

1. El congreso *Mathematics and Computation in Music 2019*

En este mes de junio se celebra el congreso internacional *Mathematics and Computation in Music 2019*. Quien estas notas escribe ha tenido el privilegio y la responsabilidad de organizarlo, en conjunción con Mariana Montiel y Octavio Alberto Agustín Aquino en el comité científico, y con Manuel Tizón y Pablo Romero en la organización local. Hace muchos años, cuando este campo, el de la Teoría Matemática y Computacional de la Música, empezó, gracias a la visión y al esfuerzo de un puñado de investigadores heterodoxos, se le veía como una extravagancia, un capricho pasajero, o a veces incluso un suicidio académico. Si te empeñabas en defenderlo, con frecuencia uno oía que este campo “no es serio”. Sin embargo, esos críticos se dejaron llevar por una inercia intelectual que, como su propio nombre sugiere, rechazaba el cambio. Hoy en día ya se habla con normalidad de campos como la Lingüística Computacional o la Informática Médica.

Ese puñado de aguerridos pioneros, muchos de los cuales están en esta conferencia, con su ejemplo y trabajo pronto atrajeron a otros investigadores, los cuales fascinados por las estructuras matemáticas que se encuentran en la música, empezaron a trabajar con ahínco en este campo. Tras unos años de dificultades, empezaron a cuajar las relaciones de colaboración nacionales e internacionales, se crearon revistas, se celebraron talleres y también se creó el congreso del que hoy hablamos aquí. Estamos en su séptima edición de un congreso que se celebra bianualmente. El congreso ya está maduro en términos de excelencia científica y reconocimiento internacional. Y, como digo, me ha sido concedido el privilegio de participar en su organización.

La columna de este mes consiste simplemente en el programa (en inglés) del congreso. Este programa vale más que mil reseñas que pueda dar. Disfrutad.

2. Introduction

The Seventh International Conference on Mathematics and Computation in Music will be held June 18-21, 2019 at Universidad Politécnica de Madrid (UPM) and Real Conservatorio de Música de Madrid (RCSMM), Madrid, Spain.

MCM is the flagship conference of the Society for Mathematics and Computation in Music (SMCM), whose official publication is the Journal of Mathematics and Music (JMM).

MCM 2019 continues the tradition of biennial international conferences of the Society for Mathematics and Computation in Music held on alternating sides of the Atlantic. In this occasion it is hosted by the Escuela Técnica Superior de Ingeniería de Sistemas Informáticos (ETSISI).

The conference brings together researchers from around the world who combine mathematics or computation with music theory, music analysis, composition and performance. MCM provides a dedicated platform for the communication and exchange of ideas amongst researchers in mathematics, computer science, music theory, composition and performance, musicology and related disciplines.

The disciplines of Mathematics and Music share an intertwined history stretching back more than two and a half millennia. Nowadays computer science points towards new approaches to these disciplines, often with transformative effect.

In addition to the scientific program, there will be concerts open to both conference participants and the general public.

3. Organization

General Organizing Committee

- Francisco (Paco) Gómez, Technical University of Madrid, Spain.
- Mariana Montiel, Georgia State University, Georgia, USA.
- Emilio Lluís-Puebla, Faculty of Sciences, UNAM, Mexico.
- Guerino Mazzola, University of Minnesota, USA.
- Thomas Noll, Escola Superior de Música de Catalunya.
- José Luis Besada, Université de Strasbourg and IRCAM.

Scientific Programme Committee

- Mariana Montiel, Georgia State University, Georgia, USA.
- Francisco (Paco) Gómez, Technical University of Madrid, Spain.
- Octavio Alberto Agustín Aquino, Instituto de Física y Matemáticas, Universidad Tecnológica de la Mixteca.

Scientific Committee

- Octavio A. Agustín-Aquino
- Jean Paul Allouche
- Emmanuel Amiot
- Moreno Andreatta
- Juan Sebastián Arias
- Aitor Arronte Álvarez
- Cristian Bañuelos
- Gilles Baroin
- Chantal Buteau
- Olivia Caramello
- Norman Carey
- Rodrigo Castro López Vaal
- David Clampitt
- Darrell Conklin
- Maxime Crochemore
- Andrée Ehresmann
- Michael Franklin
- Harald Fripertinger
- Emilia Gómez
- Francisco (Paco) Gómez
- Yupeng Gu
- Gareth Hearne
- Julian Hook
- Franck Jedrzejewski
- Maximos Kaliakatsos
- Jeremy Kastine
- Olivier Lartillot
- Vicente Liern

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Escrito por Paco Gómez Martín (Universidad Politécnica de Madrid)
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- Emilio Lluís-Puebla
- Pedro Louzeiro
- Maria Mannone
- Dimitrios Margounakis
- Guerino Mazzola
- Brent Milam
- Andrew Milne

- Mariana Montiel
- Javier Mora
- Thomas Noll
- Robert Peck
- Richard Plotkin
- Alexandre Popoff
- David Rappaport
- David Temperley
- Petri Toiviainen
- Isao Tokuda
- Jason Yust
- Marek Źabka
- Fernando Zalamea

Local Organizing Committee

- Francisco (Paco) Gómez
- Pablo Romero
- Manuel Tizón

4. Conference Schedule

4.1. Tuesday, June 18th, 2019

8:30: Buses taking the conference participants to the UPM Campus Sur. **Meeting point:** Hotel Mediodía, on 8th Plaza del Emperador Carlos V. Coordinates: C854+9P Madrid.

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9:00-12:00: Registration at the registration desk at Sala de Grados (ETSISI)

9:00-9:30: Opening Session: Sala de Grados, ETSISI.

Opening Addresses and Welcome:

- Guillermo Cisneros Pérez, President of UPM
- Agustín Yagüe, Dean of ETSISI
- Prof. Dr. Guerino Mazzola President of the Society for Mathematics and Computation in Music
- Prof. Dr. Francisco Gómez, Head of the General and Local Organizing Committees
- Prof. Dr. Mariana Montiel Head of the Scientific Committee

9:30-13:00. Session 1: Algebraic and other Abstract Mathematical Approaches to Understanding Musical Objects

Sessions to be held at Sala de Grados, ETSISI.

Chairperson: Paco Gómez

1) 9:30-10:00 Alexandre Popoff, Moreno Andreatta, and Andréé Ehresmann. *Groupoids and Wreath Products of Musical Transformations: a Categorical Approach from poly-Klumpenhouver Networks*

2) 10:00-10:30 Dmitri Tymoczko and Jason Yust. *Fourier Phase and Pitch-Class Sum*

3) 10:30-11:00 Maria Mannone and Federico Favali. *Categories, Musical Instruments, and Drawings: A Unification Dream*

11:00-11:30: Coffee break

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Chairperson: Octavio A. Agustín-Aquino

4) 11:30-12:00 Giovanni Albin and Marco Paolo Bernardi. *Tropical Generalized Interval Systems*
Mannone and Luca Turchet. *Shall we (math and) dance?*

5) 12:00-12:30 Maria

12:30-13:30: Poster session

- Aitor Arronte Álvarez and Francisco Gómez. *Distributed Vector Representations of Folksong Motifs: A Similarity and Classification Study*
- Gilles Baroin. *Visualizing Temperaments: Squaring the Circle?*
- Billie Sandak, Avi Mazor, Amichay Asis, Avi Gilboa, and David Harel. *Computational Music Therapy*
- Isaac del Pozo and Francisco Gómez. *Formalization of Voice-Leadings and the Nabla Algorithm*
- Miguel Díaz-Báñez and Nadine Kroher. *Maths, Computation and Flamenco: overview and challenges*
- Darrel Conklin. *Music Corpus Analysis Using Unwords*

1:30 pm-2:50 pm: Lunch

3:00 pm: Bus to Madrid downtown (Atocha)

Sessions to be held at RCSMM.

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5:00 pm-6:00 pm: Plenary talk.

Speaker: Guerino Mazzola. Title: *COMMUTE - Towards a Computational Musical Theory of Everything.*

6:30 pm-7:30 pm: MCM Concert. Moreno Andreatta (music) and Gilles Baroin (visuals) . *Math'n Pop Concert or How to turn a Poem into a Song (with a little help of mathematics)*

4.2. Wednesday, June 19th, 2019

8:30: Buses taking the conference participants to the UPM Campus Sur. **Meeting point:** Hotel Mediodía, on 8th Plaza del Emperador Carlos V. Coordinates: C854+9P Madrid.

9:00-11:00 am: Session 2: Special Session: Remanaging Riemann: Mathematical Music Theory as “Experimental Philology”? (I)

Sessions to be held at Sala de Grados, ETSISI.

Chairperson: Norman Carey

1) 9:00-9:30. Jason Yust. *Decontextualizing Contextual Inversion* 2) 9:30-10:00. Markus Schmidmeier. *Fro*

m Schritte and Wechsel to Coxeter Groups

. 3) 10:00

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10:30. Thomas Noll and David Clampitt.
Exploring the Syntonic Side of Major-Minor Tonality

. 4) 10:30

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11:00. Thomas Noll and Karst de Jong.
Embedded Structural Modes: Unifying Scale

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Degrees and Harmonic Functions

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11:00-11:30: Coffee break

11:30-12:30: Session 3: Special Session: Remanaging Riemann: Mathematical Music Theory as “Experimental Philology”? (II)

Chairperson: Norman Carey

1) 11:30-12:00. Franck Jedrzejewski. *Non-Contextual SQZ Transformations*. 2) 12:00-12:30. Franck Jedrzejewski.

The Hierarchy of Rameau Groups

. 3) 12:30

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1:00 pm. Daniel Harasim, Thomas Noll, and Martin Rohrmeier.

“Distant Diatonic

Neighbors and Inter-Diatonic Shortcuts?”

. 4) 1:00 pm

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1:30 pm. Matt Klassen.

Constraint-Based Systems of Triads and Seventh Chords, and Parsimonious Voice-Leading

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1:30 pm-2:50 pm: Lunch

3:00 pm: Bus to Madrid downtown (Atocha)

Sessions to be held at RCSMM.

5:00 pm-6:00 pm: Plenary talk.

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Speaker: Octavio A. Agustín-Aquino (joint work with Guerino Mazzola). Title: *Counterpoint
t* *Worlds.*

6:00 pm-6:30 pm: *Visualizing the temperaments*, a short film by Gilles Baroin.

7:00 pm-8:00 pm: MCM Concert. Naoki Kita (violin), Guerino Mazzola (piano) and Heinz Geisser (drums). *MA - Music of Change.*

4.3. Thursday, June 20th, 2019

8:30: Buses taking the conference participants to the UPM Campus Sur. Meeting point: Hotel Mediodía, on 8th Plaza del Emperador Carlos V. Coordinates: C854+9P Madrid.

**9:00-11:00: Session 4: Special Session on the Pedagogy of Mathematical Music Theory (I
)**

Chairperson: Paco Gómez

1) 9:00-9:30. Thomas Noll. *Insiders' Choice: Studying Pitch Class Sets through their Discrete Fourier Transformations*

. 2)

9:30

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10:00

. Maria Mannone.

Have Fun With Math and Music

. 3)

10:00

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10:30

. Andrew J. Milne and Andrea M. Calilhanna.

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*Teaching Music with
Mathematics: A Pilot Study*

. 4)

10:30

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11:00

. Miguel R. Wilhelmi and Mariana Montiel.

*Integrated Music and Math Projects
in Secondary Education*

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11:00-11:30: Coffee break

**11:30-12:00: Session 5: Special Session on the Pedagogy of Mathematical Music Theory
(II)**

Chairperson: Paco Gómez

5) 11:30-12:00. Brent Milam and Mariana Montiel. *A Collaborational Concert: Mathematics Club-Composition Seminar and their Interdisciplinary endeavor*

6) 12:00

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12:30. Emmanuel Amiot.

Conc

*ferences: of music and mathes for the audience's
delight*

Octave division

Chairperson: Jeremy Kastine

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1) 12:30-13:00. Gareth M. Hearne, Andrew J. Milne, Roger T. Dean. *Distributional Analysis of n-dimensional Feature Space for 7-note Scales in 22-TET*

. 2) 13:00

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13:30. Louis Bigo y Moreno Andreatta.
Filtration of pitch-class sets complexes

.

1:30 pm-2:50 pm: Lunch

3:00 pm: Bus to Madrid downtown (Atocha)

Sessions to be held at RCSMM.

5:00 pm-6:00 pm: Plenary talk.

Speaker: Emmanuel Amiot. Title: *The unreasonable efficiency of Algebra in Maths and Music (Musica Exercitia algebricae est?)*

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6:00 pm-6:45 pm: Editorial meeting of the JMM

7:00 pm-8:00 pm: MCM Concert. Emilio Lluís-Puebla (piano) and Octavio Agustín-Aquino (guitar).
Integral of Diabelli's Piano and Guitar Sonatas and Manuel M. Ponce's Sonata for Piano and Guitar.

5. Friday, June 21st, 2019

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8:30: Buses taking the conference participants to the UPM Campus Sur. **Meeting point:** Hotel Mediodía, on 8th Plaza del Emperador Carlos V. Coordinates: C854+9P Madrid.

9:00-11:00: Session 7: Computer based approaches to composition and score structuring

Sessions to be held at Sala de Grados, ETSISI.

Chairperson: Luis Nuño

1) 9:00-9:30. Giovanni Santini. *Synthesizer: physical modelling and machine learning for a color-based synthesizer in Virtual Reality*

. 2) 9:30

-

10:00. Vicente Liern Carrión and Brian Martínez.

Mercury R: A software based on fuzzy clustering for computer-assisted composition

. 3) 10:00

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10:30. Francesco Foscarin, Florent Jacquemar, Philippe Rigaux, and Masahido Sakai.
A Parse-based Framework for Coupled Rhythm Quantization and Score Structuring

. 4) 10:30

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11:00. Paul Lanthier, Coerntin Guischaoua and Moreno Andreatta.

Reinterpreting and extending Anatol Vieru's Periodic Sequences through the Cellular Automata formalisms: some theoretical, computational and compositional aspect

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11-11:30: Coffee break

11:30-12:30: Session 8: Models for music cognition and beat tracking

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Escrito por Paco Gómez Martín (Universidad Politécnica de Madrid)
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Chairperson: José Luis Besada

1) 11:30-12:00. Noah Fram. *Surprisal, liking, and musical affect*. 2) 12:00-12:30. Christopher White. *Autocorrela*

tion of Pitch-Event Vectors in Meter Finding

. 3) 12:30

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13:00 pm. Luis Nuño.

The Envelopes of Consonant Intervals and Chords in Just Intonation and Equal Temperament

.

13:00-13:30 Tilings, canons and maximal evenness

1) 1:00 pm-1:30 pm. Jeremy Kastine. *Maximally Even Tilings*.

1:30 pm-2:50 pm: Lunch

2:50 pm: Bus to Madrid downtown (Atocha)

Sessions to be held at RCSMM.

5:00 pm-6:00 pm: Plenary talk.

Speaker: Paco Gómez. Title: *Outreach in Mathematical Music Theory*.

8:30: Conference gala dinner.

6. Musical and Social Programme

6.1. Math'n Pop Concert

Moreno Andreatta, *piano and voice*
Gilles Baroin, *visual representations*

Composing chansons based on texts by poets has become a popular genre within the field of songwriting. Building on this tradition, Moreno Andreatta adds a mathematical dimension to this genre: using permutational tools and graph-theoretical methods, he creates an original universe where poetry and music meet in a new dialogue. Combining piano and voice, Moreno Andreatta introduces the audience to his original musical creations. The concert will be accompanied by visual representations of the underlying mathematical constructions, conceived and realized by 'mathemusician' Gilles Baroin.

6.2. MA - Music of Change

Naoki Kita, *violin*
Guerino Mazzola, *grand piano*
Heinz Geisser, *drums and percussions*

The free jazz collaboration duo of drummer Heinz Geisser and pianist Guerino Mazzola has lasted twenty years now. In April 2017 they had a series of six highly acclaimed concerts in Tokyo and Yokohama, resulting in three CD productions including Ma, with the collaboration of Japanese violinist Naoki Kita.

Geisser and Mazzola strongly adhere to the idea that music should transform with virtuosity gestures and thoughts in the imaginary time of our consciousness into real sound structures that shape the body of time instead of following any external baton. Naoki Kita's performances include a blend of original music and improvisation and the transformation of the duo in trio has created new avenues.

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6.3. Integral of Diabelli's Piano and Guitar Sonatas and Manuel M. Ponce's Sonata for Piano and Guitar

Emilio Lluís-Puebla, *piano*
Octavio Alberto Agustín Aquino, *guitar*

Mathematicians Emilio Lluís-Puebla and Octavio Alberto Agustín Aquino also have parallel careers as accomplished musicians. Together they have played and recorded the integral of Diabelli's piano and guitar sonatas, which they will present together with Mexican composer Manuel M. Ponce's sonata for piano and guitar.

7. Useful Information

7.1. Venues

1. Escuela Técnica Superior de Ingeniería de Sistemas Informáticos (ETSISI),
Universidad Politécnica de Madrid (UPM). Calle de Alan Turing, s/n, 28031, Madrid.



2. Real Conservatorio de Música de Madrid (RCSMM). Calle de Santa Isabel, 53, 28012, Madrid.

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