

Personal Data

Born in: Trieste, Italy on April 1981, Italian citizen, US permanent resident
Current address: Columbia University, Department of Mathematics, Rm 625, MC 4444
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Member of: American Mathematical Society, Unione Matematica Italiana, European Mathematical Society.

Employment

Joseph Fels Ritt Assistant Professor, Columbia University, 2009-present.

Education

University of Pisa, Italy 2000-2004
Italian Laurea on 10 June 2004, grade 110/110 *cum laude*

Scuola Normale Superiore of Pisa, Italy 2000-2004
Italian Diploma on 15 June 2004, grade 70/70 *cum laude*

Harvard University, USA 2004-2009
M.A. on 9 June 2005
Ph.D. on 4 June 2009, thesis title “Geometry of complex Monge-Ampère equations”
Advisor: Prof. Shing-Tung Yau

Awards and Grants

2011 Blavatnik Award for Young Scientists, given by the New York Academy of Sciences

Prize *Premio Giuseppe Bartolozzi* 2009, given by the Italian Mathematical Union

NSF Grant DMS-1005457, *Partial Differential Equations on Complex and Symplectic Manifolds*, July 2010 - June 2013.

Harvard Merit Fellowship 2007-2008

Prize *Premio Franco Triccerri* 2005, given by the Italian Mathematical Union

Research Interests

General research areas: Differential Geometry, Geometric Analysis, Complex Geometry, PDEs.

Some specific topics: Kähler Geometry, Calabi-Yau manifolds, complex Monge-Ampère equations, almost-complex, symplectic and Hermitian geometry, geometric flows.

Publications and Preprints

20. *On the evolution of a Hermitian metric by its Chern-Ricci form*
(with B. Weinkove), preprint 2012.
19. *Collapsing of abelian fibred Calabi-Yau manifolds*
(with M. Gross and Y. Zhang), preprint 2011.
18. *Calabi-Yau manifolds and their degenerations*
to appear in Ann. N.Y. Acad. Sci. 2012.
17. *Plurisubharmonic functions and nef classes on complex manifolds*
(with B. Weinkove), to appear in Proc. Amer. Math. Soc. 2012.
16. *The K-energy on small deformations of constant scalar curvature Kähler manifolds*
in *Advances in Geometric Analysis*, Adv. Lect. Math. (ALM) **21**, International Press, 2012.
15. *Kähler-Einstein metrics on Fano surfaces*
Expo. Math. 2011.
14. *Regularity of weak solutions of a complex Monge-Ampère equation*
(with G. Székelyhidi), Anal. PDE **4** (2011), no.3, 369-378.
13. *Degenerations of Calabi-Yau metrics*
Acta Phys. Polon. B Proc. Suppl. **4** (2011), no.3, 495–505.
12. *The Calabi-Yau equation on the Kodaira-Thurston manifold*
(with B. Weinkove), J. Inst. Math. Jussieu **10** (2011), no.2, 437–447.
11. *The Calabi-Yau equation, symplectic forms and almost complex structures*
(with B. Weinkove), in *Geometry and Analysis, Vol. I*, 475–493, Adv. Lect. Math. (ALM) **17**, International Press, 2011.
10. *The complex Monge-Ampère equation on compact Hermitian manifolds*
(with B. Weinkove), J. Amer. Math. Soc. **23** (2010), no.4, 1187-1195.
9. *Estimates for the complex Monge-Ampère equation on Hermitian and balanced manifolds*
(with B. Weinkove), Asian J. Math. **14** (2010), no.1, 19–40.
8. *Adiabatic limits of Ricci-flat Kähler metrics*
J. Differential Geom. **84** (2010), no.2, 427–453.
7. *Kähler-Ricci flow on stable Fano manifolds*
J. Reine Angew. Math. **640** (2010), 67–84.
6. *Limits of Calabi-Yau metrics when the Kähler class degenerates*
J. Eur. Math. Soc. (JEMS) **11** (2009), no.4, 755-776.
5. *Taming symplectic forms and the Calabi-Yau equation*
(with B. Weinkove and S.-T. Yau), Proc. London Math. Soc. **97** (2008), no.2, 401-424.
4. *A general Schwarz Lemma for almost-Hermitian manifolds*
Comm. Anal. Geom. **15** (2007), no.5, 1063-1086.
3. *The Calabi flow with small initial energy*
(with B. Weinkove), Math. Res. Lett. **14** (2007), no.6, 1033-1039.
2. *On the Critical Points of the E_k Functionals in Kähler Geometry*
Proc. Amer. Math. Soc. **135** (2007), no.12, 3985-3988.
1. *Explaining the uneven distribution of numbers in nature*
(with L. Pietronero, E. Tosatti, and A. Vespignani), Phys. A **293** (2001), 297-304

Fellowships and Visiting Positions

September-December 2003 - Visiting Fellow at the École Normale Supérieure of Paris, France.
September 2005 - Cooper-Siegel Graduate Student Fellowship Fund, Harvard University.
August 2006 - Juan Carlos Fellow, to attend the ICM 2006.

November 2006 - de Valpine Graduate Student Fellowship Fund, Harvard University.
April-May 2007 - Visiting Student at UCLA, USA
June-August 2007 - Visitor of the Morningside Center of Mathematics, Beijing, China.
July-August 2008 - Visitor of the Morningside Center of Mathematics, Beijing, China.
June 2010 - US Junior Oberwolfach Fellow, MFO Oberwolfach, Germany.
June-August 2011 - Visitor of the MSC, Tsinghua University, Beijing, China.

Invited Talks

1. ICTP, Trieste, Italy (Sept 2005), *Constant scalar curvature Kaehler metrics and geometric stability of polarized algebraic varieties*
2. Indian Institute of Science, Bangalore, India (July 2006), *Constant scalar curvature Kaehler metrics and the Calabi flow*
3. Chennai Mathematical Institute, Chennai, India (July 2006), *Constant scalar curvature Kaehler metrics and the Calabi flow*
4. Differential Geometry Seminar, Harvard University, USA (October 2006), *The Calabi flow with small initial energy*
5. Peking University, China (January 2007), *The Calabi flow with small initial energy*
6. ICTP, Trieste, Italy (March 2007), *The Calabi-Yau equation on symplectic manifolds*
7. Symposia on Analysis of Geometric Evolution, Austin, USA (May 2007), *The Calabi flow with small initial energy*
8. Morningside Center of Mathematics, Beijing, China (June 2007), Series of lectures *The Calabi-Yau equation on symplectic manifolds*
9. Lehigh University Geometry and Topology Conference, Lehigh University, USA (October 2007), *The Calabi-Yau equation on symplectic manifolds*
10. Ohio State University, USA (February 2008), *Kähler Degenerations of Calabi-Yau manifolds*
11. Geometric Evolution Equations, CRM, Montreal, Canada (April 2008), *The Calabi-Yau equation on symplectic manifolds*
12. Giornate di Geometria Algebrica ed Argomenti Correlati IX, Trento University, Italy (May 2008), *Degenerazioni di varietà Calabi-Yau*
13. School and Conference on Differential Geometry, ICTP, Trieste, Italy (June 2008), *The Calabi-Yau equation on symplectic manifolds*
14. London topology and geometry seminar, Imperial College, London (June 2008), *The Calabi-Yau equation on symplectic manifolds*
15. Ricci flow and related topics, IHP, Paris, France (June 2008), *The Calabi-Yau equation on symplectic manifolds*
16. ECNU Geometric Analysis Workshop, Shanghai, China (July 2008), *Kähler Degenerations of Calabi-Yau manifolds*
17. Differential Geometry Seminar, Harvard University, USA (October 2008), *Kähler-Ricci flow and stability*
18. AMS Eastern Section Meeting, Wesleyan University, USA (October 2008), *Degenerations of Calabi-Yau metrics*
19. Cornell University, USA (November 2008), *Kähler-Ricci flow and stability*
20. Johns Hopkins University, USA (November 2008), *Kähler-Ricci flow and stability*
21. Rutgers University, USA (November 2008), *Kähler-Ricci flow and stability*
22. MIT, USA (December 2008), *Kähler-Ricci flow and stability*
23. UC San Diego, USA (February 2009), *Kähler-Ricci flow and stability*
24. Differential Geometry Seminar, Harvard University, USA (March 2009), *Large Kähler limits of Calabi-Yau metrics*

25. Extremal Kähler metrics, BIRS, Canada (June 2009), *Degenerations of Calabi-Yau metrics*
26. CUNY, USA (September 2009), *Degenerations of Calabi-Yau metrics*
27. Complex Monge-Ampère Equation, BIRS, Canada (October 2009), *Complex Monge-Ampère equations on symplectic and Hermitian manifolds*
28. Complex Geometry: A Conference Honoring Simon Donaldson, Northwestern University, USA (October 2009), *Kähler-Ricci flow with bounded curvature*
29. Graduate Student Colloquium, Northwestern University, USA (October 2009), *The Calabi Conjecture*
30. AMS Western Section Meeting, UC Riverside, USA (November 2009), *Degenerations of Calabi-Yau metrics*
31. UC San Diego, USA (November 2009), *Collapsing of Ricci-flat metrics*
32. Lehigh University, USA (November 2009), *Complex Monge-Ampère equations on symplectic and Hermitian manifolds*
33. MIT, USA (November 2009), *Collapsing of Ricci-flat metrics*
34. Columbia Geometry and Analysis Seminar (February 2010), *The Calabi-Yau equation and symplectic 4-manifolds*
35. Princeton University, USA (April 2010), *Complex Monge-Ampère equations on symplectic and hermitian manifolds*
36. Ohio State University, USA (May 2010), *Collapsing of Ricci-flat metrics*
37. AMS Eastern Section Meeting, Newark, USA (May 2010), *Complex Monge-Ampère equations on compact manifolds*
38. MFO Oberwolfach, Germany (June 2010), *The Calabi-Yau equation on symplectic four-manifolds*
39. The Fifth Pacific Rim Complex and Symplectic Geometry Conference, Nagoya, Japan (July 2010), *The Calabi-Yau equation on symplectic four-manifolds*
40. Geometry and Physics in Cracow, Jagiellonian University, Poland (September 2010), *Degenerations of Calabi-Yau metrics*
41. Geometry/Topology Seminar, Duke University, USA (October 2010), *The Calabi-Yau equation on symplectic four-manifolds*
42. Geometry/Topology Seminar, SUNY Stony Brook, USA (October 2010), *How do Calabi-Yau manifolds degenerate?*
43. Geometry and Topology Seminar, UQAM, Montreal, Canada (December 2010), *How do Calabi-Yau manifolds degenerate?*
44. Colloquium, Northwestern University, USA (January 2011), *Symplectic forms and almost-complex structures in 4 dimensions*
45. Geometry and Physics Seminar, Northwestern University, USA (January 2011), *How do Calabi-Yau manifolds degenerate?*
46. Geometry Seminar, University of Texas, Austin, USA (February 2011), *Calabi-Yau manifolds and complex Monge-Ampère equations*
47. 18th Southern California Geometric Analysis Seminar, UC San Diego, USA (February 2011), *How do Calabi-Yau manifolds degenerate?*
48. Workshop on Extremal Kähler Metrics, Simons Center for Geometry and Physics, Stony Brook, USA (March 2011), *Degenerations of Calabi-Yau manifolds*
49. Differential Geometry Seminar, CUNY, USA (March 2011), *Symplectic forms and almost-complex structures in 4 dimensions*
50. Geometry Seminar, University of Michigan, USA (April 2011), *The Calabi-Yau equation on symplectic four-manifolds*
51. Complex Geometry and Analysis Seminar, Rutgers University, USA (April 2011), *The Calabi-Yau equation on symplectic 4-manifolds*
52. Università di Trieste, Italy (May 2011), *Degenerazioni di varietà Calabi-Yau*

53. ICTP, Trieste, Italy (May 2011), *How do Calabi-Yau manifolds degenerate?*
54. Capital Normal University, Beijing, China (June 2011), *The Calabi-Yau theorem for Hermitian manifolds*
55. Mathematical Sciences Center, Tsinghua University, Beijing, China (June-August 2011), Series of lectures *Topics in Kähler geometry*
56. Università di Pavia, Italy (September 2011), *Collapsing di varietà di Calabi-Yau fibrante in tori e simmetria speculare hyperkahleriana*
57. Geometric Structures in Mathematical Physics, Golden Sands, Bulgaria (September 2011), *Collapsing of abelian fibred Calabi-Yaus and hyperkähler mirror symmetry*
58. Geometric structures on complex manifolds, Laboratory of Algebraic Geometry, Moscow, Russia (October 2011), *Collapsing of abelian fibred Calabi-Yaus and hyperkähler mirror symmetry*
59. Colloquium, Northwestern University, USA (October 2011), *Ricci curvature and complex geometry*
60. Geometry/Topology Seminar, Duke University, USA (November 2011), *Collapsing of Calabi-Yau manifolds*
61. Florida International University, Miami, USA (November 2011), *The Calabi-Yau Theorem for Hermitian Manifolds*
62. Geometry Seminar, University of Texas, Austin, USA (November 2011), *Ricci curvature and complex geometry*
63. Colloquium, Rice University, USA (December 2011), *Ricci curvature and complex geometry*
64. Northeastern University, USA (December 2011), *Ricci curvature and complex geometry*
65. Colloquium, UCLA, USA (December 2011), *Ricci curvature and complex geometry*
66. Geometric Analysis Seminar, MIT, USA (December 2011), *Collapsing of abelian fibred Calabi-Yaus and hyperkähler mirror symmetry*
67. Università di Roma, Italy (January 2012), *Collapsing of Calabi-Yau manifolds*
68. Analysis Seminar, Cornell University, USA (January 2012), *The Chern-Ricci flow*
69. Colloquium, Stanford University, USA (February 2012), *Ricci curvature and complex geometry*
70. Colloquium, Medgar Evers College, CUNY, USA (February 2012)
71. Colloquium, Rutgers University Newark, USA (February 2012)
72. An International Conference in Nevanlinna Theory and Complex Geometry, Notre Dame University, USA (March 2012)
73. L^2 (Lafayette-Lehigh) Geometry-Topology Seminar, Lafayette College, USA (March 2012)
74. 2012 Great Lakes Geometry Conference, Ohio State University, USA (April 2012)
75. Geometric PDEs, CRM, Montreal, Canada (April 2012)
76. MFO Oberwolfach, Germany (May 2012)
77. Advances in Geometric Analysis, ICTP, Trieste, Italy (June 2012)
78. Recent Developments in Kähler Geometry, IHP, Paris, France (December 2012)

Teaching

At Harvard University

Fall Term 2005 - Instructor of Math 21a, Multivariable Calculus

Fall Term 2006 - Instructor of Math 21a, Multivariable Calculus

Fall Term 2007 - Course Assistant of Math 231a, Algebraic Topology

Fall Term 2008 - Instructor of Math 21a, Multivariable Calculus, two sections

Summer School 2009 - Course Assistant of Math 1ab, Intensive Calculus

At Columbia University

Spring Term 2010 - Instructor of Calculus IV, Multivariable Calculus, two sections
Fall Term 2010 - Instructor of Calculus III, Multivariable Calculus
Spring Term 2011 - Instructor of Calculus IV, Multivariable Calculus, two sections
Fall Term 2011 - Instructor of Complex Analysis and Riemann Surfaces I
Spring Term 2012 - Instructor of Complex Analysis and Riemann Surfaces II and Calculus IV,
Multivariable Calculus

Services

Referee for:

Advances in Mathematics
American Journal of Mathematics
Analysis & PDE
Communications in Analysis and Geometry
Communications in Pure and Applied Mathematics
Compositio Mathematica
Duke Mathematical Journal
International Journal of Mathematics
Journal für die reine und angewandte Mathematik
Journal of the American Mathematical Society
Journal of Differential Geometry
Journal of the European Mathematical Society
Journal of Geometry and Physics
Journal of Mathematical Analysis and Applications
Mathematical Research Letters
Pacific Journal of Mathematics
Proceedings of the American Mathematical Society
Transactions of the American Mathematical Society.

Reviewer for Math Reviews and Zentralblatt MATH.

Organizer of the Special Day on Complex Geometry and PDE at Columbia University (October 21 2010).

Organizer of section “Complex Geometry and Partial Differential Equations” at AMS Meeting in Akron, Ohio (October 20-21 2012).

Organizer of the Informal Complex Geometry and PDE Seminar at Columbia University (September 2009-present).

References

Prof. Shing-Tung Yau (thesis advisor), Harvard University, yau@math.harvard.edu
Prof. D.H. Phong, Columbia University, phong@math.columbia.edu
Prof. Simon K. Donaldson, Imperial College London, s.donaldson@imperial.ac.uk
Prof. Sławomir Kołodziej, Jagiellonian University, slawomir.kolodziej@im.uj.edu.pl
Prof. Pat Gallagher (teaching), Columbia University, pxg@math.columbia.edu