTATIONS

- [31] **Studies in Algebraic and Propositional Proof Complexity.** Ph.D. thesis, Computer Science Department, Tel Aviv University, 2008.
- [32] **Kruskal-Friedman gap embedding theorems over well-quasi-orderings.** M.Sc. thesis, Computer Science Department, Tel Aviv University, 2003.

Selected *Invited* Talks (international conferences and workshops)

- 2018 July Bertinoro (Forlì-Cesena), University Residential Center, Italy. *Ramsey Theory in Logic, Combinatorics and Complexity* (RaTLoCC'18): 50 minutes talk: Linear Algebra in Weak Arithmetic.
- 2018 Mar. Université Paris Diderot, Paris, France. *Workshop on Algebraic Complexity Theory* (WACT), 2018: 50 minutes talk: Algebraic Proof Complexity: Survey and Open Problems.
- 2017 Aug. Mathematisches Forschungsinstitut Oberwolfach, Germany, *Proof Complexity and Beyond*. 30 min talk: Resolution of linear equations: survey and open problems. Aug. 13-19, 2017.
- 2016 May St. Petersburg, Russia, *Workshop on Proof Complexity*. Plenary Speaker. 50 min: Algebraic Proof Complexity. May 17-20, 2016.
- 2016 Feb. Workshop on Algebraic Complexity Theory (WACT), 2016, Tel Aviv, Israel. 50 min talk: Characterizing Propositional Proofs as Non-Commutative Formulas. Feb. 3-12, 2016.
- 2014 Jul. Vienna, Austria, (*FLoC*) *Vienna Summer of Logic: Proof Complexity 2014*: 50 minutes talk. Generating matrix identities and proof complexity.
- 2013 Oct. Beijing, China, *Logic Conference: Tsinghua 2013–Foundation and Applications*: 40 minutes talk: From classical proof theory to P vs. NP.
- 2013 Mar. Aarhus Univ, Denmark, *Workshop in Algebraic Complexity Theory, CTIC*: 45 minutes talk: Algebras of polynomial identities and lower bounds on arithmetic proofs
- 2012 Sep. Rome, Italy, *Workshop on the Limits of Theorem Proving*: 45 minutes talk: Short proofs for the determinant identities
- 2012 June Dubrovnik, Croatia, *The 13th Int. Workshop on Logic and Computational Complexity (LCC'12)*: 45 minutes talk: Recent developments in algebraic and propositional proof complexity
- 2011 Oct. Banff Center, Canada, *Workshop on Proof Complexity*: 45 minutes talk: Proof complexity of dense random 3CNF formulas
- 2010 Jun. 7th Annual Conference on Theory and Applications of Models of Computation: *special session on proof complexity*; half an hour talk: Algebraic proofs in non-commutative models
- 2009 Aug. Intractability center, Institute of Advanced Study and Princeton U., New Jersey, U.S., *Barriers in Complexity Theory Workshop*; half an hour talk: Proofs of polynomial identities
- 2008 Sep. Charles University, Prague, Fall School in Logic and Complexity, Czech Rep.; two hours invited talk: Bounds on equational proofs of polynomial identities
- 2007 Sep. Fall School in Logic and Complexity, Třešt, Czech Rep.; two hours invited talk: Resolution over linear equations and multilinear proofs

2006 Apr. Isaac Newton Institute of Mathematics, Cambridge University, U.K., *New directions in proof complexity workshop*; one hour invited talk: The strength of multilinear proofs

Contributed talks (international audience)

2017 June University of Reykjavik, Iceland; *32th Annual ACM/IEEE Symposium on Logic In Computer Science (LICS)*; 25 minutes contributed talk: Uniform, integral and efficient proofs of the determinant identities.

2015 June FCRC, Portland, Oregon, *Proceedings of the 30th Annual Computational Complexity Conference (CCC)*: June 17-19, 2015; 25 minutes contributed talk: A new characterization of propositional proofs: non-commutative formulas and Frege lower bounds.

2014 June Copenhagen University, Denmark, *41st International Colloquium on Automata, Languages and Programming (ICALP)*, track A; half an hour contributed talk: Sparser Random 3-SAT Refutation Algorithms and the Interpolation Problem.

2012 June Department for Electrical Engineering and Computing at the University of Dubrovnik, Dubrovnik, Croatia; *27th Annual ACM/IEEE Symposium on Logic In Computer Science (LICS 2012)*; half an hour contributed talk: Short propositional refutations for dense random 3CNF formulas

— May New York, USA; *44th Annual ACM Symposium on the Theory of Computing (STOC)*, 2012 Twenty minutes contributed talk: Short proofs for the determinant identities

2009 July Henry Poincare Institute for Mathematics, Paris, France, *The 24th Annual IEEE Conference on Computational Complexity*; half an hour contributed talk: The proof complexity of polynomial identities

2007 July Instytut Informatyki, University of Wrocław, Poland, *The 24th International Colloquium on Automata, Languages and Programming*; half an hour contributed talk: Complexity of propositional proofs under a promise

2003 Aug. Ouro Preto, Minas Gerais, Brazil, *The 10th Workshop on Logic, Language, Information and Computation*; half an hour contributed talk: Gap embedding for well-quasi-orderings

— June Valencia, Spain, *The International Workshop on Termination*; half an hour contributed talk: Quasi-ordered gap embedding.

Seminars and other specialized talks

2017 Mar. Leeds University, UK, *Algebra, Logic and Complexity Seminar*. 50 minutes talk.

2017 Feb. Durham University, UK, *Theory and Algorithms seminar*. 50 minutes talk.

2015 Apr. Oxford University, UK, *Algorithms seminar*. 50 minutes talk: A new characterization of propositional proofs.

2013 Dec Modèles de Calcul et Complexité, Ecole Normale Supérieure de Lyon:
 – Random k -SAT, Refutations Algorithms and Logic, one hour talk.
 – Algebra, Proofs and Complexity: Recent Developments, one hour talk.

2013 Dec Algorithms and Complexity group, LIAFA, Laboratoire d'Informatique Algorithmique: Fondements et Applications, Université Paris Diderot-Paris 7: Proofs, Algebra and Complexity: Recent Development, one hour talk.

- 2012 May Algorithms and complexity seminar, Tsinghua Univ.: Short proof for linear algebra, one hour talk.
- 2011 Nov. FORMS: formal models seminar, Dept. of Software, Tsinghua university: Short propositional refutations for dense random 3CNF formulas, one hour talk.
- 2011 May Theoretical computer science seminar, KTH Royal Institute of Technology, Stockholm: Short propositional refutations for dense random 3CNF formulas, one hour talk.
- 2011 Feb Hot topics in computer science, Tsinghua Univ., Yao Class lecture, Beijing: Satisfiability and resolution, two fortyfive minutes talk.
- 2010 Dec Logic seminar, Tel Aviv Univ.: Average case separation in proof complexity, Two hours talk.
- 2010 Sep Theory lunch, Inst. for Theoretical Computer Science, Beijing: Proof complexity; Twenty five minutes introductory talk.
- 2010 May Logic seminar, Mathematical inst., Academy of Sciences, Prague: Algebraic proofs over noncommutative formulas; Two hours talk.
- 2009 Dec Complexity seminar, Mathematical inst., Academy of Sciences, Prague: On Fourier analysis of AC^0 functions; Four hours talk.
- 2009 Oct Logic seminar, Tel Aviv U.: Lengths of proofs and linear algebra; two hours talk.
- May Computer science theory, Tel Aviv U.: The proof complexity of polynomial identities
- 2008 Nov Logic Seminar, Mathematical Inst. AS CR, Prague: The proof complexity of polynomial identities; Three parts, two hours each.
- June Computer science colloquium, Tel Aviv U.: Complexity of symbolic proof of polynomial identities
- 2007 Jan Logic Seminar, Tel Aviv U.: Complexity of propositional proofs under a promise
- 2006 Mar. Computer science theory, Tel Aviv U.: The strength of multilinear proofs
- Jan Computable set theory seminar, Tel Aviv U.: Kripke-Plates set theory
- Jan Logic, Tel Aviv U.: Proof complexity generators
- 2005 Sep Pec fall school in logic, Pec pod Snezkou, Czech Rep.: Algebraic proof systems over multilinear formulas
- 2004 Dec Logic, Tel Aviv U.: Algebraic proof complexity
- Apr Logic seminar, School of Computer Science, Tel Aviv University: Basic bounded arithmetic
- 2003 Oct Combinatorics seminar, Hebrew University, Mathematics department, Jerusalem: Well-quasi-ordering of finite trees
- Mar Combinatorics seminar, School of Computer Science, Tel Aviv University: Well-quasi-ordering of finite trees
- Computer Science Logic seminar, School of Computer Science, Technion, Haifa: Well-quasi-ordering of finite trees

Teaching and Supervision

Accreditation

Fellow of the *UK Higher Education Academy (HEA)* (reference number: PR117908).

Ph.D. Supervision

- 2016 – **Fedor Part:** PhD student, University of London. Computational complexity.
- 2013 –2015 **Fu Li:** PhD student, IIIS, Tsinghua. Algebraic and proof complexity (after I left Tsinghua he joined the PhD program in theory of computation at *University of Texas at Austin (UT Austin)*).

Completed (Research) Undergraduate Theses

- 2012 – 2014 **Zhengyu Wang:** undergraduate Tsinghua CS pilot class student; undergraduate *thesis* in complexity. Accepted for an internship at the theory group of IBM, Almaden. Currently: PhD student at **Harvard University**, *Theory of Computation group*.
- 2012 – 2013 **Fu Li:** undergraduate Tsinghua CS pilot class student. Algebraic and proof complexity.
- 2011 **Pei Dong:** undergraduate Tsinghua CS pilot class student; undergraduate *thesis* in proof complexity.

Undergraduate Supervision

- 2014– Regular advisor to undergraduate students (via *tutorials*), Royal Holloway, University of London

Course Taught

- 2017, Fall *Databases*, undergraduate, Royal Holloway, University of London
- 2017, Fall *Semantic Web*, 3rd year, elective, Royal Holloway, University of London
- 2016, Fall *Databases*, undergraduate, Royal Holloway, University of London
- 2016, Fall *Semantic Web*, 3rd year, elective, Royal Holloway, University of London
- 2015, Fall *Databases*, undergraduate, Royal Holloway, University of London
- 2015, Fall *Semantic Web*, 3rd year, elective, Royal Holloway, University of London
- 2014, Spring *Theory of computation*, undergraduate course, Tsinghua University
- 2013, Spring *Theory of computation*, undergraduate course, Tsinghua University
- 2012, Fall *Advanced theoretical computer science* (co-teacher), graduate course, Tsinghua Univ.
- 2012, Spring *Theory of computation*, undergraduate course, Tsinghua University.
- 2011, Fall *Advanced theoretical computer science: computational and proof complexity*, graduate course (co-teacher), Tsinghua University.

Instructor

- 2010-2011 *Algebraic complexity reading group*, Tsinghua University.
- 2003 Spring *Temporal verification of reactive systems*, temporal logic and its application to verification (Lecturer: Zohar Manna), Tel Aviv University.

Course Development

- 2015 *Semantic Web* (elective course), Royal Holloway, University of London.
- 2010–2011 IIIS, Tsinghua Univ.: Part of a team for developing the undergraduate course syllabus.
- 2011 IIIS, Tsinghua Univ.: Co-developing the graduate course “*computational and proof complexity*”.

Seminars

- 2013–2014 *Theory of Computation Seminar*, IIS, Tsinghua Univ.
 2012–2013 *Theory of Computation Seminar*, IIS, Tsinghua Univ.

Teaching Assistant

- 2002 Fall Discrete mathematics
 — Fall Logic for computer science
 — Spring Introduction to computer science
 — Spring C programming for biologists

Departmental Service

University of London

- 2015– *Final year projects committee*: co-coordination of projects, allocation, marking, and student presentations. Royal Holloway, University of London.

Recruitment Committees

- 2013, Aug. IIS, Tsinghua Univ.: recruitment committee for undergraduate CS Pilot class (including interviews with candidates).
 2011– IIS, Tsinghua Univ.: recruitment committees for undergraduate and graduate students.

Miscellaneous

- 2012– 2014 Founder and Head of the *Laboratory for Complexity of Computation and Reasoning*, IIS, Tsinghua University.

Seminar Coordinator

- 2011–2012 *Lunch-Meeting Seminar*, IIS, Tsinghua Univ. Main graduate student seminar of the institute. Held separate practice talks for each speaker.
 2011, Fall *Algorithms, Complexity and Cryptography seminar*, IIS, Tsinghua Univ.

Professional Service

Program Committees

AAAI (2018), IJCAI (2017), Logic and Computational Complexity (LCC) 2015

Ph.D. Thesis Committees

- 2014 *Navid Talebanfarld*, Computer Science, Aarhus Univ., Denmark
 2014 *Hao Song*, IIS, Tsinghua Univ.
 2013 *Bangsheng Tang*, IIS, Tsinghua Univ.
 2012 *Youming Qiao*, IIS, Tsinghua Univ.

Defense (and Pre-Defense) Committee Member

2014	<i>Hao Song</i> , IIS, Tsinghua Univ.	2012	<i>Lou Tiancheng</i> , IIS, Tsinghua Univ.
2014	<i>Chenggang Wu</i> , IIS, Tsinghua Univ.	2012	<i>Xiaohubei Wu</i> , IIS, Tsinghua Univ.
2013	<i>Chengu Wang</i> , IIS, Tsinghua Univ.	2012	<i>Jing He</i> , IIS, Tsinghua Univ.
2013	<i>Bangsheng Tang</i> , IIS, Tsinghua Univ.	2011	<i>Wei Yu</i> , IIS, Tsinghua Univ.
2012	<i>Youming Qiao</i> , IIS, Tsinghua Univ.	2011	<i>Changcun Ma</i> , IIS, Tsinghua Univ.

Referee and Review ActivitiesSelected journals and conferences refereed

Journal of the ACM (JACM)
SIAM Journal on Computing (SICOMP)
IEEE Conf. on Comput. Complexity (CCC)
ACM Transactions on Computational Logic (TOCL)
Intl. Coll. Automata, Language Programming (ICALP)
IEEE Annual Symposium on Logic in Computer Science (LICS)
Annals of Pure and Applied Logic (APAL)
International Joint Conference on Artificial Intelligence (IJCAI)

Granting Agencies

Czech Science Foundation 2012, 2014
Engineering and Physical Sciences Research Council UK (EPSRC) 2018

Societies

Reviewer for the *Mathematical Reviews* (American Mathematical Society (AMS))
2015 –

