FILIPPO SARTI

Curriculum vitae

PERSONAL DATA

Born in Castel San Pietro Terme, Bologna, Italy on December 15, 1993.
Email: filippo.sarti@dm.unipi.it
Personal website: sites.google.com/view/filipposarti/home-page

POSITIONS

University of Pisa, Pisa *April, 2024 - present*
PostDoctoral researcher

University of Bologna, Bologna *July, 2023 - March, 2024*
PostDoctoral researcher

University of Torino, Torino *October, 2022 - July, 2023*
PostDoctoral researcher

EDUCATION

University of Bologna, Bologna *November 2018 - June 2022*
PhD in Mathematics
Advisors: Stefano Francaviglia, Alessio Savini
Thesis: *Numerical invariants for measurable cocycles*

University of Pisa, Pisa *September 2015 - July 2018*
Master degree in Mathematics 110/110 cum laude
Supervisor: Carlo Petronio
Thesis: *Surface branched covers and Hurwitz numbers*

University of Bologna, Bologna *September 2012 - July 2015*
Bachelor degree in Mathematics 110/110
Supervisor: Massimo Ferri
Co-supervisor: Alessia Cattabriga
Thesis: *Branched covers in dimension 3*

PREPRINTS

[SS24] F. Sarti - A. Savini, *Boundaries and equivariant maps for ergodic groupoids, submitted* (2024) arxiv:2402.15355.

[SS23b] F. Sarti - A. Savini, *Measurable bounded cohomology of measured groupoids, submitted* (2023) arxiv:2304.07765.

[SS21] F. Sarti - A. Savini, *Boundary maps and reducibility for cocycles into the isometries of CAT(0)-spaces, submitted* (2021), arXiv:2005.10529.

PUBLISHED OR ACCEPTED PAPERS

[SS23a] F. Sarti - A. Savini, *Parametrized Kähler class and Zariski dense orbital 1-cohomology,* **Mathematical Research Letters 30** (2023), *1895-1929* arXiv:2106.02411.

[BFMSS] L. Battista - S. Francaviglia - M. Moraschini - F. Sarti - A. Savini, *Bounded cohomology classes of exact forms,* **Proceedings of the American Mathematical Society 152** (2024)*, 71-80,* arxiv:2211.16125*.*

[SS22] F. Sarti - A. Savini, *Superrigidity of maximal measurable cocycles of complex hyperbolic lattices,* **Mathematische Zeitschrift 300** (2022)*, n. 1, 421-443 ,* arXiv:2002.03628*.*

[PS19] C. Petronio - F. Sarti, *Counting surface branched covers,* **Studia Scientiarum Mathematicarum Hungarica 56(3)** (2019)*, 309-322,* arXiv:1901.08316*.*

BOOK CHAPTERS

[...] F. Sarti, *The Proportionality Principle via Hyperbolic Geometry. (2022).* In C. Campagnolo, F. Fournier-Facio, N. Heuer & M. Moraschini (Eds.), *Bounded Cohomology and Simplicial Volume* **London Mathematical Society Lecture Note Series***, pp. 20-27* DOI*.*

PHD THESIS

[S22] F. Sarti, *Numerical invariants for measurable cocycles,* PhD thesis, Bologna (2022) pdf*.*

RESEARCH INTERESTS

Numerical invariants for measurable cocycles. In 2020/21, Moraschini and Savini formalized the notion *numerical invariants* for measurable cocycles. Inspired by Zimmer's superrigidity result about higher rank lattices, the aim is to exploit numerical invariants to study cocycles from lattices in rank one groups. [S22, SS22, SS23a, SS21]

Measurable bounded cohomology for groupoids. Moved by the interest in numerical invariants for Borel 1-cocycles, I am trying to develop a theory of bounded cohomology for measured groupoids, which could give results in the study of the dynamical system given by actions of discrete groups on measure spaces. This is a joint project with Alessio Savini. [SS23b]

Cocycles and simplicial volume. In some works by Bader-Furman-Sauer and Löh-Pagliantini, cocycles coming from couplings have been employed to study *integral foliated simplicial volume*. The idea is to understand the relation between the recent notion of measurable bounded cohomology for groupoids with $\mathcal{R}$-simplicial complexes introduced by Gaboriau, in order to study the integral foliated simplicial volume.

Boundary maps for measurable cocycles. A fruitful approach in the study of numerical invariants makes use of boundary maps, that are equivariant maps between boundaries, to implement the pullback in bounded cohomology. I am interested in proving existence results for such maps in the context of measurable cocycles. I am also interested into extend the notion of boundaries to measured groupoids and to relate it with bounded cohomology for groupoids. [SS22a, SS21]

TALKS

- *November, 30 2023* - **(Measured) groupoids: from the beginning to recent constructions** - Seminari di Algebra e Geometria, Politecnico di Milano.
- *September, 19 2023* - **Bounded cohomology in Measured Group Theory** - Leaning into Topology Workshop, University of Pisa.
- *September, 11 2023* - **Measurable cocycles and bounded cohomology of groupoids** (lightening talk) - Groups and Rigidity Around the Zimmer Program - Ventotene .

- *April, 17 2023* - **Measurable cocycles and rigidity via bounded cohomology** - Groups and operators algebra seminar - University of Paris-Saclay, Orsay.
- *January, 31 2023* - **A gentle introduction to measurable cocycles, rigidity and recent advances** - Seminari di Algebra e Geometria - University of Bologna.
- *January, 23 2023* - **Milnor-Wood inequalities for volume of representations** - International young seminar on bounded cohomology and simplicial volume WS22 - online seminar.
- *May, 25 2022* - **Numerical invariants for measurable cocycles** - First UMI meeting of Ph.D. students - Padova.
- *April, 26 2022* - **Numerical invariants for measurable cocycles and rigidity** - Séminaire Groupes et géométrie - University of Geneva.
- *September, 6 2021* - **Numerical invariants for measurable cocycles** (lightening talk) - Counting problems - Ventotene .
- *November, 9 2020* - **The proportionality principle via hyperbolic geometry** - International young seminar on bounded cohomology and simplicial volume WS20 - online seminar.
- *June, 15 2020* - **Numerical invariants and bounded cohomology** - International young seminar on bounded cohomology and simplicial volume SS20 - online seminar.
- *December, 5 2019* - **Problema di esistenza di Hurwitz e Cut&Paste tra rivestimenti** - Baby Geometry - University of Pisa.
- *March, 7 2019* - **The Hurwitz existence problem and bipartite graphs** - Talk given for the course Graph Theory (Prof. Marilena Barnabei), University of Bologna.
- *April, 7 2017* - **Invariante di Witten per 3-varietá** - Baby Geometry - University of Pisa.

TEACHING EXPERIENCE

- Spring 2024 - Co-teacher (with M. Moraschini) for the PhD course **Introduction to bounded cohomology and simplicial volume**, PhD course in Mathematics, University of Bologna (10 h (25 in total)).
- *Fall 2023* - Teaching assistant for the course **Istituzioni di Matematica - Geometria**, Ingegneria meccatronica, University of Bologna (30 h).
- *Fall 2021* - Teaching assistant for the course **Linear Algebra**, Ingegneria informatica, University of Bologna (30 h).
- *Fall 2021/Spring 2022* - Teaching assistant for the course **Mathematics**, Management and Marketing, University of Bologna (30 h).
- *Fall 2021/Spring 2022* - Teaching assistant for the course **Mathematics**, Business and Economics, University of Bologna (50 h).
- *Fall 2020/Spring 2021* - Teaching assistant for the course **Mathematics**, Management and Marketing, University of Bologna (40 h).
- *Fall 2020* - Teaching assistant for the course **Linear Algebra**, Ingegneria informatica, University of Bologna (30 h).
- *Fall 2020* - Teaching assistant for the course **Mathematics**, Management and Marketing GII, University of Bologna (50 h).

- *Spring 2019* - Teaching assistant for the course **Linear Algebra**, Informatica per il Management, University of Bologna (15 h).
- *Fall 2019* - **Alignment math course**, Management and marketing, University of Bologna (60 h).

VISITING PERIODS

- *April, 2023* - Invited by Camille Horbez for a collaboration with Camille Horbez, Jean Lécureux and Bruno Duchesne - University of Paris-Saclay, Orsay (Funded by ERC grant *Artin-Out-ME-OA*, PI: Camille Horbez)
- *September, 2021 - December 2021* - Research period hosted by Michelle Bucher and Alessio Savini - University of Genéve (Funded by University of Bologna through *Marco Polo* fellowship and by Michelle Bucher' *SNSF* grant).
- *June, 2019* - Collaboration with Carlo Petronio - University of Pisa.

ORGANIZATIONAL EXPERIENCE

- *April, 17-19 2024* - Workshop: **Manifolds and groups in Bologna, II**, University of Bologna, Co-organizers: Marco Moraschini and Stefano Riolo, webpage.
- *Spring 2023* - **Seminari di Topologia e Geometria delle Varietá (TGV)**, University of Bologna, Co-organizer: Marco Moraschini, webpage.
- *March, 24 2023*- INdAM Activity: **Non-positive curvature in manifolds and groups**, University of Bologna, Co-organizers: Ludovico Battista, Pierluigi Contucci, Stefano Francaviglia, Marco Moraschini and Stefano Riolo, webpage.
- *March, 22-23 2023*- Workshop: **Manifolds and groups in Bologna**, University of Bologna, Co-organizers: Ludovico Battista, Stefano Francaviglia, Marco Moraschini and Stefano Riolo, webpage.
- *2019-2021* - Co-organizer of the **BAD seminars** for graduate students, University of Bologna.
- *Spring 2020* - Co-organizer of the PhD course **Lie groups and lattices** given by Alessio Savini, University of Bologna.

PROJECTS

- *2022 - 2024* - Member of **PRIN CUP J53D23003820001** *Geometry and topology of manifolds* funded by Italian Government (PI: Bruno Martelli).
- *March, 2023 - February, 2024* - Member of **INdAM - GNSAGA Project E55F22000270001** *Bounded cohomology and simplicial volume: new computations and applications* (PI: Marco Moraschini).
- *January, 2019 - present* - Member of **GNSAGA**, funded by INDAM.
- *February, 2019 - 2021* - Member of **PRIN 2017** *Real and Complex Manifolds: Topology, Geometry and Holomorphic Dynamics*, funded by Italian Government (PI: Filippo Bracci).

PRIZE AND AWARDS

- *June 2019* - Fondazione Premi, Borse di studio e Provvidenze dell'Universitá di Pisa; prize for graduate students.
- *May 2019* - Credito Cooperativo Ravennate, Forlivese e Imolese and Fondazione Giovanni dalle Fabbriche; prize for graduate students cum laude.

SCHOLARSHIPS AND GRANTS

- *March, 6-17 2023* - **GNSAGA Scholarship** - INDAM (euro 1000).
- *July, 4, 8 2022* - **GNSAGA Scholarship** - INDAM (euro 500).
- *July, 6-14 2022* - **Kovalevskaya Grant for ICM 2022 in Saint Petersburg** - IMU
- *November, 2018 - January, 2022* - **Ph.D Scholarship**, University of Bologna.
- *September, 20 2021 - December, 23 2021* - **Marco Polo Scholarship** - University of Bologna (euro 3450).
- *February, 23-28 2020* - **GNSAGA Scholarship** - INDAM (euro 400).
- *July, 8-12 2019* - **GNSAGA Scholarship** - INDAM (euro 400).
- *June, 30 - July, 5 2019* - **GNSAGA Scholarship** - INDAM (euro 400).
- *April, 8-12 2019* - **GNSAGA Scholarship** - INDAM (euro 400).

CONFERENCES ATTENDED

- *July, 15-19 2024* - **Moving to higher rank: from hyperbolic to Anosov** - Cetraro, Italy.
- *September, 18-19 2023* - **Leaning into Topology Workshop** - Pisa, Italy.
- *September, 11-16 2023* - **Groups and Rigidity Around the Zimmer Program** - Ventotene, Italy.
- *March, 6-17 2023* - **Measured Group Theory** - CRM Montréal, Canada.
- *July, 4-8 2022* - **Complex hyperbolic geometry and related structures** - CIRM Luminy, France.
- *September, 6-11 2021* - **Counting problems** - Ventotene, Italy.
- *September, 20-25 2020* - **Virtual workshop: Simplicial Volumes and Bounded Cohomology** - online.
- *February, 23-28 2020* - **Young Geometric Group Theory** - Saint Jacut de la mer, France.
- *September, 8-14 2019* - **Of coarse! Quasi-isometries and groups: rigidity and classification** - Ventotene, Italy.
- *July, 8-12 2019* - **Arbeitstagung 2019 on Geometry** - MPIM, Bonn.
- *June, 30 - July, 5 2019* - **Young Geometric Group Theory** - Bilbao.
- *April, 8-12 2019* - **Workshop: Riemannian and Simplicial Volume** - KIT, Karlsruhe.
- *February, 21-23 2019* - **Workshop su varietá reali e complesse: geometria, topologia e analisi armonica** - SNS, Pisa.

OTHER SKILLS

Software skills
I'm quite familiar with the following software: LaTeX, Python, Mathematica, Excel.

Language skills
Italian - mother tongue
English - good