

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.
- Fellow of King's College, Cambridge, from October 2016.

Awards and honors

- ICBS Frontiers of Science Award, 2023, for the paper “Canonical bases for cluster algebras.”
- Fellow of the Royal Society, from 2017.
- 2016 Clay Research Award.

Curriculum Vitae

Selected Recent Invited Addresses at Conferences

- 10 hour lecture course, online, hosted by ICTP-LATAM. September-October 2023.
- ICTP Conference on Deformation Theory, September 2023.
- CQT Colloquium, Nijmegen, September 2023.
- Sheffield University, June 2023.
- BIMSA conference on moduli, April 2023 (online).
- Lecture series at MATRIX, December 2022.
- Combinatorial Algebraic Geometry LMS workshop, Bath, August 2022.
- Hosono birthday conference, Tokyo, July 2022 (lecture delivered online).
- Oberwolfach workshop, July 2022 (First in-person conference post-pandemic).
- Plenary speaker, BCM, April 2021 (Online).
- Simons collaboration on Homological Mirror Symmetry, annual conference, November 2020. (Online)
- Conference on mirror symmetry and the SYZ conjecture, September 2020. (Online)
- 3CinG annual workshop, Chicheley hall, September 2019.
- University of Leeds, Workshop on Gromov-Witten theory, September, 2019.
- Paris, Workshop on Gromov-Witten theory, June, 2019.
- Lille, Conference, May, 2019.
- Leicester, Conference on algebraic methods in homological mirror symmetry, May 2019.
- Birmingham, Conference on mirror symmetry, April 2019.
- Loughborough, Conference, March 2019.
- Kyoto, Fukaya 60th birthday conference, February, 2019.
- London, Simons conference on special holonomy, January, 2019.
- Heilbronn annual conference, September, 2018.
- University of Canterbury workshop on mirror symmetry, November, 2017.
- 3CinG Workshop, LMS, London, October 2017.
- ETH conference on Open Gromov-Witten theory, October 2017.
- Short lecture course, KIAS, Seoul, September 2017. (Delivered by videoconferencing).
- Simons Collaboration workshop, Varese, Italy, August 2017.
- Complex and Algebraic Geometry workshop, Luminy, January, 2017.
- Imperial College, Simons Collaboration workshop, January, 2017.

Curriculum Vitae

- 3CinG grant workshop, University of Warwick, October 2016.
- Clay workshop on Algebraic Geometry, Oxford, September, 2016.
- Retro conference of the Fields Institute thematic program on Calabi-Yau manifolds, Herstmonceux, June 2016.
- MSRI, Hot Topics conference, 2 lectures, March 2016.
- UC Berkeley, Simons Collaboration conference talk, March 2016.
- George Boole Bicentennial Conference, Cork, August, 2015.
- University of Texas, Austin, April 2015, 5 lectures.
- 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.
- 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.

Curriculum Vitae

- 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.)

Conferences Organized

- 2023 Simons Math Summer Workshop, August 7-25, 2023.
- 3CinG workshop on Mirror symmetry and cluster algebras, Cambridge, July 2019.
- 3CinG workshop on computational algebra, King's College, Cambridge, April 2017.
- Retrospective conference for the Thematic Program on Calabi-Yau varieties, Hermione, 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.

Curriculum Vitae

Selected Invited Lectures at Universities

- Harvard-MIT Algebraic Geometry seminar, October 2023.
- Trinity College Dublin Colloquium, October 2023.
- King's College London Geometry Seminar, June 2023.
- Kyoto University, 10 hour lecture course, April 2023.
- Seminar and colloquium, UCSD, November 2022.
- Three seminars, Caltech, October-November 2022.
- Colloquium, UCLA, October 2022.
- Combinatorial Algebraic Geometry LMS workshop, Bath, August 2022.
- Hosono 60th birthday conference, Tokyo (lectured virtually), August 2022.
- Oberwolfach workshop, July 2022 (First in-person conference post-pandemic.)
- Oxford Geometry seminar, June 2022.
- Caltech algebraic geometry seminar, March 2022 (First in-person seminar talk post-pandemic).
- Many other Covid-era zoom talks.
- MPI Bonn/Berlin math/physics colloquium. March 2021.
- University of Antofagasta, Chile, Algebraic Geometry seminar, July 2020. (Online)
- ETH algebraic geometry seminar, June 2020. (Online)
- Brown University, Colloquium, September 2018.
- University of Augsburg, Colloquium, 2019.
- London Geometry Seminar, November 2018.
- Freiburg, Geometry seminar, June 2018.
- MSRI, February, 2018.
- UCSD, February, 2018.
- Paris VI, January, 2018.
- Bonn, Colloquium and Algebraic Geometry seminar, December 2017.
- ETH and University of Zurich colloquium, October 2017.
- University of Warwick, seminar talk, February 2016.
- University of Hannover, Colloquium, November, 2015.
- University of Cardiff, Colloquium, November, 2015.
- Trinity Maths Society, November 2015.
- University of Bath, Colloquium, October, 2015.
- Bath, colloquium, October 2015.

Curriculum Vitae

- 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.
- ETH, June 2012.
- Kuwait Lecture, Cambridge University, April 2009.

Curriculum Vitae

Ph.D students

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

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

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

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

Daniel Budreau, UCSD, 2010, Currently practicing surgery after obtaining a degree from University of Chicago Medical School.

Michael Slawinski, UCSD, 2011. Currently working in data science.

Karl Fredricksen, UCSD, 2011. Currently working in finance.

Peter Overholser, UCSD, 2013. Currently working at Cal State Humboldt

Brandon Meredith, UCSD, 2013. Currently work in data science.

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

Manwai Cheung, UCSD, 2016. BP at Harvard, now working in industry.

Lawrence Barrott, Cambridge, 2018, Currently working in data science.

Zhi Jin, Cambridge, 2019. Currently working in finance.

Sam Johnston, Cambridge, 2023, Currently a Heilbronn fellow at Imperial College

Yu Wang, Cambridge, 2023, Currently a post-doc at University of Georgia.

Evgeny Goncharov, Cambridge, 2023.

Current students: Xuanchun Lu, Peter Zaika, began October 2023.

Departmental and college service.

- Electoral board for Rouse Ball chair, 2022.
- King's College committees: Audit and Scrutiny Committee, Buildings and Safety Committe, Concerts Committee.
- REF committee, 2019.
- Research strategy committee, Cambridge, from 2015.
- 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.

Curriculum Vitae

Service to the wider community

- Editorial boards: *Journal of Algebraic Geometry*, *Journal of Topology*, *Geometry & Topology*, *Mathematical Proceedings of the Cambridge Philosophical Society*.
- Algebraic and Complex Geometry Sectional committee member for the 2018 ICM.
- Royal Society Sectional Committee for Mathematics, 2018–2020.
- Royal Society University Research Fellowship selection committee, from 2020.
- London Mathematical Society Publications Nominating Group, 2015–2018.
- Member of the London School for Geometry and Number Theory Centre for Doctoral Training steering committee.

Recently funded grants

- ERC Advanced Grant, EUR 2,434,492, 2021-2026.
- EPSRC Programme Grant, GBP 2,171,099, 2016-2021.
- 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.

Curriculum Vitae

- [1] “The Distribution of Bidegrees of Smooth Surfaces in $\mathrm{Gr}(1, \mathbf{P}^3)$,” *Math. Ann.* **292**, (1992) 127–147.
- [2] “Surfaces of Bidegree $(3, n)$ in $\mathrm{Gr}(1, \mathbf{P}^3)$,” *Math. Zeitschrift*, **212**, 73–106 (1993).
- [3] “Surfaces of Degree 10 in $\mathrm{Gr}(1, \mathbf{P}^3)$,” *Crelle’s Journal*, **436**, (1993) 87–127.
- [4] With E. Arrondo, “On Smooth Surfaces in $\mathrm{Gr}(1, \mathbf{P}^3)$ 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 Fibra-tions,” *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.

Curriculum Vitae

- [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.

Curriculum Vitae

- [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,” *Surveys in differential geometry 2016. Advances in geometry and mathematical physics*, 95–138, *Surv. Differ. Geom.* **21**, Int. Press, Somerville, MA, 2016.
- [45] With L. Katzarkov and H. Ruddat, “Towards mirror symmetry of general type,” *Advances in Mathematics*, **308** (2017), 208–275.
- [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, Sommerville, MA, 2013.
- [48] With V. Tosatti and Y. Zhang, “Gromov-Hausdorff collapsing of Calabi-Yau manifold,” *Comm. Anal. Geom.* **24** (2016), 93–113.
- [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,” Proceedings of the International Congress of Mathematicians—Seoul 2014. Vol. II, 723–744, Kyung Moon Sa, Seoul, 2014.
- [51] With P. Hacking, S. Keel, and M. Kontsevich, “Canonical bases for cluster algebras,” *J. Amer. Math. Soc.*, **31** (2018), 497–608.
- [52] With D. Matessi, “On homological mirror symmetry of toric Calabi-Yau threefolds,” *J. Symplectic Geometry*, **16** (2018), 1249–1349.
- [53] With M. Cheung, G. Muller, G. Musiker, D. Rupel, S. Stella, H. Williams, “The greedy basis equals the theta basis: a rank two haiku,” *J. Combin. Theory Ser. A*, **145** (2017), 150–171.

Curriculum Vitae

- [54] With P. Hacking, S. Keel and B. Siebert, “Theta functions on varieties with effective anti-canonical divisor,” *Memoirs of the AMS*, No. 1367, 2022.
- [55] With B. Siebert, “Intrinsic mirror symmetry and punctured Gromov-Witten invariants,” in *Algebraic geometry: Salt Lake City 2015*, 199–230, Proc. Sympos. Pure Math., 97.2, Amer. Math. Soc., Providence, RI, 2018.
- [56] With D. Abramovich, Q. Chen, B. Siebert, “Decomposition of degenerate Gromov-Witten invariants,” *Compos. Math.* **156** (2020), 2020–2075.
- [57] With B. Siebert, “Intrinsic mirror symmetry,” preprint, 2019, 153 pages.
- [58] With P. Hacking, S. Keel, B. Siebert, “The mirror of the cubic surface,” *London Math. Soc. Lecture Note Ser.*, **478**, Cambridge University Press, Cambridge, 2022, 150–182.
- [59] With V. Tosatti, Y. Zhang, “Geometry of twisted Kähler-Einstein metrics and collapsing,” *Comm. Math. Phys.* **380** (2020), 1401–1438.
- [60] With D. Abramovich, Q. Chen, B. Siebert, “Punctured Gromov-Witten invariants”, preprint, 2020, 99 pages.
- [61] With H. Argüz, “The higher dimensional tropical vertex,” *Geom. Topol.*, **26** (2022), 2135–2235.
- [62] With B. Siebert, “The canonical wall structure and intrinsic mirror symmetry,” *Inv. Math.*, **229**, (2022) 1101–1202.
- [63] With T. Kelly, R. Tessler, “Mirror symmetry for open r -spin invariants,” *Pure Appl. Math. Q.* **20** (2024), 1005–1024.
- [64] With T. Kelly, R. Tessler, “Open FJRW theory and mirror symmetry”, preprint, 2022, 140 pages.
- [65] “Remarks on gluing punctured logarithmic maps,” preprint, 2023, 58 pages.
- [66] With P. Hacking, S. Keel, B. Siebert, “Theta functions for K3 surfaces,” in preparation, currently 200 pages.