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# Federico Fallucca

**Nationality:** Italian **Date of birth:** 3 Jan 1996 **Gender:** Male

**Phone number:** (+39) 3337924176 **Email address:** federico.fallucca@unitn.it

**Email address:** fallucca96.96@hotmail.it

**Website:** https://fefe9696.github.io/federico.fallucca.github.io/

**Work:** Via Sommarive 14, Povo, 38123 Trento (Italy)

## CURRENT POSITION

### Ph.D. in Mathematics

[ 1 Nov 2019 – Current ]

I am doing my Ph.D. at the University of Trento, Italy, and at University of Bayreuth, Germany (*cotutelle de thèse*).

The expected date of the defence is September 2023.

**Thesis:** On the degree of the canonical map of surfaces of general type.

**Supervisors:** Prof. Dr. Ingrid Bauer and Prof. Dr. Roberto Pignatelli.

## EDUCATION AND TRAINING

### Master's Degree in Mathematics - Curriculum Advanced Mathematics

***University of Trento*** [ 24 Oct 2017 – 23 Oct 2019 ]

**City:** Trento
**Country:** Italy
**Field(s) of study:** Mathematics
**Final grade:** full marks with honours (cum laude) – **Level in EQF:** EQF level 7
**Thesis:** Classification of (ℤ/2ℤ)^k− abelian coverings of P^2 with geometric genus equal to 3 and canonical linear system base point free.

### Bachelor's Degree in Mathematics

***University of L'Aquila*** [ 21 Aug 2014 – 22 Jul 2017 ]

**City:** L'Aquila
**Country:** Italy
**Field(s) of study:** Mathematics
**Final grade:** full marks with honours (cum laude) – **Level in EQF:** EQF level 6
**Thesis:** Introduzione alle rappresentazioni di gruppi di matrici: Il caso di SO(3,R) - Introduction to representations of groups of matrices: The case of SO(3,R)

## PUBLICATIONS

### Smooth k-double covers of the plane of geometric genus 3

[2023]

with R. Pignatelli, to appear on Rend. Mat. Appl.

In this work we classify all smooth surfaces with geometric genus equal to three and an action of a group G isomorphic to $\mathbb{Z}_2^k$ such that the quotient is a plane. We find 11 families. We compute the canonical map of all of them, finding in particular a family of surfaces with canonical map of degree 16 that we could not find in the literature. We discuss the quotients by all subgroups of G finding several K3 surfaces with symplectic involutions. In particular we show that six families are families of triple K3 burgers in the sense of Laterveer.

### Examples of surfaces with canonical map of degree 12, 13, 15, 16, and 18

[2022]

to appear on Ann. Mat. Pura Appl.

In this note we present examples of complex algebraic surfaces with canonical maps of degree 12, 13, 15, 16 and 18. They are constructed as quotients of a product of two curves of genus 10 and 19 using certain non-free actions of the group $S_3 x \mathbb{Z}_3^2$. To our knowledge there are no other examples in literature of surfaces with canonical map of degree 13, 15, and 18.

### Some surfaces with canonical map of degree 4

[2021]

with R. Pignatelli, to appear on Port. Math.

In this short note we construct unbounded families of minimal surfaces of general type with canonical map of degree 4 such that the limits of the slopes assume countably many different values among 6+2/3 and 8.

### Some surfaces with canonical maps of degree 10, 11 and 14

[2023]

with C. Gleissner, Math. Nachr. (online)

In this note we present examples of complex algebraic surfaces of general type with canonical maps of degree 10,11 and 14. They are constructed as quotients of a product of two Fermat septics using certain free actions of the group $\mathbb{Z}_7^2$.

## HONOURS AND AWARDS

### Kovalevskaya grant ICM 2022

[ 6 Jul 2022 ]

Grant to participate to the International Congress of Mathematics (ICM) in Saint Petersburg (Russia), 6 -14 July 2022 (canceled due to the war between Russia and Ukraine), awarded by ICM and Italian Mathematical Union.

### Ph.D. scholarship at the University of Trento

[ 1 Nov 2019 ]

Three-year scholarship to support doctoral research studies in Mathematics at the University of Trento.

### Scholarship for undergraduate students in Mathematics at the University of L'Aquila

[ 22 Jul 2015 ]

€3000 scholarship for deserving students enrolled in the first year of the Bachelor's degree program in Mathematics at the University of L'Aquila.

## CONFERENCES AND SEMINARS

### Algebraic Geometry in Roma Tre. A conference on the occasion of Sandro Verra's 70(+2)th birthday

[ Rome, Italy, 14 Jul 2022 – 17 Jul 2022 ]

**Poster presentation: Surfaces with canonical map of degree 10, 11, 14.**

Joint presentation with Christian Gleissner.

**Link:** http://ricerca.matfis.uniroma3.it//users/moduli/verra70/poster.html

### First UMI meeting of Ph.D. students

[ Padua, Italy, 26 May 2022 – 27 May 2022 ]

**Talk:** Surfaces with canonical map of high degree.

The meeting was part of the celebrations for the 100 years of the Italian Mathematical Union and the 800 years of the University of Padua, held in Padue in the week 23-27 May 2022.

**Link:** https://www.100umi800unipd.it/?page_id=362#parallel-sessions

## INVITED TALKS

### University of Bayreuth, Germany

[ 21 Jul 2022 ]

**Title:** Examples of surfaces with canonical map of degree 4

I presented the paper *Examples of surfaces with canonical map of degree 4,* by Carlos Rito.

The talk was given within the seminars series of Algebraic Geometry Group at the University of Bayreuth.

### University of Bayreuth, Germany

[ 26 Oct 2021 ]

**Title:** On the degree of the canonical map of a Product-Quotient surface

I presented my research activity. The talk was given within the seminars series of Algebraic Geometry Group at the University of Bayreuth.

### University of Trento, Italy

[ 8 Jun 2020 ]

**Title:** Teorema del Cono di Mori e MMP per superfici - On the Mori Cone Theorem and the MMP for surfaces.

I presented (online due to pandemic) the Mori Cone Theorem and the Minimal Model Program for surfaces.

### University of Trento, Italy

[ 7 Nov 2018 ]

**Title:** About Ultrafilters and Tychonoff Theorem

I presented a proof of the Tychonoff Theorem through the filter and ultrafilters theory.

### University of L'Aquila, Italy

[ 25 Mar 2017 ]

**Title:** Brachistocrona - Brachistochrone

Using a wooden model of my own construction, I compared the travel times of a ball constrained to slide along an inclined straight axis and a ball constrained to slide along a cycloid.

## ORGANIZATIONS

### Doc in Progress, University of Trento, Department in Mathematics

[ Sep 2020 – Jan 2023 ]

I have been one of the organizers of the cycle "Doc in Progress", which consists of a series of meeting with dissemination purposes. Speakers are chosen from among currently Ph.D. students as the name suggests, in Mathematics or related fields.

**Link:** https://docinprogressunitn.wordpress.com/

## TEACHING EXPERIENCE

### Teaching Assistant of the course "Geometria 1"

[ 12 Sep 2022 – 22 Feb 2023 ]

Teaching assistant for the course of Geometry and Linear Algebra for undergraduate students in Physics at the University of Trento. The commitment included delivering 28 hours of lectures, conducting weekly student office hours, and participating in five exam sessions.

### Teaching Assistant of the course "Geometria 1"

[ 14 Sep 2020 – 22 Feb 2021 ]

Teaching assistant for the course of Geometry and Linear Algebra for undergraduate students in Physics at the University of Trento. The commitment included delivering 28 hours of lectures, conducting weekly student office hours, and participating in five exam sessions. Due to the pandemic, the lessons were held both in person and remotely.

### Supervisor of online university exams

[ 29 Jun 2020 – 9 Nov 2020 ]

Due to the pandemic, the University of Trento had to conduct many written exams online that were originally planned to be in person. Paid proctoring positions were offered for overseeing these exams. I was granted 16 hours of paid proctoring for the Linear Algebra course in the Civil, Environmental, and Mechanical Engineering Bachelor's degree program.

## NETWORKS AND MEMBERSHIPS

### Classification Problems in Algebraic Geometry: Lefschetz Properties and Moduli Spaces

[ Research Project GNSAGA-INdAM, 13 Mar 2023 – 13 Mar 2024 ]

I am one of the members of the Research Project CUP_E53C22001930001 coordinated by Filippo Favale funded by

GNSAGA-INdAM: the National Group for Algebraic and Geometric Structures and their Applications, a section of the National Institute of High Mathematics in Rome.

### GNSAGA - INdAM

[ 1 Feb 2020 – Current ]

I am a member of GNSAGA, the National Group for Algebraic and Geometric Structures and their Applications, a section of INdAM, the National Institute of High Mathematics in Rome

**Link:** https://www.altamatematica.it/gnsaga/attivita/

### Q&A Math Stack Exchange

I am a user of the Q&A Math Stack Exchange website, where I enjoy answering and asking questions from every branch of mathematics.

**Link:** https://math.stackexchange.com/users/531470/federico-fallucca

## LANGUAGE SKILLS

Mother tongue(s): **Italian**

**Other language(s):**

**English**

**LISTENING** B2 **READING** B2 **WRITING** B2

**SPOKEN PRODUCTION** B2 **SPOKEN INTERACTION** B2

*Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user*

## DIGITAL SKILLS

LaTeX / MAGMA / MATLAB / Java