

# Luca Fabrizio Di Cerbo

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## Positions

Assistant Professor, *University of Florida*, August 2018 -

S.-S. Chern Senior Postdoctoral Fellow, *International Centre for Theoretical Physics (ICTP)*, September 2016 - September 2017

Visiting Assistant Professor, *Notre Dame University*, August 2014 - May 2015

Simons Postdoctoral Fellow, *Duke University*, August 2011 - July 2014

## Research Visits

*Stony Brook University*, September 2017 - August 2018

*Max Planck Institute for Mathematics (MPIM)*, June 2015 - May 2016

## Education

Ph.D. Mathematics, Stony Brook University, NY, USA

*September 2006-May 2011*

Thesis: *Aspects of the Seiberg-Witten equations on manifolds with cusps*

Advisor: Prof. Claude LeBrun

Laurea Specialistica (M. Sc.) summa cum laude in Mathematics, University of Rome "La Sapienza", Italy

*September 2004-July 2006*

Laurea Triennale (B. Sc.) summa cum laude in Physics, University of Rome "La Sapienza", Italy

*September 2001-November 2004*

## Research

### *Publications*

1. (with M. Stover) *Punctured spheres in complex hyperbolic surfaces and bielliptic ball quotient compactifications*. **Trans. Amer. Math. Soc.** (DOI: <https://doi.org/10.1090/tran/7650>).
2. (with G. Di Cerbo) *On Seshadri constants of varieties with large fundamental group*. **Ann. Sc. Norm. Super. Pisa Cl. Sci. (5) 19, no. 1** (2019), 335-344.
3. (with G. Di Brino) *Exceptional collections and the bicanonical map of Keum's fake projective planes*. **Commun. Contemp. Math. 20, no. 1** (2018) 1650066 (13 pages).

4. (with M. Stover) *Classification and arithmeticity of toroidal compactifications with  $3\bar{c}_2 = \bar{c}_1^2 = 3$ .* **Geom. Topol.** **22**, no. 4 (2018), 2465-2510.
5. *The Toledo invariant, and Seshadri constants of fake projective planes.* **J. Math. Soc. Japan** **69**, no. 4 (2017), 1601-1610
6. (with M. Stover) *Bielliptic ball quotient compactifications and lattices in  $PU(2, 1)$  with finitely generated commutator subgroup.* **Ann. Inst. Fourier (Grenoble)** **67**, no. 1 (2017), 315-328.
7. (with G. Di Cerbo) *On the canonical divisor of smooth toroidal compactifications.* **Math. Res. Lett.** **24**, no. 4 (2017), 1005-1022.
8. (with M. Stover) *Multiple realizations of varieties as ball quotient compactifications.* **Michigan Math. J.** **65**, no. 2 (2016), 441-447.
9. (with G. Di Cerbo) *Effective results for complex hyperbolic manifolds.* **J. London Math. Soc.** **91**, no.1 (2015), 89-104.
10. (with G. Di Cerbo) *Positivity in Kähler-Einstein theory.* **Math. Proc. Cambridge Philos. Soc.** **159**, no. 2 (2015), 321-338.
11. (with G. Di Cerbo) *A sharp cusp count for complex hyperbolic surfaces and related results.* **Arch. Math. (Basel).** **103**, no. 1 (2014), 75-85.
12. *On Kähler-Einstein surfaces with edge singularities.* **J. Geom. Phys.** **86** (2014), 414-421.
13. *Generic properties of homogeneous Ricci solitons.* **Adv. Geom.** **14**, no. 2 (2014), 225-237.
14. *Seiberg-Witten equations on surfaces of logarithmic general type.* **Internat. J. Math.** **24**, no. 9 (2013), 1350074, 23 pages.
15. *Finite-volume complex-hyperbolic surfaces, their toroidal compactifications, and geometric applications.* **Pacific J. Math.** **255**, no. 2 (2012), 305-315.
16. *Finite-volume complex surfaces without cuspidal Einstein metrics.* **Ann. Global Anal. Geom.** **41**, no. 3 (2012), 371-380.
17. *Seiberg-Witten equations on certain manifolds with cusps.* **New York J. Math.** **17** (2011), 491-512.
18. *A gap property for the growth of closed 3-manifold groups,* **Geom. Dedicata** **143** (2009), 193-199.
19. (with M. Disconzi) *Yamabe solitons, determinant of the Laplacian and the uniformization theorem for Riemann surfaces.* **Lett. Math. Phys.** **83** (2008), 13-18.
20. *Eigenvalues of the Laplacian under the Ricci flow.* **Rend. Mat. Appl. (7)** **27**, no. 2, (2007), 183-195.
21. (with F. Calogero and R. Droghei) *On isochronous Shabat-Yamilov-Toda lattices: equilibrium configurations, behavior in their neighborhood, Diophantine relations and conjectures.* **Phys. Lett. A** **355** (2006), 262-270.
22. (with F. Calogero and R. Droghei) *On isochronous Bruschi-Ragnisco-Ruijsenaars-Toda lattices: equilibrium configurations, behavior in their neighborhood, Diophantine relations and conjectures.* **J. Phys. A: Math. Gen.** **39** (2006), 313-325.

### *Papers submitted and preprints*

1. (with L. Lombardi) *Moving Seshadri constants, and coverings of varieties with maximal Albanese dimension,* arXiv:1902.04098v2[math.AG].
2. (with M. Stern) *Price inequality and Betti numbers growth on manifolds without conjugate points,* arXiv:1704.06354v1[math.DG].

## Undergraduate Students Supervised

Kenneth DeMason - *Summer 2018 - Present*, **3rd Year Mathematics and Chemistry UF Student**. He is currently learning Differential and Riemannian Geometry under my direction. During the academic year 2019-2020 year he will be supported by a CLAS scholar award (2500\$) to write a honor thesis under my direction.

Farnaz Ghanbari - *Spring / Summer 2017*, **ICTP Diploma Thesis**. Title: Introduction to General Relativity and Positive Energy Theorem (supervised jointly with C. Arezzo).

## Service to the Department

Department of Mathematics, **University of Florida**, Gainesville, USA.

*May 2019* - Commencement Marshal.

*August 2018 - Present* - Member of the Colloquium, Conferences, Visitors, and Travel Committee.

*August 2018 - Present* - Member of the Visiting Assistant Professor Search Committee.

*August 2018 - Present* - Member of the Computer Committee.

*August 2018 - Present* - Member of the Library Committee.

Mathematics Section, **International Centre for Theoretical Physics**, Trieste, Italy.

*September 2017* - Contributed to the writing of the ICTP Entrance Diploma Exam for the 2017/2018 Class.

*January - February 2017* - Served on the ICTP Selection Committee for the 2017/2018 Diploma Student Class.

*September 2016* - Served on the ICTP Entrance Exam Committee for the 2016/2017 Diploma Student Class.

## Teaching Experience

Department of Mathematics, **University of Florida**, FL.

*Instructor for Undergraduate Classes*

*Spring 2019* - MAC 2313, Calculus 3 (over 200 students)

*Fall 2018* - MAC 2313, Calculus 3 (over 200 students)

Department of Mathematics, **Stony Brook University**, NY.

*Instructor for Undergraduate Classes*

*Spring 2018* - MAT 126, Calculus B

*Fall 2017* - MAT 132, Calculus II

Mathematics Section, **International Centre for Theoretical Physics (ICTP)**.

*Instructor for both Graduate and Undergraduate Classes*

*Summer 2017* - ICTP - EAUMP School on Modern Functional Analysis, Nairobi - Kenya:

The Laplacian on Riemannian Manifolds (jointly with C. Arezzo)

*Fall 2016* - Diploma Course: Curves and Surfaces (Single Instructor)

Fall 2016 - Weekly Reading Course: Symplectic Geometry (jointly with C. Arezzo)

Department of Mathematics, **Notre Dame University**, IN.

*Instructor for Undergraduate Classes*

Spring 2015 - MAT 10360, Calculus B

Spring 2015 - MAT 20580, Introduction to Linear Algebra and Differential Equations

Fall 2014 - MAT 10250, Elements of Calculus I

Fall 2014 - MAT 10350, Calculus A for the Life and Social Sciences

Department of Mathematics, **Duke University**, NC.

*Instructor for both Graduate and Undergraduate Classes*

Spring 2014 - MAT 790-90.05, Positive Currents and Lelong Numbers (Advanced Graduate Level Class)

Fall 2013 - MAT 625.01, Riemann Surfaces (Graduate Level Course)

Spring 2013 - MAT 633.01, Complex Analysis (Graduate Level Course)

Spring 2012 - MAT 790-03.02, Theorems of Bombieri and Reidier (Advanced Graduate Level Class)

Fall 2011 - MAT 353.02, Ordinary and Partial Differential Equations

Department of Mathematics, **Stony Brook University**, NY.

*Teaching Assistant for Undergraduate Classes*

Spring 2011 - MAT 303, Calculus IV with Applications

Fall 2010 - MAT 123, Introduction to Calculus

Spring 2010 - MAT 205, Calculus III

Fall 2009 - MAT 132, Calculus II

Spring 2009 - MAT 305, Calculus IV

Fall 2008 - MAT 126, Calculus B

Spring 2008 - MAT 126, Calculus B

Fall 2007 - MAT 132 Calculus II

Spring 2007 - MAT 126 Calculus B

Fall 2006 - MAT 125 Calculus A (Grader)

## Honors, Awards, & Fellowships

University of Florida, CLAS Scholar Faculty Mentor Award, 2019-2020 (500\$ Travel Grant).

International Centre for Theoretical Physics (ICTP), **S.-S. Chern Senior Postdoctoral Fellowship**, 2017-2018 (it included a 4,000 € Travel Grant over 1 year).

Max Planck Institute for Mathematics (MPIM), **Fellowship**, 2015-2016 (it included a 1,000 € Travel Grant over 1 year).

Duke University, **Simons Postdoctoral Fellowship**, 2011-2014 (Approximately 225,000\$ Salary plus 21,000\$ Travel Grant over 3 years).

SUNY Stony Brook, **Renaissance Technologies Fellowship** (From the Simons Foundation), 2006-2009 (21,000\$ over 3 years on top of regular TA salary).

Institut Henri Poincaré (IHP), **Marie Curie Fellowship** (From the European Commission), April-June, 2008 (5400 € over 3 months).

SUNY Stony Brook, Research Assistantship plus Tuition Scholarship, 2010-2011 (7,000\$ over 1 year on top of TA salary).

SUNY Stony Brook, Research Fellowship, 2009-2010 (7,000\$ over 1 year on top of TA salary).

SUNY Stony Brook, Teaching Assistantship with half duties plus Tuition Scholarship, 2006-2010.

University of Rome "La Sapienza", Tuition Scholarship and Undergraduate Fellowship, 2004-2006 (8,000 € fellowship over 2 years).

University of Perugia, Scholarship, summer 2004 (1,000 € plus housing).

University of Rome "La Sapienza", Tuition Scholarship and Undergraduate Fellowship, 2001-2004 (12,000 € fellowship over 3 years).

## Colloquia, Conference and Workshop Presentations

1. *Workshop "Differentialgeometrie im Grossen"*, **Oberwolfach, Germany**, June 30th - July 6th, 2019 (expected).
2. *Conference "Surfaces quotient de la boule unité et réseaux de  $PU(2; 1)$ "*, **CIRM - Luminy, France**, February 25th - March 1st, 2019.
3. *Conference "UF/FSU Topology and Geometry Meeting"*, **Tallahassee, Florida**, February 8-9, 2019.
4. *Colloquium*, **University of Florida**, February 2nd, 2018.
5. *Colloquium*, **University of Kansas**, January 23th, 2018.
6. *Colloquium*, **UC Riverside**, January 19th, 2018.
7. *Colloquium*, **Centre for Quantum Geometry of Moduli Spaces** (Aarhus University), May 26th, 2017.
8. *Special Colloquium*, **Stockholm University**, September 26th, 2016.
9. *Conference on Differential Geometry celebrating Claude LeBrun's 60th birthday*, **Montréal, Canada**, July 5-9, 2016.
10. *Oberseminar*, **Max Planck Institute for Mathematics**, August 6th, 2015.
11. *Colloquium*, **Queens College CUNY**, April 27th, 2015.
12. *Colloquium*, **Queen's University, Canada**, February 4th, 2015.
13. *Colloquium*, **University of Arizona**, January 21st, 2015.
14. *Colloquium*, **UC Davis**, December 15th, 2014.
15. *Conference "Giornate di Geometria Algebrica e Argomenti Correlati"*, **Torino, Italy**, June 7th, 2014.
16. *Conference "Geometria Algebrica nella Capitale"*, **Rome, Italy**, July 5th, 2013.
17. *Conference "Algebraic & Hyperbolic Geometry-New Connections"*, **Cabo Frio, Brazil**, June 18th, 2013.
18. *American Mathematical Society Eastern Section Meeting "Complex Geometry and Microlocal Analysis"*, **Boston College**, April 6th, 2013.
19. *Shanks Workshop "Kähler geometry on the edge"*, **Vanderbilt University**, March 22nd, 2013.

20. *Simons Postdoctoral Fellows Meeting*, **Simons Center for Geometry and Physics**, April 11th, 2012.
21. *Conference "Progressi Recenti in Geometria Reale e Complessa"*, **Levico Terme (Trento), Italy**, October 20th, 2010.

## Seminars

1. *Topology and Dynamics Seminar*, **University of Florida**, April 9th, 2019 (expected).
2. *Graduate Mathematics Association Seminar*, **University of Florida**, September 26th, 2018.
3. *Topology and Dynamics Seminar*, **University of Florida**, September 18th, 2018.
4. *Topology and Dynamics Seminar*, **University of Florida**, September 11th, 2018.
5. *Geometric Analysis Seminar*, **CUNY Graduate Center**, December 7th, 2017.
6. *Geometry-Topology Seminar*, **Temple University**, October 25th, 2017.
7. *Algebraic Geometry Seminar*, **Washington University in St. Louis**, October 16th, 2017.
8. *Geometry-Topology Seminar*, **Stony Brook University**, October 10th, 2017.
9. *Geometry Seminar*, **Centre for Quantum Geometry of Moduli Spaces** (Aarhus University), May 26th, 2017.
10. *Geometry Seminar*, **Florence University**, May 24th, 2017.
11. *Geometry Seminar*, **Texas A&M University**, May 12th, 2017.
12. *Geometry-Topology Seminar*, **Stony Brook University**, May 9th, 2017.
13. *Geometry Seminar*, **Rome III University**, April 20th, 2017.
14. *Geometric Analysis Seminar*, **ICTP-SISSA**, March 23rd, 2017.
15. *Geometry-Topology seminar*, **Warwick University**, November 3rd, 2016.
16. *Waterloo Geometry Summer School*, **Waterloo University**, June 30th, 2016.
17. *Waterloo Geometry Summer School*, **Waterloo University**, June 29th, 2016.
18. *Differential Geometry & Geometric Analysis Seminar*, **Max Planck Institute for Mathematics**, January 12th, 2016.
19. *General Mathematics Seminar*, **University of Luxembourg**, November 3rd, 2015.
20. *Felix Klein Seminar*, **Notre Dame University**, October 30th, 2014.
21. *Topology-Analysis-Geometry Seminar*, **Notre Dame University**, October 9th, 2014.
22. *Complex Geometry seminar*, **Columbia University**, April 3rd, 2014.
23. *Algebraic Geometry Seminar*, **Princeton University**, October 24th, 2013.
24. *Complex Geometry Seminar*, **John Hopkins University & University of Maryland**, October 22nd, 2013.
25. *Geometry-Topology Seminar*, **Stony Brook University**, September 24th, 2013.
26. *Geometry-Topology Seminar*, **Duke University**, March 19th, 2013.
27. *Geometry-Topology Seminar*, **Stony Brook University**, October 9th, 2012.
28. *Differential Geometry & Geometric Analysis Seminar*, **Princeton University**, October 5th, 2012.

29. *Geometry Seminar*, **Universita' di Roma "La Sapienza"**, June 19th, 2012.
30. *Geometry Seminar*, **Universita' di Roma "La Sapienza"**, June 14th, 2012.
31. *Topology Seminar*, **University of California at Riverside**, May 1st, 2012.
32. *Graduate-Faculty Seminar*, **Duke University**, January 20th, 2012.
33. *Geometry-Topology Seminar*, **Duke University**, December 6th, 2011.
34. *Symplectic and Differential Geometry Seminar*, **Vanderbilt University**, November 30th, 2011.
35. *Geometry-Topology Seminar*, **Duke University**, March 29th, 2011.
36. *Geometry Seminar*, **Simons Center for Geometry and Physics**, January 24th, 2011.
37. *Geometry-Topology Seminar*, **University of Pennsylvania**, January 12th, 2011.
38. *Geometry Seminar*, **Universita' di Roma "La Sapienza"**, June 8th, 2010.
39. *Geometry Seminar*, **Universita' di Roma "La Sapienza"**, June 7th, 2010.
40. *Graduate Student Seminar*, **Stony Brook**, March 2010.
41. *Séminaire de jeunes mathématiciens (Organized by P. Pansu)*, **Institut Henri Poincaré**, May 2008.

## Service to the Mathematical Community

Co-organizer, **AMS Special Session** on “Geometric Structures on Manifolds” at the Southeastern Sectional Meeting, University of Florida, Gainesville, FL November 2-3, 2019.

Co-organizer, **AMS Special Session** on “Geometry and Topology of Ball Quotients and Related Topics” at the Spring Eastern Sectional Meeting Hunter College, City University of New York, New York, NY May 6-7, 2017.

Co-organizer, **Geometry-Topology seminar**, Duke University, Fall 2011- Spring 2014.

Co-organizer, **27th Geometry Festival**, Duke University, April 27-29, 2012.

Referee for several journals, since 2011.

Reviewer for Math Reviews.