

### Personal Information and Current Position

- Date of birth 28th November 1988  
Place of birth Cagliari (Italy)  
Citizenship Italian
- Research Group Member of the SMIR research group (Structural Music Information Research) financed by USIAS and member of the INdAM Research Group GNSAGA (Algebraic and Geometric Structures and their Applications)
- Current position **Adjunct professor of Mathematics**, degree course in Pharmacy, University of Cagliari (Italy).  
Research interests: Mathematical Music Theory, Transformational theory, Neo-Riemannian Theory, History of Mathematics and Music.  
**Teacher of Mathematics and Physics (A27)**, *Liceo Classico-Scientifico "Euclide"*, Cagliari.

### Education

- 1/10/2015 **PhD in Mathematics**, University of Pavia in co-tutorship with the University of Strasbourg and joint agreement with the University of Milano-Bicocca and INdAM.  
27/11/2018 Thesis title: *Geometric representation and algebraic formalization of musical structures*  
Supervisors: Athanase Papadopoulos (IRMA/Unistra), Ludovico Pernazza (Unipv). Co-supervisor: Moreno Andreatta (IRCAM/CNRS/IRMA)
- 1/10/2012 **Master of Science in Mathematics**, University of Cagliari.  
31/03/2015 Grade: 110/110 cum laude  
Thesis title: *The generalized diatonic scale and the Stern-Brocot trees*  
Supervisor: Prof. Lucio Cadeddu
- 1/11/2003 **Academic diploma (M.A.) in Viola**, Conservatory "G. P. da Palestrina", Cagliari.  
15/07/2014 Licenses: Music Theory and Solfeggio (3 years), Piano (3 years), History of Music (2 years), Harmony (2 years), Quartet String (3 years).  
Other: Orchestral practice (6 years), Choral singing (5 years), Chamber music (4 years).
- 1/10/2007 **Bachelor of Science in Mathematics**, University of Cagliari.  
28/02/2012 Grade: 106/110  
Thesis title: *Music and Mathematics: the CHAS algorithm*  
Supervisor: Prof. Lucio Cadeddu
- 2002–2007 **Scientific High School Diploma**, *Liceo Scientifico "L.B. Alberti"*, Cagliari.  
Grade: 100/100

### Participation to schools, workshops, congresses and masterclass

- 24/08/2021 Online training course "*Potenziare la didattica digitale a distanza e integrata: videolezione e ambiente di apprendimento*" (9 h), Tecnica della scuola
- 12-16/07/2021 Summer school of excellence "Masterclass for STEAM" (30 h), Fondazione Golinelli, Bologna
- 15/05/2021 Online training course "*Potenziare la didattica digitale a distanza e integrata: tecnologie per la progettazione*" (10 h), Tecnica della scuola
- 15/05/2021 Online training course "*Impostare i percorsi per le competenze trasversali e l'orientamento*" (6 h), Tecnica della scuola
- Apr-May 2021 Online training course "*Gestire l'innovazione nella scuola del 202\**" by Biancato, Benassi, Belardinelli, Fini, Grillai, Maragliano, Meneghetti, Raina, Rucci, Solesin, Stefanel (12 h), Indire
- 11/04/2020 Master "Bes - Bisogni Educativi Speciali" (1500 h, 60 CFU), Università per Stranieri "Dante Alighieri" di Reggio Calabria

- 8/06/2019 International conference *Education and Post-Democracy*, Università di Cagliari, Italy.
- 30/05/2019 *Partial Differential Equations in Analysis and Mathematical Physics*, Santa Margherita di Pula, Italy.  
1/06/2019
- 22-23/05/2019 National congress *Educare alla razionalità – L'insegnamento della matematica e della logica nella scuola secondaria*, Università di Torino, Italy.
- 27/11/2018 Course "*Lo sviluppo di competenze didattiche*" in DISCENTIA project (DIgital SCience and EducatIoN for Teaching Innovative Assessment), by R. Trincherò, C. Cabras, M. Ranieri (20h, with exam), Università di Cagliari, Italy.  
1/01/2019
- 4-6/10/2018 XXXV congress UMI-CIIM *Matematica e scienze dell'insegnamento: frontiere da aprire e ponti da costruire*, Università di Cagliari, Italy.
- 3-7/09/2018 *European Women in Mathematics - General Meeting 2018*, Graz, Austria.
- 25-29/07/2018 *Bridges2018 - Mathematics, Art, music, Architecture, Education, Culture*, Stockholm.
- 16-18/05/2018 "*Journées d'Informatique Musicale*" (JIM2018), Université de Picardie, Amiens.  
18/04/2018 Workshop "*Mathematical and Computational models in Music*", Università di Pavia.  
18/01/2018 "*Modèles mathématiques et computationnels dans la chanson*", Département de musicologie, Université de Strasbourg.  
5/04/2018  
1/02/2018 6e Journée des jeunes chercheurs du Gream - "Apports multidisciplinaires en musicologie : enjeux, interrogations et défis", Strasbourg.
- 15/11/2017 "Scientific communication and research culture" by P. Montgomery (22h), Université de Strasbourg.  
17/01/2018
- 11/11/2017 XVI Congress of The Italian Society of History of Mathematics, Pavia.  
3/07/2017 International Conference "*art\*science/Leonardo50*", Bologna.  
5/07/2017
- 30/06/2017 IX EuroMAC "*European Conference in Music Analysis*", Université de Strasbourg.  
1/07/2017
- 26/06/2017 VI International Conference MCM2017 "*Mathematics and Computation in Music*", UNAM, Mexico City.  
29/06/2017
- 19/06/2017 Masterclass "*Contemporary Perspectives in Geometry*", IRMA (Université de Strasbourg).  
23/06/2017
- 15/06/2017 "*GT Graphes et Optimisation*", Université Paris Dauphine, France.
- 8-10/06/2017 "*99e rencontre entre mathématiciens et physiciens théoriciens : Géométrie et physique*", IRMA/Université de Strasbourg, France.
- 23/04/2017 Workshop "*Post-Tonal Theory and Analysis*" by R. Hermann, GREAM, University of Strasbourg,  
24/05/2017 France.
- 28/04/2017 9th Karlsruhe-Heidelberg-Strasbourg "*Geometry Day*", IRMA/Université de Strasbourg.  
1/10/2016 PhD/Master course "*Geometric theory of groups*" by T. Weigel (56h, with exam), University of  
7/02/2017 Milano-Bicocca, Italy.
- 7-9/10/2016 XXXIII congress UMI-CIIM "*Criticità per l'insegnamento della matematica nella scuola di oggi*", Pavia, Italy.
- 27/06/2016 Campus Levi doctoral seminars 2016 with scholarship "*Teoria musicale. L'organizzazione dello spazio sonoro dall'antichità all'età contemporanea*" (40h), Venezia, Italy.  
2/07/2016
- 9/03/2016 PhD course "*Harmonic maps between Riemannian surfaces*" by F. Bonsante (28h), University of  
18/05/2016 Pavia, Italy.
- 1/02/2016 PhD course "*Linguaggi, problemi e metodi della comunicazione della ricerca scientifica*" by M. Cagnotti  
5/05/2016 e G. Mainino (20h), Pavia, Italy.
- 14/04/2016 PhD course "*Storia della probabilità nella prima metà del XX secolo*" by E. Regazzini (30h), University  
13/05/2016 of Pavia, Italy.
- 10/03/2016 PhD course "*Finite simple groups*" by T. Weigel (28h, with exam), University of Milano-Bicocca,  
21/04/2016 Italy.

- 08/2010 Masterclass for viola with M. Dimitri Mattu organized by *Società dei Concerti di Cagliari*, Scuola Civica di Musica di Quartu (CA), Italy.
- 08/2009 Masterclass for viola with M. Dimitri Mattu organized by *Accademia musicale Euromediterranea*, Tempio Pausania, Italy.

## Experience

### Teaching

2018 – **Adjunct professor**, University of Cagliari.

- A.Y. 2021–22, Lectures for “Mathematics” (48h) for the degree course in Pharmacy, University of Cagliari.
- A.Y. 2020–21, Lectures for “Mathematics” (48h) for the degree course in Pharmacy, University of Cagliari.
- A.Y. 2019–20, Lectures for “Mathematics” (48h) for the degree course in Pharmacy, University of Cagliari.
- A.Y. 2018–19, Lectures for “Mathematics” (48h) for the degree course in Pharmacy, University of Cagliari.

2013 – 2021 **Exercise Lecturer**, Universities of Cagliari, Milan and Pavia, Italy.

- A.A. 2020–21, Exercises Lectures for “Mathematical Analysis 1” (35h), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.
- A.A. 2019–20, Exercises Lectures for “Algebra and Geometry” (15h), e-learning course for the B.Sc. in Electrical, Electronic and Computer Engineering, Faculty of Engineering, University of Cagliari,
- A.Y. 2019–20, Exercises Lectures for “Mathematical Analysis 1” (48h), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.
- A.Y. 2018–19, Exercises Lectures for “Algebra and Geometry” (30h), e-learning course for the B.Sc. in Electrical, Electronic and Computer Engineering, Faculty of Engineering, University of Cagliari.
- A.Y. 2018–19, Exercises Lectures for “Mathematical Analysis 1” (48h), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.
- A.Y. 2017–18, Exercises Lectures for “Algebra and Geometry” (30h), e-learning course for the B.Sc. in Electrical, Electronic and Computer Engineering, Faculty of Engineering, University of Cagliari.
- A.Y. 2016–17, Exercises Lectures for “Mathematic” (16h), course for the B.Sc. in Biological Science, Faculty of Science, University of Pavia.
- A.Y. 2016–17, Exercises Lectures for “Mathematics” (20h), course for the B.Sc. in Economy and Management, Faculty of political, economic and social science, University of Milan.
- A.Y. 2015–16, Exercises Lectures for “Mathematical Analysis 1” (40h), course for the B.Sc. in Mathematics and B.Sc in Physics, Faculty of Science, University of Cagliari.
- A.Y. 2015–16, Exercises Lectures for “Discrete Mathematics” (30h), course for the B.Sc. in Informatics, Faculty of Science, University of Cagliari.
- A.Y. 2015–16, Exercises Lectures for “Mathematics and Statistics” (22h), course for the B.Sc. in Natural Science, Faculty of Biology and Farmacy, University of Cagliari.
- A.Y. 2015–16, Exercises Lectures for “Geometry” (20h), course for the B.Sc. in Physics, Faculty of Science, University of Cagliari.
- A.Y. 2014–15, Laboratory Exercises Assistant for “Elements of Computer Science” (24h), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.
- A.Y. 2014–15, Exercises Lectures for “Mathematical Analysis 1” (40), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.
- A.Y. 2012–13, Exercises Lectures for “Mathematical Analysis 1” (18), course for the B.Sc. in Mathematics, Faculty of Science, University of Cagliari.

2015 – 2018 **Lecturer of Pre-courses**, Universities of Cagliari and Pavia, Italy.

Lecturer for pre-courses for first year students of undergraduate courses.

- Aug. – Sept. 2020, Lecturer for “Mathematics” (30h), Faculty of Science, University of Cagliari.
- Sept. 2018, Lecturer for “Mathematics” (30h), B.Sc. in Natural Science, University of Cagliari.
- Sept. 2017, Lecturer for “Mathematics” (15h), B.Sc. in Mathematics, University of Pavia.
- Sept. 2016, Lecturer for “Mathematics” (15h), B.Sc. in Mathematics, University of Pavia.
- Sept. 2015, Lecturer for “Mathematics” (40h), Faculty of Science, University of Cagliari.
- Sept. 2015, Lecturer for “Geometry” (20h), Faculty of Engineering, University of Cagliari.
- Sept. 2015, Lecturer for “Mathematical Analysis” (44h), Faculty of Engineering, University of Cagliari.

## 2014 – **Teacher.**

- Oct 2020 – Jun 2020, Teacher of Mathematics and Physics, High School "Euclide", Cagliari.
- Oct 2019 – Jun 2020, Special educational needs teacher, High School "De Sanctis-Deledda", Cagliari.
- Sept 2019 – Jun 2020, Teacher of Mathematics, High School "Siotto", Cagliari.
- Sept 2019 – Jun 2020, Teacher of Mathematics, High School "Foiso Fois", Cagliari.
- Dec 2018 – Jul 2019, Teacher of Mathematics for the project "Tutti a scol@", High School "L. B. Alberti", Cagliari.
- Oct 2018 – Jun 2019, Special educational needs teacher, High School "De Sanctis-Deledda", Cagliari.
- Oct 2018 – Feb 2019, Teacher of Mathematics, High School "De Sanctis-Deledda", Cagliari.
- Apr 2014 – Jun 2015, Teacher for the first and the second level of the courses of Computer Science organized by Permanent Territorial Center for Education and Training in Adult Age, Istituto Comprensivo Statale, Serramanna (VS), Italy.
- Sept 2014 – May 2015, Teacher of Mathematics and Physics, High School "Luigi Pirandello", Cagliari.

## Information technology experiences

2013 – 2014 **Webmaster, Web Developer**, *Conservatorio di Musica "G. P. da Palestrina"*, Cagliari.  
Development of the new website and collaboration for the management of the current one.

## 2005 – **Webmaster, Web Developer and Web Designer.**

- 2005 –, Webmaster, Web Developer and Web Designer of the website <http://yuka88.org>.
- 2018, Web Developer and Web Designer of the website for the workshop *Mathematical and Computational models in Music*.
- 2014, Web Developer and Web Designer of the *Mattu Oliviero Duo* website.
- 2012, Webmaster of the *Orchestra Dorica* website.

## Talks

- 29/06/2021 Webinar "On the evolution of the Tonnetz in XVIII and XIX century", workshop "Mathematical and Computational Models in Music", Università di Pavia
- 17/03/2021 Webinar "Come suonano i numeri irrazionali?"
- 28/09/2019 "L'arte della Matematica", Notte dei Ricercatori, Università di Cagliari.
- 29/04/2019 "Musica irrazionale",  $M=M(c,t)+m$  [Matematica, Cinema, Teatro + Musica], Università di Cagliari.
- 5/10/2018 Laboratory "Costruzioni geometriche e aritmetiche attraverso la musica", XXXV congress UMI-CIIM, Università di Cagliari.
- 28/09/2018 "Matematica e Musica", Notte dei Ricercatori, Università di Cagliari.
- 3-7/09/2018 "Mathematical Music Theory: an overview and some pedagogical experiences" (poster), European Women in Mathematics - General Meeting 2018, Graz (Austria).
- 26/07/2018 "A generalized Dual of the Tonnetz for Seventh Chords: Mathematical, Computational and Compositional Aspects", Bridges 2018: Mathematics, Art, Music, Architecture, Education, Culture, Stockholm.
- 25/06/2018 "Algebraic formalizations and geometric visualizations of musical structures", IRMA/Université de Strasbourg.
- 7/06/2018 "Graph-theoretical and algebraic strategies for representing musical structures: an overview and some pedagogical approaches", IRMA/Université de Strasbourg.
- 18/05/2018 "Learning geometry and music through computer-aided music analysis and composition: a pedagogical approach" (short talk and poster), JIM2018, Amiens (France).
- 19/04/2018 "Algebraic formalizations of musical structures and their geometric representations", *Insalate di matematica* seminars, Università di Milano-Bicocca.
- 18/04/2018 "Generalized  $PLR$ -group and Chicken-Wire Torus for seventh chords", *Mathematical and Computational models in music* workshop, Università di Pavia.
- 9/03/2018 "El proyecto SMIR: Matemáticas, informática, cognición", Universidad de Salamanca.
- 1/02/2017 "Neo-Riemannian transformations and their geometric representations: a generalization for seventh chords", 6e Journée des jeunes chercheurs du Gream - "Apports multidisciplinaires en musicologie : enjeux, interrogations et défis", Université de Strasbourg.

- 10/11/2017 "Viaggio tra cammini musicali su modelli geometrici", for the *Festival della Scienza* (X edition), Cagliari.
- 5/07/2017 "Can mathematics help to compose music?", International Conference *art\*science*, Bologna.
- 28/06/2017 "On the group of transformations of classical types of seventh chords", International Conference MCM2017, UNAM, Mexico City.
- 19/06/2017 "Algebraic structures on musical chords and their geometric visualizations", IRMA, Strasbourg (France).
- 15/06/2017 "Musical Graphs", GT Graphes et Optimisation, Université Paris Dauphine.
- 26/05/2017 "Examples of applied algebra and geometry in music theory and composition", University of Pavia.
- 10/11/2016 "La sezione aurea in musica", *Festival della Scienza* (IX edition), Cagliari.
- 19/04/2016 "Musical graphs: the Tonnetz and its generalizations", University of Pavia.
- 10/12/2015 "La scala diatonica generalizzata e gli alberi di Stern-Brocot" (short talk and poster), University of Cagliari.
- 13/11/2015 "Pitagora e la musica", for the *Festival della Scienza* (VIII edition), Cagliari.
- 10/11/2013 "Musica, analisi ed esecuzione" for the *Festival della Scienza* (VI edition), Cagliari.
- 16/03/2012 "I canoni musicali e le superfici non-orientabili", University of Cagliari.

## Scholarships and Awards

- 2021 Winner of the public competition for permanent Mathematics and Physics teacher in high schools.
- 2018 First prize for the poster "Mathematical Music Theory: an overview and some pedagogical experiences", presented at the 18th General Meeting of EWM in Graz.
- 2017 Winner of the selection of a funding financed by the Embassy of France in Italy for the organization of the workshop *Mathematical and Computational models in Music* at the University of Pavia (€1000).
- 2017–2018 Winner of selections for a mobility grant to carry out research periods abroad reserved for PhD students of the University of Pavia (€13200).
- 2015–2018 Winner of the competition to access to the PhD program of the University of Pavia and University of Milano-Bicocca PhD with scholarship awarded by University of Pavia.
- 2015 My Master thesis has been selected among the 17 best thesis of the University of Cagliari for the A.Y. 2014-15
- 2008 "Assegno di merito" awarded by *Regione Autonoma della Sardegna* for deserving students (€3000).

## Scientific travels

- 1/03/2017 – 30/09/2018 IRMA (Institut de Recherche Mathématique Avancée), Université de Strasbourg (France).
- 8-10/03/2018 Universidad de Salamanca (Spain).
- 19-21/05/2016 IRCAM (Institut de Recherche et Coordination Acoustique/Musique Ircam), Paris (France).

## Other activities

- Referee for *Rivista di analisi e teoria musicale* and for *Journées d'Informatique Musicale - JIM2020*.
- 2020 – Member of the National Secretariat of ADI (Associazione Dottorandi e Dottori di Ricerca in Italia).
- 2019 – National coordinator in the school sector for ADI (Associazione Dottorandi e Dottori di Ricerca in Italia) and member of the board of ADI Cagliari.
- 2019 – 2020 Organizer of the seminars in  $M=M(c,t) + m$  [*Matematica, Cinema, Teatro + Musica*], funded by the PLS, INdAM and the Department of Mathematics and Computer Science, University of Cagliari.
- 2018 – 2019 Organizer of the *Mathemusical seminars* financed by SMIR project, IRMA (University of Strasbourg).
- 2018 Organizer of the workshop *Mathematical and Computational models in Music* financed by the Embassy of France in Italy, University of Pavia.

## Languages

Italian	<b>C2</b>
English	<b>B2 (certificate Pearson-LCCI Jetset Level 5)</b>
German	<b>A1/A2</b>
French	<b>A2</b>

## Computer skills

- ECDL specialised certificate - IT security
- OS: Microsoft Windows (3.0, 95, 98, XP, Vista, 7, 10), Linux (Ubuntu)
- Structured programming languages: C, Matlab, PostScript
- Object-oriented programming languages: Java
- Markup languages: HTML, XML, TeX
- Graphics Softwares: GIMP, Blender, Inkscape
- Scorewriter: MuseScore
- Computer Security: basic knowledge about cryptography and cryptographic protocols

## Publications

- [1] S. Cannas, M. Andreatta, *A Generalized Dual of the Tonnetz for Seventh Chords: Mathematical, Computational and Compositional Aspects*, Proceedings of Bridges 2018: Mathematics, Art, Music, Architecture, Education, Culture, Tessellations Publishing, Stockholm, 2018. ISBN: 978-1-938664-27-4
- [2] S. Cannas, *Learning geometry and music through computer-aided music analysis and composition: a pedagogical approach*, Journées d'Informatique Musicale (JIM 2018), May 2018, Amiens, France, 2018. hal-01791428.
- [3] S. Cannas, M. Andreatta, *Can Mathematics help to compose music?*, *art\*science 2017/Leonardo 50 Proceedings*, Noema, Ravenna, 2018. ISBN 978-88-909189-7-1
- [4] S. Cannas, S. Antonini, L. Pernazza, *On the group of transformations of classical types of seventh chords*, in: O. Agustín-Aquino, E. Lluís-Puebla, M. Montiel (eds) *Mathematics and Computation in Music (MCM 2017)*. Lecture Notes in Computer Science, vol. 10527, Springer, 2017. ISBN: 978-3-319-71826-2, doi: [https://doi.org/10.1007/978-3-319-71827-9\\_2](https://doi.org/10.1007/978-3-319-71827-9_2).
- [5] L. Cadeddu, S. Cannas, *Musical Surfaces*, Lettera matematica - International Edition, Vol.5, n.3, 2017. ISSN: 2281-6917, doi: 10.1007/s40329-017-0195-z.
- [6] L. Cadeddu, S. Cannas, *Superfici Musicali*, Lettera Matematica Matematica Pristem, Vol.101, Springer, 2017. ISSN: 1593-5884, doi: 10.1007/s10031-017-0032-8.

### Preprint

- [7] S. Cannas, *Towards the history of the Tonnetz: from Euler to Mathematical Music Theory*, In: X. Hascher, A. Papadopoulos (eds) "Mathematics and music, from the Greeks to Euler", Hermann, Paris, 2019 (to appear).

### In preparation

- [8] T. Noll, T. Fiore, S. Cannas, M. Andreatta, *Balanced uniform chord transformations of triads and sevenths*
- [9] S. Cannas, *Generalized PLR-group for seventh chords*