

Annamaria IEZZI

Curriculum Vitae et Studiorum

Dipartimento di Matematica e Applicazioni
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Personal Information

Annamaria Iezzi, born in Teramo (Italy) on January 19, 1989. Citizenship: Italian.

Research interests

Algebraic geometry over finite fields (algebraic curves, number of rational points, function fields, elliptic curves, abelian surfaces, etc.), algebraic and computational number theory, cryptography (isogeny-based cryptography, post-quantum cryptography), coding theory (algebraic geometric codes).

Employment

- 01/22 – **Ricercatrice di tipo A** in MAT/03 - Geometry ~ **Post-doc** - Dipartimento di Matematica e Applicazioni "Renato Caccioppoli", Università degli Studi di Napoli Federico II, Napoli.
- 09/20 – 12/21 **ATER** (Attachée Temporaire d'Enseignement et de Recherche) ~ **Visiting assistant professor** - Laboratoire GAATI (*Géométrie Algébrique et Applications à la Théorie de l'Information*), Université de la Polynésie Française, Tahiti.
- 08/17 – 08/20 **Postdoctoral Scholar Researcher** - Department of Mathematics & Statistics, University of South Florida, Tampa.
Mentor: Jean-François Biasse.
- 09/15 – 08/17 **ATER** (Attachée Temporaire d'Enseignement et de Recherche) ~ **Visiting assistant professor** - Institut de Mathématiques de Marseille (I2M), Aix-Marseille Université, Marseille.
- 10/13 – 09/15 **Monitorat** ~ **Teaching assistant** - Institut de Mathématiques de Marseille (I2M), Aix-Marseille Université, Marseille.

Education

- 02/2022 **French Qualification** to become a Maître de Conférences in section CNU 25 (Mathematics).
- 11/12 – 07/16 **Ph.D. in Mathematics**, Aix-Marseille Université (*grant of LabEx Archimède*).
Title of the thesis: *Number of rational points on singular curves over finite fields*.
Supervisor: Yves Aubry.
- 09/10 – 07/12 **M.S. cum laude in Mathematics**, Università degli Studi di Roma Tre, Rome.
Title of the master's thesis: *Almost Dedekind domains*.
Supervisor: Stefania Gabelli.
- 09/11 – 01/12 **Five-months Erasmus Exchange Program**, Université d'Aix-Marseille II, Marseille, within the master *Mathématiques Discrètes et Fondements de l'Informatique*.
- 09/07 – 07/10 **B.S. cum laude in Mathematics**, Università degli Studi di Roma Tre, Roma.

Publications

Research

- [7] [A. Iezzi](#), M. Q. Kawakita, M. Timpanella, - *New sextics of genus 6 and 10 attaining the Serre bound*. Accepted to Advances in Geometry (2023). [arXiv: 2306.01928](https://arxiv.org/abs/2306.01928).

- [6] L. Amorós, [A. Iezzi](#), K. Lauter, C. Martindale, J. Sotáková - *Explicit connections between supersingular isogeny graphs and Bruhat-Tits trees*. Women in Numbers Europe III: Research Directions in Number Theory. Association for Women in Mathematics Series, vol 24. Springer, Cham, pp 39–73 (2021) https://doi.org/10.1007/978-3-030-77700-5_2.
- [5] X.-d. Hou, [A. Iezzi](#) - *An application of the Hasse-Weil bound to rational functions over finite fields*, Acta Arith. 195, no. 2, 207-216 (2020) <https://doi.org/10.4064/aa190701-5-12>.
- [4] J.-F. Biasse, [A. Iezzi](#), M. Jacobson Jr. - *A note on the security of CSIDH*, Progress in Cryptology - INDOCRYPT 2018, Proceedings, Security and Cryptology, vol. 11356, Springer, pp. 153-168, (2018), https://doi.org/10.1007/978-3-030-05378-9_9.
- [3] Y. Aubry, [A. Iezzi](#) - *Optimal and maximal singular curves*, Contemporary Mathematics, 686, Amer. Math. Soc., pp. 31-43, (2017), <https://doi.org/10.1090/conm/686>.
- [2] [A. Iezzi](#) - *Nombre de points rationnels des courbes singulières sur les corps finis*, Tesi di dottorato.
- [1] Y. Aubry, [A. Iezzi](#) - *On the maximal number of points on singular curves over finite fields*, Mosc. Math. J. 15 (2015), no. 4 pp. 615-627, <https://doi.org/10.17323/1609-4514-2015-15-4-615-627>.

Preprint

- [8] Jenny Fuselier, [A. Iezzi](#), Mark Kozek, Travis Morrison, Changningphaabi Namoiyam, - *Computing supersingular endomorphism rings using inseparable endomorphisms* (2023) [arXiv:2306.0305](https://arxiv.org/abs/2306.0305).

Outreach

- [9] E. Berardini, J. Cohen, G. Geoffroy, [A. Iezzi](#): *Pi Day: An International Festival of Mathematics*. EMS Newsl. 3 (2018), 36-37, <https://doi.org/10.4171/NEWS/107/8>.

Talks

Research talks - International conferences

- 11/07/2023 *Computing supersingular endomorphism rings using inseparable endomorphisms*, SIAM Conference on Applied Algebraic Geometry (AG23), Eindhoven, Netherlands.
- 22/06/2023 *Kani–Rosen theorem, a tool for finding maximal curves*, 15th International Conference on Finite Fields and Their Applications (Fq15), Paris, France.
- 01/03/2023 *Computing supersingular endomorphism rings using inseparable endomorphisms*, COmputations and their Use in Number Theory (COUNT), CIRM, Marseille, France.
- 16/07/2022 *Computing the endomorphism ring of a supersingular elliptic curve*, Coding theory and cryptography, a conference in honor of Joachim Rosenthal's 60th birthday, Zurich, Switzerland.
- 30/06/2022 *Computing the endomorphism ring of a supersingular elliptic curve*, Jornadas de Teoría de Números, Logroño, Spain.
- 18/06/2022 *Computing the endomorphism ring of a supersingular elliptic curve*, AWM (Association for Women in Mathematics) Research Symposium, Minneapolis, United States. (online)
- 01/06/2022 *Finding cycles in the supersingular isogeny graph*, Combinatorics 2022, Mantova, Italy.
- 22/09/2021 *Bruhat–Tits trees as a cryptanalytic tool for isogeny-based cryptography*, First Annual Conference in Cryptography and Coding Theory Conferenza Annuale in Crittografia e Codici, organised by the Unione Matematica Italiana (UMI) and the initiative De Componendis Cifris. (online)
- 01/06/2021 *Can we use Bruhat–Tits trees to better understand supersingular isogeny graphs?*, Arithmetic, Geometry, Cryptography and Coding Theory (AGC²T), virtually at CIRM, Marseille. (online)
- 12/06/2019 *An application of the Hasse-Weil bound to rational functions over finite fields*, Arithmetic, Geometry, Cryptography and Coding Theory (AGC²T17), CIRM, Marseille, France.
- 07/06/2019 *An application of the Hasse-Weil bound to rational functions over finite fields*, Finite Fields and their Applications (Fq14), Vancouver, Canada.
- 11/12/2018 *A note on the security of CSIDH*, Indocrypt 2018, New Delhi, India.
- 18/05/2015 *Towards maximal singular curves over finite field*, Arithmetics, Geometry, Cryptography and Coding Theory (AGCT), CIRM, Marseille.

- 11/06/2014 *Singular curves over finite fields with many rational points*, Yet Another Conference on Cryptography (YACC), Porquerolles Island, France.
- 12/05/2014 *Singular curves over finite fields with many rational points*, Antalya Algebra Days XVI, Antalya, Turkey.
- Research talks - Meetings and seminars**
- 07/04/2023 *Not everything has been broken in isogeny-based cryptography...*, Cryptography and Coding Theory organized by the group CRITTOGRAFIA E CODICI of the Italian Mathematical Union (UMI), Perugia, Italy.
- 07/04/2023 *Computing the endomorphism ring of a supersingular elliptic curve*, Séminaire Laboratoire Jean Kuntzmann, Université Grenoble Alpes. (online)
- 31/05/2022 *Computing the endomorphism ring of a supersingular elliptic curve*, Seminario di Geometria Algebrica, Università degli studi di Roma Tor Vergata.
- 17/05/2022 *Sur le calcul de l'anneau des endomorphismes d'une courbe elliptique supersingulière*, Séminaire Théorie des Nombres, Laboratoire de Mathématiques Blaise Pascal de l'Université Clermont Auvergne.
- 04/03/2022 *Sur le calcul de l'anneau des endomorphismes d'une courbe elliptique supersingulière*, Séminaire de théorie des nombres, Laboratoire de Mathématiques Nicolas Oresme de l'Université de Caen.
- 26/01/2022 *An application of the Hasse-Weil bound to rational functions over finite fields*, Seminario di Geometria, Dipartimento di Matematica e Applicazioni, Università degli Studi di Napoli Federico II.
- 20/05/2021 *Strumenti per fare crittoanalisi nei grafi di isogenie supersingolari*, Seminario De Cifris Athesis, De Componendis Cifris (online).
- 29/04/2021 *Graphes d'isogénies supersingulières, algèbres de quaternions et arbres de Bruhat–Tits*, Séminaire GAATI, Université de la Polynésie Française.
- 22/04/2021 *Looking at supersingular isogeny graphs from the perspective of Bruhat–Tits trees*, FRAGMENT Seminar (Front Range interested in algebra, geometry and number theory), University of Colorado and Colorado State University (online).
- 25/02/2021 *Can we use Bruhat–Tits trees to better understand supersingular isogeny graphs?*, eSeminar Discrete Mathematics, Codes and Cryptography, Université de Paris 8 (online).
- 12/02/2021 *Un résultat sur les fonctions rationnelles sur un corps fini à l'aide de la borne d'Hasse–Weil*, Séminaire de Théorie des Nombres, Institut de Mathématiques de Bordeaux (online).
- 15/12/2020 *Bruhat–Tits trees as a tool for exploring supersingular isogeny graphs*, Linfoot Number Theory Seminars, University of Bristol (online).
- 10/01/2020 *A quantum attack to the isogeny problem in the “commutative case”*, Centrum Wiskunde & Informatica (CWI), Amsterdam.
- 10/11/2019 *Singular curves over finite fields with many rational points*, Fall Western Sectional Meeting, Special Session on Arithmetic Geometry in Finite Characteristic, University of California, Riverside.
- 28/10/2019 *A result on rational functions via curves over finite fields*, Discrete Mathematics Seminar, Department of Mathematics & Statistics, University of South Florida.
- 9/02/2018 *Isogeny-based cryptography, a quantum-safe alternative*, Florida Women In Mathematics Day, Florida Atlantic University.
- 8/01/2018 *Un échange de clés dans le monde des calculateurs quantiques (A key exchange in the world of quantum computers)*, workshop ANR Manta, Paris, France.
- 19/11/2018 *On the security of a recent isogeny-based cryptosystem*, Discrete Mathematics Seminar, Department of Mathematics & Statistics, University of South Florida.
- 05/03/2018 *A singular trip through the world of algebraic curves over finite fields*, Discrete Mathematics Seminar, Department of Mathematics & Statistics, University of South Florida.
- 20/11/2016 *Curve su campi finiti a singolarità prescritte (Curves over finite fields with prescribed singularities)*, Seminar of Commutative Algebra, Dipartimento di Matematica e Fisica, Università degli studi di Roma Tre.
- 05/11/2015 *Courbes optimales et maximales (Optimal and maximal curves)*, Seminar of Arithmetic and Information Theory, I2M, Université d'Aix-Marseille.

- 17/02/2015 *Sur le nombre maximum de points rationnels d'une courbe singulière sur un corps fini (On the maximal number of points on singular curves over finite fields)*, Seminar of Algebra at IMATH, Université de Toulon.
- 29/01/2015 *Sur le nombre maximum de points rationnels d'une courbe singulière sur un corps fini (On the maximal number of points on singular curves over finite fields)*, Seminar of Arithmetic and Information Theory, I2M, Université d'Aix-Marseille.
- 14/05/2013 *Courbes avec un nombre fixé de points rationnels (Curves with a prescribed number of rational points)*, Seminaire of Algebra at IMATH, Université de Toulon.

Lectures in schools/courses

- 20/05/2022 *Identity-based encryption*, 15th lecture for the online course *De Cifris Trends in Modern Cryptography*.
Video: <https://youtu.be/3vPiWQ07YsE>

Outreach talks

- 12/05/2021 *Alice in post-quantum land*, Women in Mathematics Day 2021, University College Dublin School of Mathematics and Statistics (online).
- 06/03/2021 *Si on pouvait mentir au jeu du Qui est-ce ?*, École Moorea, French Polynesia.
- 12/05/2020 *Billiards and donuts*, for the event *May 12, Mathematics: to the power of women!* (online). **Video:** https://www.youtube.com/watch?v=gh_L6H_xP78&t=145s
- 02/03/2020 *Guess who, if I can lie*, University of Tampa.
- 01/08/2019 *From a liar Guess who to error-correcting codes*, Young Cryptographers Cybercamp 2019, Florida Atlantic University, Boca Raton.
- 19/04/2019 *Guess who, if I can lie*, Math Club, University of South Florida. **Video:** https://youtu.be/4jB2Aph_Rx8
- 22/01/2016 *Allô Papa Tango Charlie, théorie des codes correcteurs (Allô Papa Tango Charlie, theory of error-correcting codes)*, for a High School class, Marseille.
- 06/06/2014 *Les nombres premiers ne sont pas si aléatoires (Prime numbers are not so random)*, Journée d'étude sur le Hasard (Thematic day on Randomness), Fort St Jean, Marseille.
- 25/03/2014 *L'hypothèse de Riemann dans le paysage des courbes sur les corps finis (The Riemann Hypothesis in the landscape of curves over finite fields)*, Ph.D. student seminar, Marseille.
- 14/03/2014 *Pi... comme pizza (Pi... as pizza)*, Pi day 2014, Campus Saint-Charles, Marseille.

Participation to research projects

- 2016-2020 ANR-15-CE39-0013 Manta: *Algebraic Geometry and Algebraic Coding Theory for Cryptography*. PI: Prof. Daniel Augot.
<https://anr.fr/Project-ANR-15-CE39-0013>

Awards

- 2016 *D'Alembert Prize 2016* awarded by the French Mathematical Society to the *Pi Day Association* (which I co-founded in 2015) for all its original and creative actions of scientific outreach.

Funding for organising outreach events

- 95 000 € by 30 different sponsors for organising the *Tournée de π* in March 2017 in Paris, Lyon and Marseille.
- 26 500 € by 15 different sponsors for organising the *Pi day 2016* in Marseille.
- 14 200 € by 12 different sponsors for organising the *Pi day 2015* in Marseille.

Teaching experience

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II - ITALY
Academic years 2021/2022, 2022/2023

Undergraduate courses:

- *Geometria e Algebra* (Spring 2022, Spring 2023).

UNIVERSITÉ DE LA POLYNÉSIE FRANÇAISE - FRENCH POLYNESIA
Academic years 2020/2021, 2021/2022

Undergraduate courses:

- *Programmation Analyse Matricielle en Python* (Fall 2020, Fall 2021).
- *Initiation à l'algèbre A* (Fall 2020, Fall 2021).
- *Analyse 1.B* (Fall 2020, Fall 2021).

UNIVERSITY OF SOUTH FLORIDA - UNITED STATES
Academic years 2017/2018, 2018/2019, 2019/2020

Graduate courses:

- *MAT 5932 - Applied Cryptography* (online course - Spring 2020).
- *MAT 6932 - Algebraic curves over finite fields* (Fall 2018).

Undergraduate courses:

- *MGF 3301 - Bridge to Abstract Mathematics* (Spring 2020).
- *MAC 2311 - Calculus 1* (Fall 2018, Spring 2018, Fall 2017).

AIX-MARSEILLE UNIVERSITÉ - FRANCE
Academic years 2013/2014, 2014/2015, 2015/2016, 2016/2017

Undergraduate courses:

- *Algèbre Linéaire* (Spring 2017, Spring 2016).
- *Géométrie et Arithmétique* (Fall 2016, Fall 2015).
- *Refresher course* in mathematics (Fall 2016, Fall 2015, Fall 2014).
- Recitations: *Géométrie et Arithmétique* (Fall 2014), *Introduction à l'Analyse* (Fall 2014), *Algèbre Linéaire* (Spring 2014).

Engaging a broad body of students:

- *Stages Hippocampe* (three-day research project for high-school students):
 - *Allô Papa Tango Charlie, théorie des codes correcteurs* (*Theory of error-correcting codes*) (creator and supervisor).
 - *The Mathematics of Sudoku* (tutor).
 - *Théorie des noeuds* (*Knot theory*) (tutor).
 - *Les Mathématiques des jeux : comment gagner presque sûrement* (*The mathematics of games: how to win almost surely*) (tutor).

Tutor for undergraduate/graduate courses:

- *Topologia Generale ed elementi di Topologia Algebrica* (Spring 2011).
- *Geometria Euclidea e Proiettiva* (Fall 2010, Fall 2009).
- *Teoria delle Equazioni e Teoria di Galois* (Spring 2010).

Mathematical outreach activities

Co-founder of the **Pi day Association** that promotes and communicates mathematics to the general public. For all its original and creative actions, the association has been awarded the **d'Alembert Prize** in 2016 by the French Mathematical Society (Société Mathématique de France).

Organisation of outreach events

MAY 12

- 12/05/2020 Organiser of **May 12**, an online event with 5 contributions by early career women in mathematics, followed by the screening of the film *Secrets of the Surface, the Mathematical Vision of Maryam Mirzakhani* - **Online** - 100 people.
Video: https://youtu.be/gh_L6H_xP78

CODEBREAKHERS

- 04/2019-06/2020 Lead instructor of **CodebreakHERS**, a week-long summer camp in cybersecurity for young girls at the University of South Florida: I have coordinated the development of the curriculum activities regarding cryptography and coding theory for the first and the second edition (unfortunately, due to covid-19, the second one never took place). **Website:** <https://www.codebreakhers.org/>

PI DAY

- 03/14,16,19/17 Director of **Tournée de π** - 3.14 Paris (Théâtre des Variétés), 3.16 Marseille (Le Silo), 3.19 Lyon (Le Transbordeur) - 2000 people.
- *From Marseille to Vegas* (mathematical musical with professional actors and musicians);
 - Three 15-minute math talks for the general public (different in each city);
 - Pie contest with prizes (only in Lyon);
 - Booths and animations.
- Videos:** <http://bit.ly/pi-day2017>
- 14/03/2016 Co-organiser of **Pi day 2016** - Théâtre National de la Criée, Marseille - 700 people.
- *Les π travaux d'Archimède* (mathematical musical with professional singers and musicians);
 - Three 15-minute math talks for the general public;
 - Pie contest with prizes;
 - Booths and animations.
- Videos:** <http://bit.ly/pi-day2016>

14/03/2015 Co-organiser of **Pi day 2015** - MuCEM, Marseille - 500 people.

- Concert of a wind orchestra;
- Three 30-minute math talks for the general public;
- Pie contest with prizes;
- Afternoon of booths and animations.

TREIZE MINUTES JEUNES CHERCHEURS
(*Thirteen minutes young researchers*)

Night of 6 multidisciplinary conferences of 13 minutes by young researchers, organized by a group of Ph.D students of Aix-Marseille Université.

Videos: <https://treize.lis-lab.fr/?cat=3>

26/04/2017 Co-organiser of **Treize Minutes Jeunes Chercheurs 2017** - Alcazar, Marseille - 300 people.

10/05/2016 Co-organiser of **Treize Minutes Jeunes Chercheurs 2016** - Alcazar, Marseille - 300 people.

Other outreach activities

09/05/2022 Invited speaker at the event *Lo sguardo di Mirzakhani*, organised by the Unione Matematica Italiana, the Gran Sasso Science Institute and the Dipartimento di Ingegneria e Scienze dell'Informazione e Matematica of the Università dell'Aquila.

06/03/2021 Invited speaker at *Indovina chi viene a cena? Aperitivo con le matematiche*, an event addressed to high school students and organized by the Università degli Studi dell'Aquila and the GSSI - Gran Sasso Science Institute. The event was part of the initiative *May 12*.

03/17/2021 Presenter for the regional regional stage of *Ma thèse en 180s* (Three-minute Ph.D.) in French Polynesia and member of the coaching team.

May 2020 Co-realizer of a mathematical scavenger hunt for the Salon Culture et Jeux Mathématiques (online).

02/2019 Career panelist at Florida Women in Mathematics Day, Florida Atlantic University.

10/2016 Guide for the booth *Tous les chemins mènent à Rome-Dragon (T3)* (*All roads lead to Rome-Dragon*), *Fête de la Science 2016*, Vieille Charité, Marseille.

05/2016 Guide for the *Exposition Imaginary*, Salon Culture et Jeux Mathématiques, Paris.

02/2016 Participation to the writing of the play *Les π travaux d'Archimède*, performed during *Pi day 2016*, at Théâtre National de la Criée in Marseille.

10/2015 Creation and animation of a booth on cryptography and coding theory: *Le charabia du numérique : mégapixels, gigaoctets, cryptage... et autres gros mots !*, *Fête de la Science 2015*, Villa Méditerranée, Marseille.

22/03/2015 Guide for the *Exposition Imaginary*, Vieux Port, Marseille.

14/03/2015 Creation and animation of the booth *Les Mathématiques nous transportent en... cuisine !* (*The Mathematics of cooking*), *Pi day 2015*, MuCEM, Marseille.

Administrative responsibilities

11/16-01/18 Secretary of the *Pi day* association.

03/14-08/17 Appointed member of I2M council (college of non-permanent researchers).

11/15-11/16 Treasurer of the *Pi day* association.

Other academic service

- Member of the Program Committee of *MathCrypt21*.

- Reviewer for the journal *Finite Fields and Their Applications*, *Journal of Number Theory*, *Journal of Mathematical Cryptology*, *Mediterranean Journal of Mathematics*, *Mathematics of Computation*, *Advances in Mathematics of Communications*, *Journal of Algebra and Its Applications*. Subreviewer for the conference *NutMiC2019*.
- Reviewer for *Mathematical Reviews* - 6 reviews.
- Organiser of a welcome day for the academic years 2014/2015 and 2015/2016 of the *Mathematics and Computer Science Doctoral School* of Aix-Marseille Université.

Computer skills

Symbolic computation	Sage, Magma
Programming	C, Python
Others	html, css, photo and video editing

Language skills

	Italian (mother tongue), French (fluent), English (fluent), Spanish (fluent), Portuguese (intermediate).
2012-2017	Creator and coordinator (and animator for the Italian language) for the project <i>Café des Langues Luminy</i> : daily conversation groups in foreign languages for students and staff of Aix-Marseille Université. The project has been awarded in 2016 the <i>Trophée Phocéén Étudiant</i> (prize for student projects) by the city of Marseille.