

Andrea Loi: Curriculum Vitae et Studiorum.

Personal Details

Date of birth: September 28, 1969

Place of birth: Cagliari, Italy.

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Current Position

Full Professor at University of Cagliari (Italy).

Postgraduate studies

1998 Ph.D. in Mathematics at the University of Warwick, supervisor J. Rawnsley, dissertation titled *Quantization of Kähler manifolds and Holomorphic immersions in projective spaces*.

1994 Master in Mathematics at the University of Warwick, supervisor J. M. Micallef, dissertation titled *Deformation of complex structures : Complex Tori and K3 Surfaces*.

Skills

- Proficient in written and spoken English; good in written and spoken French.

Scientific travels

- Jussieu Paris (France) (22 February-24 February 2018)
- Luminy (France) (14 January–19 January 2018).
- University of Evora (Portugal) (1 September–06 September 2013).
- Visiting Professor, Institut Fourier de Mathématiques (Grenoble) (9 January - 9 February 2012).
- University of München (Germany) (18-21/12/2011).
- University of Bilbao (Spain) (06-10/10 2011).
- The thirteenth international conference on Geometry, Integrability and Quantization; Varna (Bulgaria), (with a cast grant) (03-08/06 2011).
- Workshop on Symplectic Geometry, Contact Geometry, and Interactions; Department of Mathematics, Uppsala University (with a CAST grant) (27-29/1 2011).
- University of Sofia (Bulgary) (6-8/9 2010).
- University of Veliko Tarnovo (Bulgary) (8-10/9 2010)].

- Mathematics Institute, Princeton University (invitation by G. Tian);
Courant Institute, Department of Mathematics New York (invitation by M. Gromov) (01/04-30/04 2008)
- University of Sofia (15/7-15/9 2003).
- I.H.E.S. (invitation by J. P. Bourguignon) (one month: October 1995)
- University of Warwick, England (1993-98)
- Mathematics Institute Louis Pasteur, Strasbourg (one year: 1990-91).

Invited speakers to the following conferences

- 2023 *Rigidity properties of holomorphic isometries into homogeneous Kähler manifolds*, The 7th workshop "Complex Geometry and Lie Groups" May 22- 26, 2023, Lecce, Italy.
- 2020 *Kähler immersions into complex space forms: old and new results*, A Geometry Day in Como (on January 10th),
- 2018 *Symplectic coordinates on Kähler manifolds*, Sèminarie de Gèometrie Hamiltonienne, Jussieu Paris (France)
- 2018 *Kähler immersions of homogeneous Kähler manifolds into complex space forms*, CIRM Luminy (France), 14 January 2018.
- 2013 *The Gromov width of symmetric spaces*, XXII International fall workshop on Geometry and Physics, 2-5 September 2013, Evora (Portugal).
- 2012 *Kähler immersions of homogeneous Kähler manifolds into complex space forms*, Institut Fourier de Mathématiques (Grenoble), 24 Gennaio 2012.
- 2011 *Balanced metrics, TYZ expansion and Szegő kernel*, conference at the Mathematics Institute of the University of München, München (Germany) 20 Dicembre 2011.
- 2011 *Global Symplectic coordinates on Kähler manifolds*, EMS-RSME JOINT MATHEMATICAL WEEKEND, Bilbao, October 7-9, 2011.
- 2011 *Balanced metrics, Tian–Yau–Zelditch expansion and quantization of a Kähler manifold*, The thirteenth international conference on Geometry, Integrability and Quantization, Varna (Bulgaria) 3-8 June 2011.
- 2011 *Metrische bilanciate, espansione di Tian–Yau–Zelditch e quantizzazione di una varietà di Kähler*, Geometry in Bicocca (Milan) 2011, 12-13 May 2011.
- 2010 *Kähler immersions of homogeneous Kähler manifolds into complex space forms* Global Analysis and PDE on Manifolds, IMI, BAS, SOFIA, 6-8 September 2010.
- 2010 *Kähler immersions of homogeneous Kähler manifolds into complex space forms* ICDG (International Congress in Differential Geometry 2010, Veliko Tarnovo 8-10 September 2010.

- 2008 *Holomorphic immersions of Kähler-Einstein manifolds into complex space forms* (School and Conference on Differential Geometry, ICTP, Trieste, 2 June - 20 June 2008)
- 2008 *Symplectic duality between complex domains* (Extremal Kaehler metrics and Kaehler-Ricci flow, Centro De Giorgi, Pisa, 2 March - 29 March 2008).
- 2007 *Immersioni simplettiche in spazi di forme complessi* (Giornate di Geometria, Pavia, February 13-14).
- 2006 *Symmetric coordinates on symmetric domains and their compact duals* (Mathematics and its applications, Torino, July 3-7).
- 2006 *Symmetric coordinates on symmetric domains and their compact duals* (Recenti sviluppi della geometria complessa, differenziale, simplettica, Centro di Ricerca Matematica Ennio de Giorgi, Pisa, Marzo 9-11).
- 2003 *On Nash's C^1 -isometric theorem* (Miniworkshop on PDE and Geometry, Institute of Mathematics and Informatics, Bulgarian Academy of Sciences, Sofia, Settembre 1-2).
- 2002 *Una versione simplettica del teorema di immersione isometrica di Nash* (Nuovi contributi italiani alla geometria differenziale III, Palermo).
- 2000 *Isometric Immersions and Symplectic Geometry* (Dynamical Systems and PDE, Cagliari).
- 1999 *Decomposizioni a libro aperto positive e strutture di contatto bordo sulle 3-variet* (Nuovi contributi italiani alla geometria differenziale II, Palermo).
- 1997 *Quantizzazione di variet di Kähler* (Nuovi contributi italiani alla geometria differenziale I, Bari).

Research interests

1. Induction of geometric structures (Kähler form, symplectic forms, Riemannian metrics and connections);
2. analytic and geometric methods for the quantization (geometric and by deformation) of a Kähler manifold;
3. balanced metrics and the TYZ (Tian-Yau-Zelditch) expansion.

Organization of events

1. *Odysseus 2018*, Cagliari, 3-8 June 2018.
2. *Indam-Day*, Cagliari, 1 June 2018.
3. *Two days of Geometry in honor of Giusi D'Ambra*, Cagliari, 16-17 February 2018.
4. *Complex and Riemannian Geometry days*, Cagliari, 8-9 September 2016.
5. *New Trends in Differential Geometry*, Villasimius, 18-20 September 2014.

Research publications

Complex, Kähler and Symplectic Geometry

1. (joint with Stefano Matta) Robustness of induced statistical structures, to appear to Topology and its Applications.
2. (joint with Roberto Mossa) *Holomorphic isometries into bounded homogeneous domains*, to appear in PAMS.
3. (joint F. Zuddas e Filippo) *On canonical radial Kähler metrics*, to appear in Osaka Journal of Mathematics.
4. (joint F. Zuddas e Filippo) *Kähler-Ricci solitons induced by infinite dimensional complex space forms*, Pacific Journal of Mathematics 316 (2022), 183–205.
5. (joint with R. Mossa) *KRS into definite or indefinite complex space forms* Proc. Amer. Math. Soc. 149 (2021), no. 11, 4931-4941.
6. (joint F. Salis e F. Zuddas) *Extremal Kähler metrics induced by finite or infinite dimensional complex space forms*, J. Geom. Anal. 31 (2021), no. 8, 7842-7865.
7. (joint with M. Zedda and F. Zuddas) *Ricci flat Calabi's metric is not projectively induced* Tohoku Math. J. 73 (2021), 29-37.
8. (joint with F. Zuddas) *Partially regular and cscK metrics*, Internat. J. Math. 31 (2020), no. 10, 2050079, 8 pp.
9. (joint with F. Salis and F. Zuddas) *Characterization of complex space forms through Laplacians*, Abh. Math. Semin. Univ. Hambg. 90 (2020), no. 1, 99-109.
10. (joint with B. Cappelletti Montano and G. Bande) *η -Einstein Sasakian immersions in non-compact Sasakian space forms*, Ann. Mat. Pura Appl. (4) 199 (2020), no. 6, 2117-2124.
11. (joint with R. Mossa and F. Zuddas) *Finite TYCZ expansions and cscK metrics* J. Math. Anal. Appl. 484 (2020).
12. (joint with B. Cappelletti Montano) *Einstein and η -Einstein Sasakian submanifolds in spheres* Ann. Mat. Pura Appl. (4) 198 (2019), no. 6, 2195-2205.
13. (joint F. Cannas Aghedu) *The Simanca metric admits a regular quantization* Ann. Global Anal. Geom. 56 (2019), no. 3, 583-596.
14. (joint with R. Mossa and F. Zuddas) *Bochner coordinates on flag manifolds*, Bull. Braz. Math. Soc, New Series, 50 497-514 (2019).
15. (joint with F. Salis and F. Zuddas) *On the third coefficient of TYZ expansion for radial scalar flat metrics*, Journal of Geometry and Physics 133, 210-218 (2018).
16. (joint with F. Salis and F. Zuddas) *Two conjectures on Ricci flat metrics*, Math. Z. (2018) 290, 599–613.

17. (joint with B. Cappelletti Montano and D. Zuddas) *On codimension one sub-manifolds of the real and complex projective space*, Topology Appl. 232 (2017), 237-241.
18. (joint with F. Zuddas) *Explicit symplectic coordinates on Kähler manifolds*, Special metrics and group actions in geometry, 215-239, Springer INdAM Ser., 23, Springer, Cham, 2017
19. (joint with R. Mossa and F. Zuddas) *The log-term of the disc bundle over a homogeneous Hodge manifold*, Ann. Global Anal. Geom. 51 (2017), no. 1, 35-51.
20. (joint with M. Zedda) *The diastasis function of the Cigar metric*, Journal of Geometry and Physics 110, 269-276 (2016).
21. (joint with F. Zuddas) *On the Gromov width of Homogeneous Kähler manifolds*, Diff. Geom. Appl. 47, 130-132 (2016).
22. (joint with C. Arezzo and F. Zuddas) *Some remarks on the symplectic and Kähler geometry of toric varieties*, Annali di Matematica Pura e Applicata 4, 1287-1304 (2016).
23. (joint with R. Mossa and F. Zuddas) *Symplectic capacities of Hermitian symmetric spaces of compact and non compact type*, Journal of Symplectic Geometry Volume 13, Number 4, 1049-1073 (2015).
24. (joint with R. Mossa) *Some remarks on Homogeneous Kähler manifolds*, Geometriae Dedicata Volume 179 (2015), 1-7.
25. (joint with M. Zedda) *On the coefficients of TYZ expansion of locally Hermitian symmetric spaces*, Manuscripta Mathematica (2015), Vol. 148, 303-315.
26. (joint with D. Uccheddu and M. Zedda) *On the Szegő kernel of Cartan–Hartogs domains*, Arxiv for Matematik, Vol. 54 Issue 2 (2015), 473-484.
27. (joint with L. Cadeddu and S. Gallot) *Maximizing mean exit-time of the Brownian motion on Riemannian manifolds*, Monatsh. Math. Vol. 176, Issue 4 (2015), 551-570.
28. (joint with R. Mossa and F. Zuddas) *Some remarks on the Gromov width of homogeneous Hodge manifolds*, Int. J. Geom. Methods Mod. Phys. Vol. 11, No. 2 (2014).
29. (joint with C. Arezzo and F. Zuddas) *Szego Kernel, regular quantizations and spherical CR-structures*, Math. Z. (2013) 275, 1207-1216.
30. (joint with M. Zedda) *Global symplectic coordinates on gradient Kähler–Ricci solitons*, Monatsh. Math. (2013) 171:415-423.
31. (joint with C. Arezzo and F. Zuddas) *On homothetic balanced metrics*, Ann. Global Anal. Geom. 41, n. 4 (2012), 473-491.
32. (joint with M. Zedda and F. Zuddas) *Some remarks on the Kähler geometry of the Taub–NUT metrics*, Ann. Global Anal. Geom. 41, n. 4 (2012), 515-533.

33. (joint with A. J. Di Scala and H. Hishi) *Kähler immersions of homogeneous Kähler manifolds into complex space forms*, Asian Journal of Mathematics Vol. 16 No. 3 (2012), 479-488.
34. (joint with R. Mossa) *Berezin quantization of homogeneous bounded domains*, Geom. Dedicata 161 (2012) 119-128.
35. (joint with M. Zedda) *Calabi's inhomogeneous Einstein manifold is globally symplectomorphic to \mathbb{R}^{2n}* , Diff. Geom. Appl. (30) 2 (2012), 145-147.
36. (joint with M. Zedda) *Balanced metrics on Cartan and Cartan-Hartogs domains* Math. Z. 270 (2012), no. 3-4, 1077-1087.
37. (joint with M. Zedda), *Kähler-Einstein submanifolds of the infinite dimensional projective space*, Math. Ann. 350 (2011), 145-154.
38. (joint with Roberto Mossa), *The diastatic exponential of a symmetric space*, Math. Z. 268 (2011), no. 3-4, 1057-1068.
39. (joint with G. D'Ambra and R. Deleo) *Partially isometric immersions and free maps* Geom. Dedicata 151 (2011), 79-95.
40. (joint with R. Mossa) *Uniqueness of balanced metrics on complex vector bundles*, J. Geom. Phys. 61 (2011) , 312-316.
41. (joint with M. Zedda) *Balanced metrics on Hartogs domains* Abh. Math. Semin. Univ. Hambg. 81 (2011), no. 1, 69-77.
42. (joint with T. Gramchev) *TYZ expansion for some rotation invariant Kähler metrics*, Proceedings of the 2nd International Colloquium on Differential Geometry and Its Related Fields, World Sci., (2011), 91-108.
43. (joint with M. Zedda), *A note on the l^2 -norm of the second fundamental form of algebraic manifolds* , Serdica Math. J. 36 (2010), 67-74.
44. (joint with A. J. Di Scala), *Kähler manifolds and their relatives*, Ann. Scuola Norm. Sup. Pisa Cl. Sci. (5) Vol. IX (2010), 495-501.
45. (joint with A. J. Di Scala and F. Zuddas), *Symplectic duality between complex domains* Monatsh. Math. 160 (2010) 403-428.
46. (joint with F. Zuddas), *Canonical metrics on Hartogs domains*, Osaka J. Math. Vol. 47, No.2 (2010), 507-521.
47. (joint with A. Greco), *Radial balanced metrics on the unit disk*, J. Geom. Phys. 60 (2010), 53-59.
48. (joint with F. Zuddas), *Engliš expansion for Hartogs domains*, Int. J. Geom. Methods Mod. Phys. Vol. 6, No. 2 (2009), 233-240.
49. (joint with A. J. Di Scala and F. Zuddas), *Riemannian geometry of Hartogs domains*, International Journal of Mathematics Vol. 20, Number 2 (2009), 139-149.

50. (joint with T. Gramchev), *TYZ expansion for the Kepler manifold*, Comm. Math. Phys. 289, (2009), 825-840.
51. (joint with M. Zedda), *Cartan domains and indefinite Euclidean spaces*, Extracta Math. 23 no. 3 (2008), 255-263.
52. (joint with A. J. Di Scala and Guy Roos), *The bisymplectomorphism group of a bounded symmetric domain*, Transformation Groups Vol. 13, Number 2 (2008), 283-304.
53. (joint with A. J. Di Scala) *Symplectic duality of symmetric spaces*, Adv. Math. 217 (2008), 2336-2352.
54. (joint with F. Zuddas), *Symplectic maps of complex domains into complex space forms*, J. Geom. Phys. 58 (2008), 888-899.
55. (joint with C. Arezzo and A. Ghigi) *Stable bundles and the first eigenvalue of the Laplacian*, J. Geom. Anal. Vol. 17, N. 3 (2007), 401-412.
56. (joint with F. Cuccu) *Balanced metrics on \mathbb{C}^n* , J. Geom. Phys. 57 (2007), 1115-1123.
57. (joint with G. D'Ambra) *Non-free isometric immersions of Riemannian manifolds*, Geom. Dedicata 127 (2007), 151-158.
58. (joint with A.J. Di Scala) *Kähler maps of Hermitian symmetric spaces into complex space forms*, Geom. Dedicata 25 (2007), 103-113.
59. *Regular quantizations and covering maps*, Geom. Dedicata 123 (2006), 73-78.
60. *Calabi's diastasis function for Hermitian symmetric spaces*, Differential Geom. Appl. 24 (2006), 311-319.
61. (joint with F. Cuccu) *Global symplectic coordinates on complex domains*, J. Geom. Phys. 56 (2006), 247-259.
62. *A Laplace integral on a Kähler manifold and Calabi's diastasis function*, Differential Geom. Appl. 23 (2005), 55-66.
63. *Bergman and balanced metrics on complex manifolds*, Int. J. Geom. Methods Mod. Phys. 2 (2005), 553-561.
64. *A Laplace integral, the T-Y-Z expansion and Berezin's transform on a Kaehler manifold* Int. J. Geom. Methods Mod. Phys. 2 (2005), 359-371.
65. *Regular quantizations of Kähler manifolds and constant scalar curvature metrics*, J. Geom. Phys. 53 (2005), 354-364.
66. (joint with C. Arezzo) *A note on Kähler-Einstein metrics and Bochner's coordinates*, Abh. Math. Sem. Univ. Hamburg 74 (2004), 49-55.
67. (joint with C. Arezzo) *Moment maps, scalar curvature and quantization of Kähler manifolds*, Comm. Math. Phys. 243 (2004), 543-559.

68. *The Tian–Yau–Zelditch asymptotic expansion for real analytic Kähler metrics*, Int. J. Geom. Methods Mod. Phys. v. 1 No 3 (2004), 253-263.
69. (joint with G. D’Ambra) *Inducing connections on $SU(2)$ -bundles*, JP J. Geom. Topol. 3 (1) (2003), 65-88.
70. (joint with C. Arezzo) *Quantization of Kähler manifolds and the asymptotic expansion of Tian–Yau–Zelditch*, J. Geom. Phys. 867 (2003), 1-13.
71. (joint with G. D’Ambra) *A symplectic version of Nash C^1 -isometric embedding theorem*, Differential Geom. Appl. 16, no. 2 (2002), 167-179.
72. *Holomorphic maps of Hartogs domains in Complex Space forms*, Riv. Mat. Univ. Parma (7), vol. 1 (2002), 103-113.
73. (joint with R. Piergallini) *Compact Stein surfaces with boundary as branched covers of B^4* , Invent. Math. 143 (2001), 325-348.
74. (joint with D. Zuddas) *Some remarks on Bergmann metrics*, Riv. Mat. Univ. Parma 6, no. 4 (2001), 71-86.
75. *The function epsilon for complex Tori and Riemann surfaces*, Bull. Belg. Math. Soc. Simon Stevin 7, no. 2 (2000), 229-236.
76. (joint with P. Sitzia) *Explicit formulas for geodesics of homogeneous $SO(2)$ -isotropic three dimensional manifolds*, Adv. Math. 156 (2000), 1-22.
77. *Quantization of bounded domains*, J. Geom. Phys. 29 (1999), 1-4.

Mathematical Economics

78. (joint with Stefano Matta) *Minimal entropy and uniqueness of price equilibria in a pure exchange economy*, to appear in J. Math. Econom.
79. (joint with S. Matta) *Curvature in Economy*, J. Math. Econom. 74 (2018), 62-67.
80. (joint with S. Matta) *On the topology of the set of critical equilibria*. Int. J. Econ. Theory 12 (2016), no.2, 107-126.
81. (joint with S. Matta) *Increasing complexity in structurally stable models*, J. Math. Econom. 57 (2015), 20-24.
82. (joint with S. Matta) *Structural stability and catastrophes*, Economics Bulletin (2012) Vol.32 No. 4, 3378-3385
83. (joint with S. Matta) *Measures of economies with an arbitrarily large number of equilibria*, Int. J. Econ. Theory (2012) Vol.8, No.4, 337-343.
84. (joint with S. Matta) *Catastrophes minimization on the equilibrium manifold*, J. Math. Econom. 47 (2011), 617-620.
85. (joint with S. Matta) *A note on the structural stability of the equilibrium manifold* J. Math. Econom. 46 (2010) n.4, 591-594.

86. (joint with S. Matta), *Evolution paths on the Equilibrium Manifold*, J. Math. Econom. 45 (2009), 846-851.
87. (joint with S. Matta), *Geodesics on the equilibrium manifold*, J. Math. Econom. 44 (2008), no. 12, 1379-1384.
88. (joint with S. Matta) *A Riemannian metric on the Equilibrium Manifold: the smooth case*, Economics bulletin 30 (2006), 1-9.
89. (joint with Stefano Matta) *Risk aversion and uniqueness of equilibrium in economies with two goods and arbitrary endowments*, The B.E. Journal of Theoretical Economics (BEJTE)

Mathematical Logic

90. (joint with S. Bonzio) *The Plonka product of topological spaces*, Algebra Universalis 80 (2019), no. 3, 1-29.
91. (joint with S. Bonzio e L. Peruzzi) *A duality for involutive bisemilattices*, Studia Logica (2019) 107, 423-444.
92. (joint with Stefano Bonzio) *Probability over Plonka sums of Boolean algebras: states, metrics and topology*, Internat. J. Approx. Reason. 136 (2021), 14-35.

Games and Puzzle

93. (joint with S. Bonzio and L. Peruzzi) *On the $n \times n \times n$ Rubik's Cube*, Math. Slovaca. 68 (2018), No. 5, 957-974.
94. (joint with S. Bonzio and L. Peruzzi) *On the first law of cubology for the Rubik's Revenge*. Math. Slovaca 67 (2017), No. 3, 561-572.

Networks

95. (joint F. Lilliu, D. Reforgiato Recupero, M. Sissini) *An uncertainty-aware optimization approach for flexible loads of smart grid prosumers: A use case on the Cardiff energy grid* Sustainable Energy, Grids and Networks, 20 (2019) 100272.

Books

1. *Introduzione alla Topologia Generale*, Aracne Editrice (2013).
2. (joint with M. Zedda) *Kähler immersions of Kähler manifolds into complex space forms*, Lectures Notes of the Unione Matematica Italiana, Springer (2018).