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AREAS OF INTEREST

Algebraic Geometry, Enumerative Geometry, String Theory, Homological Algebra

POSITIONS HELD

Eisenbud Endowed Professor <i>SLMath (formerly MSRI) distinguished research professor</i>	Spring 2024
Vilas Associate Research Professor <i>Named professor, University of Wisconsin-Madison, WI</i>	2020-2022
Professor <i>University of Wisconsin-Madison, WI</i>	2012---present
Visiting Invited Professor <i>Max Planck Institute for Mathematics, Bonn, Germany</i>	Fall 2012
Tenured Associate Professor <i>University of Wisconsin-Madison, WI</i>	2008---2012
Tenure Track Assistant Professor <i>University of Wisconsin-Madison, WI</i>	2005---2008

EDUCATION

Ph.D. (Mathematics) <i>Cornell University, Ithaca, NY</i> Areas of interest: algebraic geometry, string theory.	May 2000
Master of Science (Computer Science) <i>Cornell University, Ithaca, NY</i> Concentrations: theoretical computer science and cryptography.	May 2000
Bachelor of Science (Mathematics and Computer Science) <i>Hebrew University, Jerusalem, Israel</i> Graduated Summa Cum Laude with a double major in mathematics and computer science.	July 1993

PH. D. THESIS

Derived categories of twisted sheaves on Calabi-Yau manifolds
(Cornell University, 2000)

Thesis advisor: Dr. Mark Gross (currently Professor at Cambridge University, England)

AWARDS	NSF Research Grant 2202365 (\$150,000)	2022—2025
	NSF Focused Research Groups Grant 2152088 (\$341,413) <i>Collaborative research between UW-Madison, University of Chicago, Northwestern University, University of California-Berkeley, and University of Washington-Seattle</i>	2022—2025
	Vilas Associate Research Professorship (\$75,000) <i>Named professorship.</i>	2020—2022
	NSF Research Grant 1811925 (\$250,000)	2018—2022
	University of Wisconsin Graduate School Grant (\$23,466) <i>Provides summer salary and graduate student support</i>	2018
	Short term visitor, Institute for Advanced Studies <i>“Homological Mirror Symmetry” special year program.</i>	Fall 2016
	Honorary foreign member, Geometry and Physics group <i>GAP group of the Romanian Academy of Sciences</i>	Fall 2015—present
	University of Wisconsin Graduate School Grant (\$17,000)	Summer 2016
	NSF Research Training Groups Grant 1502553 (\$2,000,000) <i>Algebraic Geometry, Number Theory and Applied Algebra</i> <i>co-PI with Nigel Boston.</i>	2015-2020
	NSF Research Grant 1200721 (\$220,178)	2012—2018
	NSA Mathematical Sciences Program <i>Standard Research Grant (awarded, unable to accept due to conflict with NSF).</i>	2012
	NSF Research Training Groups Grant 0838210 (\$1,297,349) <i>Algebraic Geometry and Number Theory at the University of Wisconsin</i> <i>co-PI with Jordan Ellenberg.</i>	2011-2014
	NSF Research Grant 0901224 (\$216,342)	2009-2012
	University of Wisconsin Graduate School Grant <i>Research grant (awarded, unable to accept due to conflict with NSF).</i>	2009
	NSF Research Grant 0556042 (\$257,926)	2006-2009
	NSF Postdoctoral Research Fellowship 0202567 (\$108,000)	2002-2005
	Intel Prize <i>Awarded to outstanding students at the Hebrew University.</i>	Summer 1993
	Amirim Fellowship <i>Hebrew University, Jerusalem, Israel</i>	1991-1993
	Silver Medal, International Computer Science Olympiad <i>Part of Romania’s team at the second International Computer Science Olympiad held in Minsk, USSR.</i>	Spring 1990

PUBLICATIONS

1. HAE is easy for CEI

(with Yunfan He and Junwu Tu), 10pp, to be submitted

2. Effective algorithms for enumerating ribbon graphs

to be submitted to SIAGA

3. The $g=2$ categorical Gromov-Witten invariants of elliptic curves

(with Weng-Him Cheung and Yunfan He), in preparation

4. Constructing the topological field theory associated to a cyclic A_∞ algebra,

(with Weng-Him Cheung), preprint

5. On the cohomology of the Bridgeland differential

(with Dima Arinkin), in preparation

6. An HKR decomposition for Azumaya orbifolds

(with Dima Arinkin), in preparation

7. Effective categorical enumerative invariants

(with Junwu Tu), 76pp, arXiv:2404.01499, submitted

8. Moonshine at Landau-Ginzburg points

(with Yunfan He and Shengyuan Huang), to appear, Proc. AMS, 7pp, (arXiv:2107.12405)

9. The cup product in orbifold Hochschild cohomology

(with Shengyuan Huang), to appear, Advances in Math., 33pp, (arXiv:2101.06276)

10. Categorical enumerative invariants, I: string vertices

(with Kevin Costello and Junwu Tu), now part of paper 7 above, (arXiv:2009.06673), 35pp

11. Categorical enumerative invariants, II: Givental formula

(with Junwu Tu), now part of paper 7 above, (arXiv:2009.06659), 55pp

12. Categorical primitive forms and Gromov-Witten invariants of A_n singularities

(with Si Li and Junwu Tu), Internat. Math. Res. Notices, rnz315 (2019)

13. Computing a categorical Gromov-Witten invariant

(with Junwu Tu), Compos. Math. 156 (2020), no. 7, 1275-1309

14. On intersections of two Grassmannians in \mathbb{P}^9

(with Lev Borisov and Alex Perry), J. reine angew. Math., doi:10.1515/crelle-2018-0014

15. GLSM realizations of maps and intersections of Grassmannians and Pfaffians

(with Johanna Knapp and Eric Sharpe), J. High Energ. Phys. (2018) 2018: 119

16. Formality of derived intersections and the orbifold HKR isomorphism

(with Dima Arinkin and Márton Hablicsek), J. Algebra (2019), (arXiv:1412.5233), 23pp

17. The Hodge theorem as a derived self-intersection

(with Dima Arinkin and Márton Hablicsek) Algebraic Geometry 4 (2017), 394-423

18. On the Lie algebroid of a derived self-intersection

(with Damien Calaque and Junwu Tu), Adv. in Math. 262 (2014), 751-783

19. Curved A_∞ algebras and Landau-Ginzburg models

(with Junwu Tu), New York J. Math. 19 (2013), 305-342

20. PBW for an inclusion of Lie algebras

(with Damien Calaque and Junwu Tu), J. Algebra 378 (2013), 64-79

**PUBLICATIONS
(CONT'D)**

- 21. When is the self-intersection of a subvariety a fibration?**
(with Dima Arinkin), Adv. in Math., 231 (2012), no. 2, 815-842
- 22. Non-birational twisted derived equivalences in abelian GLSMs**
(with Jacques Distler, Simeon Hellerman, Tony Pantev and Eric Sharpe)
Communications in Mathematical Physics 294 (2010), no. 3, 605-645
- 23. The Mukai pairing, I: a categorical approach**
(with Simon Willerton), New York J. of Math., no. 16 (2010), 61-98
- 24. The Pfaffian-Grassmannian derived equivalence**
(with Lev Borisov), J. Algebraic Geom. 18 (2009) 201-222
- 25. Non-birational Calabi-Yau threefolds that are derived equivalent**
Internat. J. Math. 18 (2007), No. 5, 491-504
- 26. Derived categories: a skimming**
Snowbird Lectures in Algebraic Geometry, Contemporary Math., no. 388 (2005), 43-75
- 27. The Mukai pairing, II: the Hochschild-Kostant-Rosenberg isomorphism**
Adv. in Math., 194 (2005), no. 1, 34-66
- 28. The Mukai pairing, I: the Hochschild structure**
preprint math.AG/0308079, superseded by paper 12. above
- 29. Algebraic deformations arising from orbifolds with discrete torsion**
(with Anthony Giaquinto, Sarah Witherspoon)
J. Pure Appl. Algebra, **187** (2004), no. 1-3, 51-70
- 30. D-Branes, B-fields, and Ext groups**
(with Sheldon Katz, Eric Sharpe), Adv. Theor. Math. Phys., 7 (2003), no. 3, 381-404
- 31. Fiberwise stable bundles on elliptic fibrations with relative Picard number one**
CR Acad. Sci. Paris Ser. I, 334 (2002), no. 6, 469-472
- 32. Non-fine moduli spaces of sheaves on K3 surfaces**
Internat. Math. Res. Notices 2002 (2002), no. 20, 1027-1056
- 33. Derived categories of twisted sheaves on elliptic threefolds**
J. reine angew. Math. (Crelle's Journal) 544 (2002), 161-179
- 34. Derived categories of twisted sheaves on Calabi-Yau manifolds**
Ph.D. thesis, Cornell University (2000)

**PUBLICATIONS
COMPLETED BY
PH.D.
STUDENTS
UNDER
SUPERVISION**

- 1. Shengyuan Huang, Functoriality of HKR isomorphisms**, preprint, arXiv:2002.00017
- 2. Nicolas Addington, Spinor sheaves on singular quadrics**, Proc. Amer. Math. Soc. 139 (2011), no. 11, 3867-3879
- 3. Nicolas Addington, The Derived Category of the Intersection of Four Quadrics**, preprint arXiv:0904.1764
- 4. Junwu Tu, Matrix factorizations via Koszul duality**, preprint arXiv:1009.4151

CONFERENCES ORGANIZED	FRG Workshop on Categorical Enumerative Invariants (main organizer, with FRG members), <i>University of Wisconsin-Madison</i>	Spring 2025
	FRG Workshop on Brauer Groups and Derived Categories (with Benjamin Antieau and FRG members), <i>Northwestern University</i>	October 2023
	AMS Sectional Meeting on Categorical Enumerative Invariants (with Junwu Tu) <i>University of Wisconsin-Madison, Madison, WI</i>	September 2019
	Categorical Gromov-Witten Invariants (with R. Pandharipande and N. Sheridan) <i>ETH Zürich, Switzerland</i>	January 2019
	Homological Methods in Algebraic Geometry (with Dima Arinkin) <i>University of Wisconsin, Madison</i>	April 2014
	Mirror Symmetry in the Midwest (with Yong-Geun Oh) <i>University of Wisconsin, Madison</i>	November 2012
SELECTED INVITED LECTURES	Midwest Algebraic Geometry Graduate Conference <i>University of Wisconsin, Madison</i>	October 2010
	Mini-course at Simons Center for Geometry and Physics) (week-long lecture series on categorical enumerative invariants) <i>SCGP, Stonybrook, NY</i>	January 2025
	Algebraic geometry seminar <i>University of California at Santa Barbara</i>	March 2024
	Tenth congress of Romanian mathematicians <i>University of Pitești, Romania</i>	June 2023
	Categorical and enumerative aspects of mirror symmetry (a tribute to the life and work of Professor Bumsig Kim) <i>KLAS, Seoul, South Korea</i>	September 2022
	String-Math <i>University of Warsaw, Poland</i>	July 2022
	Geometry of GLSMs <i>University of Birmingham, England</i>	June 2022
	Derived categories and moduli spaces <i>Cornell University, Ithaca NY</i>	April 2022
	Derived algebraic geometry <i>BIRS, Banff, Canada</i>	November 2021
	Categorical Enumerative Invariants (5 lectures) <i>Imperial College, London, UK (online)</i>	September 2020
	Higher structures in geometry and physics <i>Fields Institute, Toronto, Canada</i>	November 2019
	Geometry and algebra of Landau-Ginzburg models <i>Fields Institute, Toronto, Canada</i>	September 2019
	AMS Sectional meeting <i>University of Wisconsin, Madison, WI</i>	September 2019
	Algebraic Geometry seminar <i>University of Edinburgh</i>	July 2019

**INVITED
LECTURES
(CONT'D)**

Derived categories and geometry in positive characteristic <i>IMPAN, Warsaw, Poland</i>	June 2019
Ninth congress of Romanian mathematicians <i>Galati, Romania</i>	June 2019
Derived categories and related topics conference <i>Sun-Yat Sen University, Guangzhou, China</i>	May 2019
AGNES (Algebraic Geometry in the Northeast) <i>University of Massachusetts-Amherst</i>	March 2019
Categorical Gromov-Witten invariants (series of four lectures) <i>ETH, Zürich, Switzerland</i>	January 2019
Algebraic Geometry seminars <i>Stanford University, Virginia Tech University, Cornell University</i>	April-October 2018
Spring School “Categorical Gromov-Witten invariants” (lead) <i>Castello di Montegufoni, Italy</i>	March 2018
Algebraic Geometry Seminar <i>RIMS (Research Institute in Mathematical Sciences), Kyoto, Japan</i>	November 2017
Math-String Seminar <i>IPMU (Institute for the Physics and Mathematics of the Universe), Tokyo, Japan</i>	November 2017
Algebraic Geometry Seminar <i>Northwestern University, Evanston, IL</i>	November 2017
AMS Sectional Meeting <i>University at Buffalo, Buffalo, NY</i>	September 2017
Enumerative Geometry, Mirror Symmetry, and Physics <i>University of Illinois at Urbana-Champaign</i>	July 2017
Symplectic Geometry Seminar <i>Institute for Advanced Studies, Princeton, NJ</i>	April 2017
Winter school “Higher Categories and TQFT” (primary lecturer) <i>KLAS, South Korea</i>	December 2016
I-70 Algebraic Geometry Symposium (plenary speaker) <i>University of Missouri, Columbia</i>	November 2016
Workshop on String/M-theory <i>Fields Institute, Toronto, Canada</i>	August 2016
Interacting Algebraic Geometry <i>Institut de Mathématiques de Bourgogne, Dijon, France</i>	July 2016
Factorization Algebras and Functorial Field Theory <i>Mathematisches Forschungsinstitut Oberwolfach, Germany</i>	May 2016
Algebraic Geometry seminar <i>Northeastern University, Boston, MA</i>	November 2015
AMS Sectional Meeting <i>Loyola University, Chicago, IL</i>	October 2015
AMS Summer Institute in Algebraic Geometry <i>University of Utah, Salt Lake City, UT</i>	July 2015

**INVITED
LECTURES
(CONT'D)**

Eighth Congress of Romanian Mathematicians <i>Iasi, Romania</i>	July 2015
GAP XIII, Derived Geometry conference <i>IBS Center for Geometry and Physics, Pohang, Korea</i>	July 2015
Algebraic Geometry seminar <i>Hebrew University, Jerusalem, Israel</i>	June 2015
Spring Eastern regional AMS conference <i>Georgetown University, Washington, DC</i>	March 2015
Mathematics Inspired by String Theory <i>Tsinghua Sanya Mathematical Forum, Sanya, China</i>	December 2014
Higher Structures in Philadelphia conference <i>Temple University, Philadelphia, PA</i>	August 2014
Algebraic Geometry Summer Days <i>Institute of Mathematics of the Romanian Academy, Bucharest, Romania</i>	June 2014
Deformation Theory and Topology seminars <i>University of Pennsylvania and New York University</i>	April 2014
Geometry Seminar <i>University of British Columbia, Vancouver, Canada</i>	March 2014
Algebraic Analysis and Deformation Quantization conference <i>University of Padova, Padova, Italy</i>	February 2014
Higher Categories and Topological Field Theories conference <i>Erwin Schrödinger Institute, Vienna, Austria</i>	June 2013
Moduli Spaces and their Invariants in Mathematical Physics <i>Centre de Recherche Mathématiques, Montréal, Canada</i>	June 2013
Cornell-PSU Symplectic Geometry seminar <i>Penn State University, State College, PA</i>	April 2013
Various Geometry Seminars <i>ETH Zurich, EPFL Lausanne, Oxford University, Max Planck Institute Bonn, University of Amsterdam, IMAR Bucharest</i>	Sept-Dec 2012
Syzygies in Algebraic Geometry, with an exploration of a Connection with String Theory <i>Banff International Research Station, Banff, Canada</i>	August 2012
Spring School on Algebraic Microlocal Analysis <i>Northwestern University, Evanston, IL</i>	May 2012
Colloquium and Algebra Seminar <i>University of Maryland, College Park, MD</i>	May 2012
Conference in Honor of Ragnar-Olaf Buchweitz <i>University of Syracuse, Syracuse, NY</i>	April 2012
Hyperkahler and holomorphic symplectic geometry <i>BIRS, Banff, Canada</i>	March 2012
Algebraic Geometry Seminar <i>Princeton University, Princeton, NJ</i>	February 2012

INVITED LECTURES (CONT'D)	Algebraic Analysis Seminar <i>Université Paris 7, Paris, France</i>	November 2011
	Colloquium and Algebraic Geometry Seminar <i>University of Utah, Salt Lake City, UT</i>	October 2011
	Seventh International Congress of Romanian Mathematicians <i>Brasov, Romania</i>	August 2011
	The Legacy of Deformation Quantization <i>ETH, Ascona, Switzerland</i>	July 2011
	Loop Algebras, Groups, and Spaces <i>CIRM Luminy, Marseille, France</i>	June 2011
GRADUATE AND POSTDOC ADVISING	Graduate Students	
	Nicolas Addington – Ph.D. received 12/2009, Associate Professor, University of Oregon Junwu Tu – Ph.D. received 08/2011, Professor, ShanghaiTech University, Shanghai, China Márton Hablicsek – Ph.D. received 06/2014, tenure-track professor, University of Leyden Ahmet Kabakulak – Ph.D. received 06/2017, currently at Amazon.com Shengyuan Huang – Ph.D. received 06/2021, post-doc, University of Birmingham David Wagner – Ph.D. received 06/2021 Weng-Him Cheung – Ph.D. received 08/2022 Yunfan He – Ph.D. expected 06/2024 Alex Menzia – Ph.D. expected 06/2027	
TEACHING EXPERIENCE	Postdocs Advised and Current Position	
	Sukhendu Mehrotra (2009-2011), Professor, Chennai Mathematical Institute Matthew Ballard (2011-2013), Associate Professor, University of South Carolina Parker Lowrey (UW-Madison, 2013-2014), Senior Data Scientist, Activision Alexander Pavlov (2016-2018) Michael Brown (2017-2020), tenure-track Auburn University, Auburn, AL	
	Lecture Series: Categorical enumerative invariants <i>Imperial College, London, UK</i>	September 2020
	Five lecture series presenting recent progress in the theory of categorical enumerative invariants.	
	Lead Lecturer: Categorical Gromov-Witten invariants <i>Castello di Montegufoni, Italy (organized by the University of Mainz)</i>	March 2018
	Along with Timothy Perutz, presented a five lecture series aimed at post-doctoral fellows and graduate students.	
	Lecture Series: Gromov-Witten Invariants of A_∞ Categories <i>Chinese University of Hong Kong, Hong Kong</i>	January 2010
	Presented a six lecture series aimed at post-doctoral fellows and graduate students.	
	Instructor <i>University of Pennsylvania school on Geometry of Quantum Fields and Strings</i>	June 2009
	One of the primary instructors for the summer school, which was aimed at introducing graduate students and post-doctoral fellows to advanced topics in string theory and mirror symmetry	
	Instructor <i>University of Utah summer school on Derived Categories</i>	June 2007
	One of the primary instructors for the summer school, which was aimed at introducing graduate students and post-doctoral fellows to advanced topics in derived categories and physics	

**TEACHING
EXPERIENCE
(CONT'D)**

Lead Instructor

2004

Lukecin fall school for advanced graduate students

One of two principal lecturers at the school, presenting six lectures introducing graduate students to current areas of research

SERVICE

Organizer

Algebraic Geometry Seminar – UW-Madison (2005 – present)

Putnam Club – UW-Madison 2009-2010

NSF Panel member

Evaluating proposals submitted to the NSF Algebra Section – 2008-2011, 2014, 2019-2020; Career proposals October 2017.

Referee

Various journals, including *Inventiones Mathematicae*, *Duke Mathematical Journal*, *Advances in Mathematics*, *Communications in Mathematical Physics*

Committee Member (UW-Madison)

Physical sciences divisional committee – 2013-2016, fall 2017, fall 2022

University senator – 2010-2012

Salary committee – 2013, 2014-2017 (chair), 2020-2021 (chair), 2023-2024 (chair)

Ad-hoc salary committee 2021-2022 (chair)

Awards committee – 2018-2019 (chair)

Budget committee – 2017-2018

Algebra caucus chair – 2014

Undergraduate program committee – 2005-2008

TA evaluation committee – 2011-2012

Director of computing search committee – 2011

Graduate and undergraduate advisor – 2011-2020

Graduate admissions committee – 2019-present