

Fabio Tonini

Personal Data

Date of Birth May 16, 1984
Citizenship Italy

Positions Held

November 2018 - Researcher (RTDA) at University of Florence
October 2021
October 2018 Scholarship at Scuola Normale Superiore of Pisa
October 2015 Post Doc at the Freie University of Berlin
- September 2018
April 2013 - Post Doc at the Humboldt University of Berlin
September 2015
January 2012 Scholarship at Scuola Normale Superiore of Pisa
- January 2013
January 2009 Ph.D. student at Scuola Normale Superiore of Pisa under the supervision of
- January 2012 Prof. Angelo Vistoli

Italian National Scientific Habilitation (ASN)

May 2021 - Professore II fascia nel settore 01/A2 - Geometria e Algebra
May 2030

Education

May 2013 Ph.D. at Scuola Normale Superiore of Pisa
December 2008 Diploma at Scuola Normale Superiore of Pisa
September 2008 Master's Degree in Pure Mathematics, University of Pisa, *with honors*
July 2006 Bachelor's Degree in Pure Mathematics, University of Pisa, *with honors*

PhD's Thesis

Title *Stacks of ramified Galois covers*

Università degli Studi di Firenze, Dipartimento di Matematica e Informatica 'Ulisse Dini',
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defended the 2 May 2013

pdf [online link](#)

Advisor Angelo Vistoli

[Master's Thesis](#)

Title *Rivestimenti di Gorenstein (Gorenstein covers)*

pdf [online link](#)

Advisor Angelo Vistoli

Research Interests

- Algebraic Geometry
- Algebraic stacks, Moduli theory
- Action of algebraic groups and Galois covers
- Representation theory
- Algebraic fundamental groups and gerbes

Memberships

- GNSAGA, INdAM, Gruppo Nazionale per le Strutture Algebriche, Geometriche e le loro Applicazioni

Teaching Experience

- 2020/21 Course Title: *Matematica e statistica*, First year at “Scienze Farmaceutiche”, University of Florence
- 2020/21 Course Title: *Matematica con elementi di Statistica*, First year at “Scienze Naturali”, University of Florence.
- 2019/20 Course Title: *Matematica con elementi di Statistica*, First year at “Scienze Naturali”, University of Florence.
- 2019 I held part of the course *Geometria Superiore* at the University of Florence, together with Prof. Gabriele Vezzosi
- 2019 I held part of a course in Algebraic Geometry at Scuola Normale Superiore of Pisa, together with Prof. Angelo Vistoli
- 2018/19 Course Title: *Matematica*, First year at “Scienze Naturali”, University of Florence.
- 2014 I held a course called *Introduction to algebraic stacks and moduli theory* at Humboldt University of Berlin
- 2011/12 Tutor of a group of young students at Scuola Normale Superiore of Pisa

Thesis supervised

- March 2021 Bachelor thesis: *Il teorema di separazione di Jordan-Brouwer*
Candidato: Andrea Bartolini
University of Florence.

May 2015 Master 1: *Low-degree covers in algebraic geometry*
Candidato: Gabriel Lepetit
École normale supérieure de Rennes

Languages

English **Good**
Italian **Native**

Invited Talks

- September 30 - October 1, 2021 **Cox rings and Algebraic stacks**, during the workshop “Ricercatori in Algebra e Geometria 2020” at Scuola Normale Superiore of Pisa, Italy.
- June 29, 2021 **Cox rings and Algebraic stacks**, at Chennai Mathematical Institute, India.
- May 13, 2021 **Cox rings and Algebraic stacks**, at Politecnico di Milano, Italy.
- March 26, 2021 **Cox rings and Algebraic stacks**, at University of Trieste, Italy.
- September 23-25, 2019 **Representations of the Nori fundamental group and variants**, during the workshop “Friends in Algebraic Geometry” at the University of Turin, Italy.
- September 12-13, 2019 **Crystalline fundamental group and Berthelot’s conjecture**, during the mini-workshop “Algebraic and p-adic fundamental groups” at the University of Caen, France.
- May 13-17, 2019 **Course on fundamental group schemes in positive characteristic**, during the school “Curves and groups in families” at the University of Rennes, France.
- June 4-7, 2018 **Representations of the Nori fundamental gerbes**, during Angelo Vistoli’s 60th birthday at University of Pisa, Italy.
- December 8, 2017 **Representations of the Nori fundamental gerbes**, at Osaka University, Osaka, Japan.
- September 4-5, 2017 **Sheafification functors**, during “Stacks in Turin” conference at University of Turin, Italy.
- March 15, 2016 **Representations of the Nori fundamental gerbes**, during “Equivariant geometry and algebraic stack” conference at ANU Kioloa Campus, Australia.
- December 19, 2014 **Stacks of ramified Galois covers**, at Bordeaux University, Bordeaux, France.
- May 15, 2014 **Stacks of ramified Galois covers**, at Hamburg University, Hamburg, Germany.
- April 25, 2014 **Stacks of ramified Galois covers**, at Kyoto University, Kyoto, Japan.
- April 18, 2014 **Stacks of ramified Galois covers**, at Osaka University, Osaka, Japan.

- November 28, 2013 **Stacks of ramified Galois covers**, at Essen University, Essen, Germany.
- January 30, 2013 **Stacks of ramified Galois covers**, at KTH, Stockholm, Sweden.

Schools and Conferences Attended

- September 23-25, 2019 **Friends in Algebraic Geometry**, University of Turin, Italy.
- September 12-13, 2019 **Algebraic and p-adic fundamental groups**, University of Caen, France.
- May 13-17, 2019 **Curves and groups in families**, University of Rennes, France.
- January 31 - February 8, 2019 **Introductory Workshop: Derived Algebraic Geometry and Birational Geometry and Moduli Spaces**, University of Berkeley, California.
- June 4-7, 2018 **Angelo Vistoli's 60th birthday**, University of Pisa, Italy.
- April 4-6, 2018 **Crystals and geometry in characteristic p**, University of Munich, Germany.
- September 11-22, 2017 **Instruments of Algebraic Geometry**, University of Bucharest, Romania.
- September 4-5, 2017 **Stacks in Turin**, University of Turin, Italy.
- August 28 - September 1, 2017 **Motives for periods**, Freie University of Berlin, Germany.
- March 14-18, 2016 **Equivariant geometry and algebraic stacks**, ANU Kioloa Campus, Australia.
- June 1-5, 2015 **Algebraic varieties and their moduli**, Pisa, Italy.
- September 8-12, 2014 **Modern Trends in Gromov-Witten Theory**, Hannover, Germany.
- August 25-30, 2014 **Recent Developments in Algebraic and Arithmetic Geometry**, Budapest, Hungary.
- August 25-30, 2014 **Conference on Algebraic Geometry**, Amsterdam, Netherlands.
- May 15-16, 2014 **NoGAGS**, North German Algebraic Geometry Seminar, Hamburg, Germany.
- December 16-20, 2013 **Fundamental Groups in Arithmetic and Algebraic Geometry**, Pisa, Italy.

- May 27-31, **Syzygies in Berlin**, Berlin, Germany.
2013
- May 16-17, **NoGAGS**, *North German Algebraic Geometry Seminar*, Hannover, Germany.
2013
- June 25-29, **Conference on Galois covers and deformations**, Bordeaux, France.
2012
- June 18-22, **GAel**, *Géométrie Algébrique en Liberté XX*, Grenoble, France.
2012
- June 11-15, **Summer school 'Geometry of moduli'**, Nordfjordeid, Norway.
2012
- May 23-26, **Giornate di Geometria Algebrica e argomenti correlati XI**, Pisa, Italy.
2012
- September 18-24, **Geometric Invariant Theory, Old and New**, Lucekin, Poland.
2011
- July 18-29, **Toric Varieties in Cortona**, Cortona, Italy.
2011
- June 20 - **Moduli of curves and Gromov-Witten theory**, Institute Fourier, Grenoble,
July 8, 2011 France.
- May 23-27, **Moduli spaces and moduli stacks**, Columbia University, New York.
2011
- January 5-14, **School on moduli spaces**, Isaac Newton Institute for Mathematical Sciences,
2011 Cambridge, United Kingdom.
- October 13-15, **Intersection theory on the moduli space of curves**, Humboldt University
2010 of Berlin, Germany.
- August 30 - **WDT II**, *Workshop in Deformation Theory II*, University 'La Sapienza' of
September 3, Rome, Italy.
2010
- August 9-14, **Geometry and Algebra of Orbifolds and the McKay Correspondence**,
2010 University of Warwick, United Kingdom.
- July 4-10, **Impanga**, *Summer School on Algebraic Geometry*, Institute of Mathematics of
2010 Polish Academy of Sciences, Bedlewo, Poland.
- May 25-29, **Giornate di Geometria Algebrica e argomenti correlati X**, Gargnano,
2010 Italy.
- September 13 - **P.R.A.G.MAT.I.C 2009**, *Promotion of Research in Algebraic Geometry for*
October 3, 2009 *MAThematicians in Isolated Centres*, University of Catania, Italy.
- June 8-12, **GAel**, *Géométrie Algébrique en Liberté XVII*, Lorentz Center, Leiden,
2009 Netherlands.

Referee Activities

I have been referee for the following journals: Journal of Algebra, Epiga, Mathematische Nachrichten, Annali della Scuola Normale Superiore di Pisa, Duke Mathematical Journal, Geometry & Topology, Annales de la Faculté des Sciences de Toulouse, Geometriae Dedicata, International Journal of Mathematics.

Publications

15. ———²⁰²¹ • Di Proietto, V., Tonini, F. & Zhang, L. **A crystalline incarnation of Berthelot's conjecture and Künneth formula for isocrystals.** *Accepted in Journal of Algebraic Geometry*. arXiv: 1812.05153. <http://arxiv.org/abs/1812.05153>.
14. ———²⁰²¹ • Otabe, S., Tonini, F. & Zhang, L. **A generalized Abhyankar's conjecture for simple Lie algebras in characteristic $p > 5$.** *Accepted for publication in Mathematische Annalen*. arXiv: 2003.03240. <http://arxiv.org/abs/2003.03240>.
13. ———²⁰²¹ • Romagny, M., Tonini, F. & Zhang, L. **The arithmetic local Nori fundamental group.** *Accepted in Transactions of the American Mathematical Society*. arXiv: 1711.06898. <http://arxiv.org/abs/1711.06898>.
12. ———²⁰²¹ • Tonini, F. & Yasuda, T. **Moduli of formal torsors II.** *Accepted in Annales de l'Institut Fourier*. arXiv: 1909.09276. <http://arxiv.org/abs/1909.09276>.
11. ———²⁰²⁰ • Tonini, F. & Yasuda, T. **Moduli of formal torsors.** *Journal of Algebraic Geometry* **29**, 753–801. ISSN: 1056-3911. arXiv: 1709.01705. <https://www.ams.org/jag/2020-29-04/S1056-3911-2020-00771-8/>.
10. ———²⁰²⁰ • Tonini, F. & Yasuda, T. **Notes on the motivic McKay correspondence for the group scheme α_p .** *Singularities - Kagoshima 2017*, 215–233. arXiv: 1803.09558. https://www.worldscientific.com/doi/abs/10.1142/9789811206030_0011.
9. ———²⁰²⁰ • Tonini, F. & Zhang, L. **Essentially Finite Vector Bundles on Normal Pseudo-proper Algebraic Stacks.** *Documenta Mathematica* **25**, 159–169. arXiv: 1706.00739. <https://www.elibm.org/article/10012024>.
8. ———²⁰¹⁹ • Antei, M., Biswas, I., Emsalem, M., Tonini, F. & Zhang, L. **Nori fundamental gerbe of essentially finite covers and Galois closure of towers of torsors.** *Selecta Mathematica* **25**, 18. ISSN: 1022-1824. arXiv: 1706.00739. <http://link.springer.com/10.1007/s00029-019-0449-z>.
7. ———²⁰¹⁹ • Tonini, F. & Zhang, L. **F -divided sheaves trivialized by dominant maps are essentially finite.** *Transactions of the American Mathematical Society* **371**, 5529–5549. ISSN: 0002-9947. arXiv: 1612.00208. <https://www.ams.org/tran/2019-371-08/S0002-9947-2018-07444-X/>.
6. ———²⁰¹⁹ • Tonini, F. & Zhang, L. **Algebraic and Nori fundamental gerbes.** *Journal of the Institute of Mathematics of Jussieu* **18**, 855–897. ISSN: 1474-7480. arXiv: 1605.01332. https://www.cambridge.org/core/product/identifier/S147474801700024X/type/journal_article.

5. 2017 ● Tonini, F. **Ramified Galois covers via monoidal functors.** *Transformation Groups* **22**, 845–868. ISSN: 1083-4362. arXiv: 1507.05309. <http://link.springer.com/10.1007/s00031-016-9395-4>.
4. 2017 ● Tonini, F. **Trace map and regularity of finite extensions of a DVR.** *Journal of Number Theory* **172**, 133–144. ISSN: 0022314X. arXiv: 1506.04264. <https://linkinghub.elsevier.com/retrieve/pii/S0022314X1630227X>.
3. 2015 ● Poma, F., Talpo, M. & Tonini, F. **Stacks of uniform cyclic covers of curves and their Picard groups.** *Algebraic Geometry* **2**, 91–122. ISSN: 22142584. arXiv: 1312.5675. <http://www.algebraicgeometry.nl/2015-1/2015-1-005.pdf>.
2. 2013 ● Tonini, F. **Stacks of Ramified Covers Under Diagonalizable Group Schemes.** *International Mathematics Research Notices* **2014**, 2165–2244. ISSN: 1073-7928. arXiv: 1106.2347. <https://academic.oup.com/imrn/article-lookup/doi/10.1093/imrn/rns293>.
1. 2009 ● Pons-Llopis, J. & Tonini, F. **ACM bundles on del Pezzo surfaces.** *Le Matematiche* **64**, 177–211. arXiv: 1003.3404. <https://lematematiche.dmi.unict.it/index.php/lematematiche/article/view/760/725>.

Preprints

5. 2021 ● Tonini, F. **Stack of S_3 -covers.** *arXiv:2104.08387*. <http://arxiv.org/abs/2104.08387>.
4. 2020 ● Di Proietto, V., Tonini, F. & Zhang, L. **Frobenius fixed objects of moduli.** *arXiv:2012.14075*, 21. <http://arxiv.org/abs/2012.14075>.
3. 2020 ● Hochenegger, A., Martinengo, E. & Tonini, F. **Cox ring of an algebraic stack.** *arXiv:2004.01445*. <http://arxiv.org/abs/2004.01445>.
2. 2020 ● Tonini, F. **Stacks of fiber functors and Tannaka’s reconstruction.** *arXiv:2010.12445*. <http://arxiv.org/abs/2010.12445>.
1. 2014 ● Tonini, F. **Sheafification of linear functors.** *arXiv:1409.4073*. <http://arxiv.org/abs/1409.4073>.

Ph.D. thesis

1. 2013 ● Tonini, F. **Stacks of ramified Galois covers.** *Ph.D. thesis*, *arXiv:1307.1116*. arXiv: 1307.1116. <http://people.dimai.unifi.it/tonini/Stacks%20of%20ramified%20Galois%20covers.pdf>.

November 1, 2021