

Curriculum Vitae

Dr. Mark Gross

Birth date: November 30, 1965
Current appointment: Professor, DPMMS, Cambridge

Education

Ph.D Mathematics, University of California, Berkeley, May 1990
B.A. Mathematics and Computer Science, Cornell University, 1982–1984, Summa Cum Laude

Appointments Held

- NSF-NATO postdoctoral fellow at Université de Paris VI, spring and summer 1991 and summer 1992.
- Assistant Professor, University of Michigan, fall 1990 to spring 1993, on leave spring 1991 and fall and spring 1992-1993.
- Postdoctoral Fellow, Mathematical Sciences Research Institute, Berkeley, CA, 1992-1993.
- Tenure-track Assistant Professor, Cornell University, fall 1993.
- Visiting Scholar, Trinity College, Cambridge University, summer 1996.
- Lecturer, University of Warwick, from October 1st, 1997, taken up January 1st 1998.
- Associate Professor with tenure, Cornell University, from November 1st, 1997.
- Visiting Fellow in Common, Trinity College, Cambridge, fall term 1998.
- Senior Lecturer, University of Warwick, from October 1st, 1999.
- Reader, University of Warwick, from October 1st, 2001
- Senior Researcher, University of Cambridge, April-June 2002.
- Professor, University of Warwick, 2002-2003.
- Full professor, University of California, San Diego, from July 1st 2001 until October 31st 2013.
- Simons Visiting Professor, MSRI, Fall 2009.
- Professor, University of Cambridge, from October 2013.

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Selected Recent Invited Addresses at Conferences

- George Boole Bicentennial Conference, Cork, August, 2015.
- Loughborough, LMS Summer School for undergraduates, July 2015.
- Plenary speaker, AMS Summer School in Algebraic Geometry, July, 2015, Salt Lake City.
- Plenary speaker, 8th joint Australian/New Zealand Mathematics Societies conference, December 2014, Melbourne.
- British Algebraic Geometry Seminar, Warwick, September 2014.
- Invited speaker, ICM 2014, Algebraic Geometry Section, Seoul, August 2014.
- Nordfjordeid Conference on the Gross-Siebert program, June 2014.
- Mentor, Snowbird AMS MRC workshop, June, 2014.
- Plenary address, AMS conference, UC Riverside, November 2013.
- Mentor at MIT RTG Mirror Symmetry Workshop, Big Bear, CA, May 2013.
- Current Developments in Mathematics, 2012, Harvard, November 2012.
- Spring school on tropical geometry and cluster varieties, Paris, April 2012.
- Miami Winter School, January 2012.
- Tropical Geometry Workshop, Castro Urdiales, December 2011.
- Plenary speaker, Chern Centennial Conference, MSRI, October 2011.
- Clay workshop on logarithmic Gromov-Witten invariants, September, 2011.
- Tropical geometry and mirror symmetry, Cetraro, July 2011.
- JDG conference, Harvard, May 2011.
- Symplectic geometry conference, Chengdu, May 2011.
- Dolgachev retirement conference, Ann Arbor, April 2011.
- Miami Winter School, three lectures, January 2011.
- VBAC 2010, Lisbon, June 2010.
- WAGS Vancouver, May 2010.
- RTG Conference on Gromov-Witten invariants, University of Michigan, Three lectures, April 2010.
- Two special session talks at the AMS Riverside conference, November 2009.
- A series of 10 hours of lectures at the CBMS regional conference on tropical geometry and mirror symmetry, Kansas State University, December, 2008.
- Affine manifolds and Mirror Symmetry workshop, Ann Arbor, April 2008. (This conference was devoted to the mirror symmetry program developed by myself with Bernd Siebert.)

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Conferences Organized

- Retrospective conference for the Thematic Program on Calabi-Yau varieties, Herstmonceux, July, 2016.
- Hot Topics conference on Cluster Algebras, MSRI, Berkeley, April 2016.
- Wall-crossing in geometry and physics, Berkeley, March 2016.
- Mirror Symmetry and Hodge theory, Warwick, July 2015.
- Co-organizer of Special Session on Algebraic Geometry at AMS conference, Riverside, November 2013.
- Co-organizer of semester-long Thematic Program on Calabi-Yau Varieties, Fields Institute, July-December 2013.
- Co-organizer, Clay workshop on logarithmic Gromov-Witten invariants, September, 2011.
- Co-organizer, Tropical Geometry and Mirror Symmetry, Cetraro, July 2011.
- Principal organizer, conference on tropical geometry and mirror symmetry at UCSD, February 2010.
- Co-organizer, workshop, MSRI, November 2009.
- Co-organizer, Workshop on tropical geometry at the University of Warwick, September 2007.
- Co-organizer, Perimeter Institute Workshop on String Theory and Algebraic Geometry, November, 2004.
- Co-organizer of conference on Special Lagrangian Geometry and Mirror Symmetry, April 2003, IPAM, Los Angeles.

Selected Invited Lectures at Universities

- Hannover, November 2015 (two lectures).
- Cardiff colloquium, November 2015.
- Trinity Maths Society, November 2015.
- Bath, colloquium, October 2015.
- University of Texas, Austin, 5 lectures, April 2015.
- University of Warwick, Colloquium, February 2015.
- University of Leuven, November 2014.
- Paris VI, June 2013.
- MIT, November 2012.
- Columbia University, November 2012.
- University of Warwick, 4 lectures, July 2012.
- University of Geneva, June 2012.

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- ETH, June 2012.
- Northwestern University colloquium, October 2011.
- Beijing University, May 2011.
- Northwestern University colloquium, April 2011.
- UC Berkeley, February 2011.
- University of Strasbourg, three lectures, July 2010.
- Princeton University, April 2010.
- University of Texas, Austin, March 2010.
- MSRI-Evans seminar, November 2009.
- UC Berkeley Differential Geometry Seminar, November 2009.
- Kuwait Lecture, Cambridge University, April 2009.

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Ph.D students

Andrei Caldararu, Cornell, 2000. Currently Associate Professor at UW Madison.

Diego Matessi, Warwick, 2001. Currently University of Milan.

Ricardo Castaño-Bernard, Warwick, 2002. Currently Associate Professor at U.Mass, Boston.

Simone Pavanelli, Warwick, 2003. Currently working in finance.

Daniel Budreau, UCSD, 2010, Currently student at University of Chicago Medical School.

Michael Slawinski, UCSD, 2011. Currently working in finance.

Karl Fredricksen, UCSD, 2011. Unknown.

Peter Overholser, UCSD, 2013. Currently post-doctoral researcher at Imperial College.

Brandon Meredith, UCSD, 2013. Currently working in software engineering.

Michael Kasa, UCSD, 2015. Currently working for Raytheon.

Current students: Manwai Cheung (UCSD), Lawrence Barrott, Zhi Jin.

Departmental service.

- Hiring committee, Cambridge, 2015-2016.
- Electoral board for Lowndean and Herschel Smith chairs, 2014-2015.
- Chair of Hiring Committee, UCSD, 2012-2013.
- Acting graduate chair, UCSD, Fall 2010.
- Academic senate representative, 2010-2011.
- Academic Personnel Committee, UCSD, 2007-2009.

Recently funded grants

- Royal Society Wolfson Merit Award, GBP 50,000.
- NSF FRG Award number 1262531, \$228,329.
- NSF Award number 1105871, \$243,000.
- NSF FRG Award number 0854987, \$279,417.
- NSF Award number 0805328, \$310,000.

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- [1] “The Distribution of Bidegrees of Smooth Surfaces in $\text{Gr}(1, \mathbf{P}^3)$,” *Math. Ann.* **292**, (1992) 127–147.
- [2] “Surfaces of Bidegree $(3, n)$ in $\text{Gr}(1, \mathbf{P}^3)$,” *Math. Zeitschrift*, **212**, 73–106 (1993).
- [3] “Surfaces of Degree 10 in $\text{Gr}(1, \mathbf{P}^3)$,” *Crelle’s Journal*, **436**, (1993) 87–127.
- [4] With E. Arrondo, “On Smooth Surfaces in $\text{Gr}(1, \mathbf{P}^3)$ with a Fundamental Curve,” *Manuscripta Mathematica*, **79**, (1993) 283–298.
- [5] With I. Dolgachev, “Elliptic Three-folds I: Ogg-Shafarevich Theory,” *Journal of Algebraic Geometry*, **3**, (1994) 39–80.
- [6] “A Finiteness Theorem for Elliptic Calabi-Yau Three-folds,” *Duke Math. J.*, **74**, (1994), 271–299.
- [7] “The Deformation Theory of Calabi-Yau n -folds with Canonical Singularities Can Be Obstructed,” *Essays on Mirror Manifolds, II*, (1996) 401–411.
- [8] Appendix to P. Aspinwall and D. Morrison, “Stable Singularities in String Theory,” *Comm. Math. Phys.* **178**, (1996) 115–134.
- [9] with T.-M. Chiang, B. Greene and Y. Kanter, “Black Hole Condensation and the Web of Calabi-Yau Manifolds,” *S-duality and Mirror Symmetry*, (Trieste, 1995), *Nucl. Phys. B Proc. Suppl.* **46** (1996), 82–95.
- [10] with P. Aspinwall, “Heterotic-Heterotic String Duality and Multiple K3 Fibrations,” *Phys. Lett.* **B382**, 81–88 (1996).
- [11] with P. Aspinwall, “The $SO(32)$ Heterotic String on a K3 surface,” *Phys. Lett.* **B387**, 735–742 (1996).
- [12] “Elliptic Three-folds II: Multiple Fibres,” *Trans. of the AMS.*, **349**, (1997) 3409–3468.
- [13] “Deforming Calabi-Yau Threefolds,” *Math. Ann.*, **308**, (1997) 187–220.
- [14] “Primitive Calabi-Yau Threefolds,” *J. Diff. Geom.*, **45**, (1997) 288–318.
- [15] With P.M.H. Wilson, “Mirror Symmetry via 3-tori for a Class of Calabi-Yau Threefolds,” *Math. Ann.*, **309**, (1997) 505–531.
- [16] With S. Popescu, “Equations of $(1, d)$ -polarized Abelian Surfaces,” *Math. Ann.*, **310**, (1998) 333–378.
- [17] “Special Lagrangian Fibrations I: Topology,” in *Integrable Systems and Algebraic Geometry*, eds. M.-H. Saito, Y. Shimizu and K. Ueno, World Scientific, 1998, 156–193.
- [18] “Connecting the Web: A Prognosis,” in *Essays in Mirror Symmetry III*, Eds. D.H. Phong, L. Vinet, and S.-T. Yau, (1999) 157–169.
- [19] “Special Lagrangian Fibrations II: Geometry,” *Surveys in Differential Geometry*, Somerville: MA, International Press, 1999, 341–403.

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- [20] With S. Popescu, “The Moduli Space of $(1, 11)$ -polarized Abelian Surfaces is Unirational,” *Comp. Math.*, **126**, (2001) 1–238
- [21] With S. Popescu, “Calabi-Yau Threefolds and Moduli of Abelian Surfaces I,” *Comp. Math.*, **127**, (2001) 169–228.
- [22] “Topological Mirror Symmetry,” *Invent. Math.*, **144**, (2001), 75–137.
- [23] “Examples of Special Lagrangian Fibrations,” in *Symplectic Geometry and Mirror Symmetry, Proceedings of the 4th KIAS Annual International Conference*, Edited by K. Fukaya, Y.G. Oh, K. Ono and G. Tian, World Scientific, 2001, 81–109.
- [24] With P.M.H. Wilson, “Large Complex Structure Limits of K3 Surfaces,” *J. Diff. Geom.*, **55**, (2000) 475–546.
- [25] With D. Joyce, D. Huybrechts, *Calabi-Yau manifolds and related geometries (Nordfjordeid, 2001)*, Springer-Verlag.
- [26] With B. Siebert, “Affine Manifolds, Log Structures, and Mirror Symmetry,” *Turkish J. Math.*, **27** (2003), 33–60.
- [27] With B. Siebert, “Mirror Symmetry via Logarithmic Degeneration Data I,” *J. Diff. Geom.*, **72**, (2006) 169–338.
- [28] “Toric degenerations and Batyrev-Borisov duality,” *Math. Ann.* **333**, (2005), 645–688.
- [29] With S. Pavanelli, “A Calabi-Yau threefold with Brauer group $(\mathbf{Z}/8\mathbf{Z})^2$,” *Proc. Amer. Math. Soc.*, **136**, (2005), 1–9.
- [30] “The Strominger-Yau-Zaslow conjecture: From torus fibrations to degenerations,” *Algebraic geometry—Seattle 2005. Part 1*, 149–192, *Proc. Sympos. Pure Math.*, **80**, AMS, Providence, RI, 2009.
- [31] With Aspinwall et al, “Dirichlet branes and mirror symmetry,” Clay Mathematics Monographs, **4**, American Mathematical Society, Providence, RI; Clay Mathematics Institute, Cambridge, MA, 2009. x+681 pp.
- [32] With B. Siebert, “From affine geometry to complex geometry,” *Annals of Mathematics*, **174**, (2011), 1301–1428.
- [33] With B. Siebert, “Mirror Symmetry via Logarithmic Degeneration Data II,” *Journal of Algebraic Geometry*, **19**, (2010), 679–780.
- [34] With B. Siebert, “An invitation to toric degenerations,” in *Surveys in differential geometry. Volume XVI. Geometry of special holonomy and related topics*, 43–78, *Surv. Differ. Geom.*, **16**, Int. Press, Somerville, MA, 2011.
- [35] With R. Pandharipande and B. Siebert, “The tropical vertex,” *Duke Math J.*, **153** (2010), 297–362.
- [36] “Mirror symmetry for \mathbf{P}^2 and tropical geometry,” *Advances in Math*, **224**, (2010) 169–245.

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- [37] With S. Popescu, “Calabi-Yau Threefolds and Moduli of Abelian Surfaces II,” *Trans. Amer. Math. Soc.* **363**, (2011), 3573–3599.
- [38] With R. Pandharipande, “Quivers, curves and the tropical vertex,” *Portugaliae Mathematica*, **67** (2010), 211–259.
- [39] *Tropical geometry and mirror symmetry*, CBMS Regional Conference Series in Mathematics, **114**. American Mathematical Society, Providence, RI, 2011. xvi+317 pp
- [40] With B. Siebert, “Logarithmic Gromov-Witten invariants,” *J. Amer. Math. Soc.*, **26** (2013), 451–510.
- [41] Appendix to X. Rong, Y. Zhang, “Continuity of extremal transitions and flops for Calabi-Yau manifolds,” *Journal of Differential Geometry*, **89**, (2011) 233–269.
- [42] With P. Hacking and S. Keel, “Mirror symmetry for log Calabi-Yau surfaces I,” *Publ. Math. Inst. Hautes Études Sci.*, **122**, (2015) 65–168.
- [43] With V. Tosatti and Y. Zhang, “Collapsing of abelian fibred Calabi-Yau manifolds,” *Duke Math. J.*, **162** (2013), 517–551.
- [44] With B. Siebert, “Theta functions and mirror symmetry,” JDG 2011 survey, preprint, 2012, 43 pages.
- [45] With L. Katzarkov and H. Ruddat, “Towards mirror symmetry of general type,” preprint, 2012, 79 pages, to appear in *Advances in Mathematics*.
- [46] With P. Hacking and S. Keel, “Moduli of surfaces with an anti-canonical cycle,” *Compos. Math.* **151**, (2015) 265–291.
- [47] “Mirror Symmetry and the Strominger-Yau-Zaslow conjecture,” *Current Developments in Mathematics 2012*, 133–191, Int. Press, Somerville, MA, 2013.
- [48] With V. Tosatti and Y. Zhang, “Gromov-Hausdorff collapsing of Calabi-Yau manifold,” preprint, 2013, 16 pages, to appear in *Communications in Analysis and Geometry*.
- [49] With P. Hacking and S. Keel, “Birational geometry of cluster algebras,” *Algebraic Geometry*, **2**, (2015) 137–175.
- [50] With B. Siebert, “Local mirror symmetry in the tropics,” 2014 ICM proceedings.
- [51] With P. Hacking, S. Keel, and M. Kontsevich, “Canonical bases for cluster algebras,” preprint, 2014, 136 pages.
- [52] With D. Matessi, “On homological mirror symmetry of toric Calabi-Yau threefolds,” preprint, 2015, 75 pages.
- [53] With M. Cheung, G. Muller, G. Musiker, D. Rupel, S. Stella, H. Williams, “The greedy basis equals the theta basis,” preprint, 2015, 17 pages.
- [54] With P. Hacking, S. Keel and B. Siebert, “Theta functions on varieties with effective anti-canonical divisor,” preprint, 2016, 115 pages.