Jim Bryan

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EDUCATION:

Harvard University, Cambridge, Massachusetts.
Received Ph.D. and Masters degrees in Mathematics under Cliff Taubes in 1994.

Stanford University, Palo Alto, California.
Received B.S. with Honors and Distinction in 1989.

POSITIONS:

University of British Columbia, Vancouver, British Columbia.
Professor, July 2006–Present.
Associate Professor, July 2002–June 2006.
Assistant Professor, July 2001–June 2002.

Tulane University, New Orleans, Louisiana.
Assistant Professor, July 1997–June 2001. On leave 1997–1998.

University of California, Berkeley, California.
Ford Foundation Postdoctoral Fellow, July 1997–June 1998.

Mathematical Sciences Research Institute,
Berkeley, California.
Postdoctoral Fellow, July 1996–June 1997.

University of California, Irvine, California.
Presidential Postdoctoral Fellow, Sept 1994–June 1996.

GRANTS AND AWARDS:

Simons Visiting Professorship, MSRI 2018
Elected to be a Fellow of the American Mathematical Society, 2017
Visiting Professorship, Bernoulli Institute, EPFL, 2016
NSERC Accelerator Suppliment, 2012-2015
Miller Institute Visiting Professor, 2009–2010.
Killiam Research Fellowship, 2009.
P.I. for NSERC discovery grants, 2002–present.
Clay Mathematics Institute Emissary, 2000.
P.I. for NSF grant DMS-0072492, 2000–2003.
Alfred P. Sloan Research Fellowship, 1999–2003.
P.I. for NSF grant DMS-9802612, 1998–2000.
Ford Foundation Postdoctoral Fellowship, 1997–1998.
M.S.R.I. Postdoctoral Fellowship, 1996–1997.
U.C. Presidential Postdoctoral Fellowship, 1994–1996.
Harvard Departmental Dissertation Fellowship, 1993–1994.
NSF Graduate Fellowship, 1989–1992.
Undergraduate Research Grant, Stanford University, 1989.

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Publications

[1] Jim Bryan and Adam Gyenge. G-fixed Hilbert schemes on $K3$ surfaces, modular forms, and eta products. arxiv.org/abs/1907.01535.

[2] Jim Bryan. The Donaldson-Thomas partition function of the banana manifold. *Algebr. Geom.*, 8(2):133–170, 2021. With an appendix coauthored with Stephen Pietromonaco. arXiv:math/1902.08695.

[3] Jim Bryan and Georg Oberdieck. CHL Calabi-Yau threefolds: curve counting, Mathieu moonshine and Siegel modular forms. *Commun. Number Theory Phys.*, 14(4):785–862, 2020. arXiv:math/1811.06102.

[4] Jim Bryan, Samuel Leutheusser, Zinovy Reichstein, and Mark Van Raamsdonk. Locally Maximally Entangled States of Multipart Quantum Systems. *Quantum*, 3:115, January 2019. arXiv:math/1801.03508.

[5] Jim Bryan, Zinovy Reichstein, and Mark Van Raamsdonk. Existence of locally maximally entangled quantum states via geometric invariant theory. *Ann. Henri Poincaré*, 19(8):2491–2511, 2018. arXiv:math/1708.01645.

[6] Jim Bryan and Martijn Kool. Donaldson–Thomas Invariants of Local Elliptic Surfaces via the Topological Vertex. *Forum Math. Sigma*, 7:e7, 45, 2019. arXiv:math/1608.07369.

[7] Jim Bryan, Martijn Kool, and Benjamin Young. Trace identities for the topological vertex. *Selecta Math. (N.S.)*, 24(2):1527–1548, 2018. arXiv:math/1603.05271.

[8] Jim Bryan, Georg Oberdieck, Rahul Pandharipande, and Qizheng Yin. Curve counting on abelian surfaces and threefolds. *Algebr. Geom.*, 5(4):398–463, 2018. arXiv:math/1506.00841.

[9] Jim Bryan. The Donaldson-Thomas theory of $K3 \times E$ via the topological vertex. volume 14 of *Abel Symp.*, pages 35–64. Springer, Cham, 2018. arXiv:math/1504.02920.

[10] Jim Bryan and David Steinberg. Curve counting invariants for crepant resolutions. *Trans. Amer. Math. Soc.*, 368(3):1583–1619, 2016. arXiv:math/1208.0884.

[11] Jim Bryan and Andrew Morrison. Motivic classes of commuting varieties via power structures. *J. Algebraic Geom.*, 24(1):183–199, 2015. arXiv:math/1206.5864.

[12] Kai Behrend, Jim Bryan, and Balázs Szendrői. Motivic degree zero Donaldson-Thomas invariants. *Invent. Math.*, 192(1):111–160, 2013. arXiv:math/0909.5088.

[13] Jim Bryan, Charles Cadman, and Ben Young. The orbifold topological vertex. *Adv. Math.*, 229(1):531–595, 2012. arXiv:math/1008.4205.

[14] Ben Young and Jim Bryan. Generating functions for colored 3D Young diagrams and the Donaldson-Thomas invariants of orbifolds. *Duke Math. J.*, 152(1):115–153, 2010. arXiv:math/0802.3948.

[15] Jim Bryan and Amin Gholampour. BPS invariants for resolutions of polyhedral singularities. *Selecta Math. (N.S.)*, 15(4):521–533, 2009.

[16] Jim Bryan and Amin Gholampour. The Quantum McKay correspondence for polyhedral singularities. *Inventiones Mathematicae*, 178(3):655–681, 2009. arXiv:0803.3766.

[17] Jim Bryan and Amin Gholampour. Root systems and the quantum cohomology of ADE resolutions. *Algebra and Number Theory*, 2(4):369–390, 2008. arXiv:0707.1337.

[18] Jim Bryan and Amin Gholampour. Hurwitz-Hodge integrals, the E_6 and D_4 root systems, and the Crepant Resolution Conjecture. *Advances in Mathematics*, 221(4):1047–1068, 2009. arXiv:0708.4244.

[19] Jim Bryan and Tom Graber. The crepant resolution conjecture. In *Algebraic Geometry—Seattle 2005*, volume 80 of *Proc. Sympos. Pure Math.*, pages 23–42. Amer. Math. Soc., Providence, RI, 2009. arXiv: math.AG/0610129.

[20] Jim Bryan, Tom Graber, and Rahul Pandharipande. The orbifold quantum cohomology of $\mathbf{C}^2/\mathbf{Z}_3$ and Hurwitz-Hodge integrals. *J. Algebraic Geom.*, 17(1):1–28, 2008. arXiv version:math.AG/0510335.

[21] Kai Behrend and Jim Bryan. Super-rigid Donaldson-Thomas invariants. *Mathematical Research Letters*, 14(4):559–571, 2007. arXiv version: math.AG/0601203.

[22] Jim Bryan and Rahul Pandharipande. The local Gromov-Witten theory of curves. *Journal of the American Mathematical Society*, 21:101–136, 2008. arXiv:math.AG/0411037.

[23] Jim Bryan and Rahul Pandharipande. On the rigidity of stable maps to Calabi-Yau threefolds. In Jim Bryan and David Auckly, editors, *The interaction of finite type and Gromov-Witten invariants*, volume 8 of *Geometry & Topology Monographs*, 2006. Held in BIRS, Banff, November 15–20, 2003.

[24] Jim Bryan and Dagan Karp. The closed topological vertex via the Cremona transform. *Journal of Algebraic Geometry*, 14:529–542, 2005. arXiv version math.AG/0311208.

[25] Jim Bryan and Rahul Pandharipande. Curves in Calabi-Yau 3-folds and Topological Quantum Field Theory. *Duke Mathematical Journal*, 126(2):369–396, 2005. Preprint version: math.AG/0306316.

[26] Jim Bryan and Ron Donagi. Surface bundles over surfaces of small genus. *Geom. Topol.*, 6:59–67 (electronic), 2002.

[27] Jim Bryan, Ron Donagi, and Andras Stipsicz. Surface bundles: some interesting examples. *Turkish J. Math.*, 25(1):61–68, 2001. Proceedings of the 7^{th} Gökova Geometry and Topology conference.

[28] Jim Bryan and Rahul Pandharipande. BPS states of curves in Calabi-Yau 3-folds. *Geom. Topol.*, 5:287–318 (electronic), 2001. arXiv: math.AG/0009025.

[29] Jim Bryan. Multiple cover formulas for Gromov-Witten invariants and BPS states. In *Proceedings of the Workshop "Algebraic Geometry and Integrable Systems related to String Theory" (Kyoto, 2000)*, number 1232, pages 144–159, 2001.

[30] Jim Bryan. Evidence for a conjecture of Pandharipande. *Turkish J. Math.*, 26(1):69–73, 2002. Proceedings of the 8^{th} Gökova Geometry and Topology conference.

[31] Jim Bryan, Sheldon Katz, and Naichung Conan Leung. Multiple covers and the integrality conjecture for rational curves in Calabi-Yau threefolds. *J. Algebraic Geom.*, 10(3):549–568, 2001. Preprint version: math.AG/9911056.

[32] Jim Bryan, Ron Donagi, and Naichung Conan Leung. G-bundles on abelian surfaces, hyperkähler manifolds, and stringy Hodge numbers. *Turkish J. Math.*, 25(1):195–236, 2001. Preprint version: math.AG/0004159.

[33] Jim Bryan and Naichung Conan Leung. The enumerative geometry of $K3$ surfaces and modular forms. *J. Amer. Math. Soc.*, 13(2):371–410, 2000.

[34] Jim Bryan and Naichung Conan Leung. Counting curves on irrational surfaces. In *Surveys in differential geometry: differential geometry inspired by string theory*, volume 5 of *Surv. Differ. Geom.*, pages 313–339. Int. Press, Boston, MA, 1999.

[35] Jim Bryan and Naichung Conan Leung. Generating functions for the number of curves on abelian surfaces. *Duke Math. J.*, 99(2):311–328, 1999.

[36] Jim Bryan and Jason Fulman. Orbifold Euler characteristics and the number of commuting m-tuples in the symmetric groups. *Ann. Comb.*, 2(1):1–6, 1998.

[37] Jim Bryan. Seiberg-Witten theory and $\mathbf{Z}/2^p$ actions on spin 4-manifolds. *Math. Res. Lett.*, 5(1-2):165–183, 1998.

[38] Jim Bryan. Seiberg-Witten à la Furuta and genus bounds for classes with divisibility. *Turkish J. Math.*, 21(1):55–59, 1997.

[39] Jim Bryan and Marc Sanders. Instantons on S^4 and $\overline{\mathbf{CP}}^2$, rank stabilization, and Bott periodicity. *Topology*, 39(2):331–352, 2000.

[40] Jim Bryan and Marc Sanders. The rank stable topology of instantons of $\overline{\mathbf{CP}}^2$. *Proc. Amer. Math. Soc.*, 125(12):3763–3768, 1997.

[41] Jim Bryan. Symplectic geometry and the relative Donaldson invariants of $\overline{\mathbf{CP}}^2$. *Forum Math.*, 9(3):325–365, 1997.

[42] C. H. Taubes and J. Bryan. Donaldson-Floer theory. In *Gauge theory and the topology of four-manifolds (Park City, UT, 1994)*, pages 195–221. Amer. Math. Soc., Providence, RI, 1998.

[43] James A. Bryan and Richard Wentworth. The multi-monopole equations for Kähler surfaces. *Turkish J. Math.*, 20(1):119–128, 1996.

[44] James A. Bryan, Sean M. Carroll, and Ted Pyne. Texture bestiary: from symmetry-breaking patterns to topological field configurations. *Phys. Rev. D (3)*, 50(4):2806–2818, 1994.

SERVICE:

On the Editorial Board of Geometry and Topology, 2005–present

Member of the Scientific Committee: Banff International Research Station. 2008-2010

Member of the Scientific Committee: Thematic Program on The Geometry of String Theory 2004-2005, Fields Institute for Mathematical Science.

Seminar and Conference Organizer:

- Organized the Gauge theory seminar 98-99 and the Geometry and Topology Inspired by Physics seminar 99-00.
- Organized 2000 Clifford Lectures Conference on "Lie Groups, Algebraic Geometry, and String Theory".
- Co-organized BIRS conference on String Theory and Mathematics, March 2003.
- Co-organized WAGS algebraic geometry conference, September 2003.
- Co-organized BIRS conference on Gromov-Witten and Finite type invariants, November, 2003.

- Organized UBC colloquium series, 2002–2003, 2003–2004.
- Co-organized session on Moduli of Curves and Gromov-Witten theory at the Seattle Summer Workshop in Algebraic Geometry, July, 2005.
- Co-organized BIRS conference on Algebraic Geometry inspired by Physics, October, 2005.
- Co-organized BIRS conference on Moduli spaces and combinatorics, July, 2006.
- Co-organized BIRS conference on The Moduli space of curves, March, 2008.
- Co-organized AMS special session on Algebraic-Geometry, Hawaii, March 2012
- Co-organized AIMS workshop on Donaldson-Thomas theory and singularities, Budapest, May 2012
- Organizer for a yearly job forum at PIMS for students and postdocs on the job market. October 2009-2013.
- Co-organized BIRS workshop on refined invariants, June 2013
- Organized PIMS summer school in Geometry and Physics, June 2014
- Co-organizing workshop on enumerative geomtry of curves and surfaces. Bernoulli institute, Laussane Switzerland June 2016.
- Co-organizing Fields Institute introductory workshop on Combinatorial Algebraic geometry, September 2016
- Co-organizing semester program MSRI, Spring 2018. Enumerative Geometry Beyond Numbers.

Current Students.

- Nina Morishige
- Stephen Pietromonoco

Former Students

- Nina Morishige, Ph.D. May 2021
- Oliver Leigh, Ph.D. May 2019
- Leo Tsu, Masters 2016
- Ehsan Kermani, Masters 2013
- Simon Rose, Ph.D. May 2012
- Andrew Morrison, Ph.D. May 2012
- David Steinberg, Ph.D. Nov 2012
- Ben Young, Ph.D. 2008
- Amin Gholampour, Ph.D. 2007
- Yinan Song, Ph.D. May 2006
- Dagan Karp, Ph.D. May 2005
- Lotte Hollands, Masters, Utrecht University 2004 (co-supervised with Robbert Dijkgraaf)
- Christoph Müller, Masters, Tulane University 2000
- Federico Zahariev, Masters, Tulane University 1999

Past Postdocs.

- Alex Weekes, 2019–2021
- Dylan Allegretti, 2019–2021
- Ming Zhang, 2019–2021
- Adam Gyenge, 2016–2018
- Clemens Koppensteiner, 2015-2017
- Mattia Talpo, 2015-2016
- Nicolo Sibilla, 2014-2016
- Martijn Kool, 2013-2014
- David Steinberg, 2012-2013
- Artan Sheshmani, 2011-2012
- Jonathan Wise, 2009–2011
- Zheng Hua, 2009–2011
- Mike Rose 2007–2008
- Chuck Cadman 2007–2009
- Hsian-Hua Tseng (PIMS postdoc) 2005–2007
- Jacob Shapiro (PIMS postdoc) 2003–2006
- Anca Mustata 2003-2005
- Andrei Mustata 2003-2005