

Annamaria IEZZI

Curriculum Vitae et Studiorum

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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

- 09/20 – ... 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

- 02/2017 **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

- [6] L. Amorós, A. Iezzi, K. Lauter, C. Martindale, J. Sotáková - *Explicit connections between supersingular isogeny graphs and Bruhat-Tits trees*. Accepted to Women in Numbers Europe III: Research Directions in Number Theory. Association for Women in Mathematics Series. Springer.

- [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*, Ph.D Thesis.
- [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>.

Outreach

- [7] 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

- 1/06/2021 *Can we use Bruhat–Tits trees to better understand supersingular isogeny graphs?*, Arithmetic, Geometry, Cryptography and Coding Theory (AGC²T18), Virtually in CIRM, Marseille, France.
- 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

- 20/05/2021 *Strumenti per fare crittoanalisi nei grafi di isogenie supersingolari*, Seminario De Cifris Athesis, iniziativa nazionale 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.

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 ?*, Écoole Moorea, French Polynesia.
- 12/05/2020 *Billiards and donuts*, for the event *May 12, Mathematics: to the power of women!* (online).
- 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.
- 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.

Awards

Academic 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.

Student awards

- 2012 Three-year scholarship by the LabEx Archimède for a Ph.D. thesis in mathematics at Aix-Marseille Université.
- 2011 Scholarship of 500 € by the province of Rome for attending the school of excellence *Piccola Astre* (selected among the best 40 graduate students of Roma Tre).
- 2007 Scholarship 1500 € by the Università degli Studi Roma Tre for first-year students enrolled in mathematics (First ranked ex-æquo).

Grants 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

UNIVERSITÉ DE LA POLYNÉSIE FRANÇAISE - POLINESIA FRANCESE
Academic year 2020/2021

Undergraduate courses:

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

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).

UNIVERSITÀ DEGLI STUDI DI ROMA 3 - ITALY
Academic years 2009/2010, 2010/2011

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- Lead instructor of **CodebreakHERS**, a week-long summer camp in cybersecurity for young girls
06/2020 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)

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

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* and *Journal of Mathematical Cryptology*. 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 *Café des Langues Luminy*: daily conversation groups in foreign languages for students and staff of Aix-Marseille Université. The project has been awarded in 2016 the Trophée Phocéén Étudiant (prize for student projects) by the city of Marseille.

Hobbies

Photography, cooking, piano, dance (jazz, contemporary, hip-hop, latin, rock&roll), tennis.