

# MCM'24

**18 – 21 JUNE**  
**COIMBRA, PORTUGAL**

## **PROGRAMME**

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18 – 21 JUNE  
COIMBRA, PORTUGAL

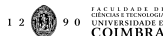
## 9TH INTERNATIONAL CONGRESS ON MATHEMATICS AND COMPUTATION IN MUSIC

Organization

CENTRE FOR INTERDISCIPLINARY STUDIES OF THE UNIVERSITY OF COIMBRA AND  
CENTRE FOR INFORMATICS AND SYSTEMS OF THE UNIVERSITY OF COIMBRA

Partnership

FACULTY OF ARTS AND HUMANITIES OF THE UNIVERSITY OF COIMBRA AND  
SOCIETY FOR MATHEMATICS AND COMPUTATION IN MUSIC



## WELCOME

We are delighted to welcome you to Coimbra for the 9th Biennial International Conference for Mathematics and Computation in Music (MCM 2024). During four exciting days (Jun 18-21), the conference provides a forum for scholars from around the world and through various disciplines to explore and debate practical or theoretical ideas, welcoming a scope of approaches to mathematical and computational music modeling, creation and application, and engaging fields within mathematics, informatics, engineering, cognition and music analysis, theory and performance, among others.

Organized by the Centre for Interdisciplinary Studies (CEIS20) and the Centre for Informatics and Systems (CISUC) of the University of Coimbra, in partnership with the Faculty of Arts and Humanities (FLUC), where the conference takes place, MCM 2024 is the flagship conference of the Society for Mathematics and Computation in Music (SMCM), and continues the biennial recurrence of meetings alternating sides of the Atlantic (Berlin 2007, New Haven 2009, Paris 2011, Montreal 2013, London 2015, Mexico City 2017, Madrid 2019, and Atlanta 2022).

The Program and e-Book of the conference can be downloaded at <https://www.uc.pt/ceis20/mcm24/>. The Scientific Program Committee has organized the conference featuring 28 talks, 5 posters, 5 communication-performance talks, a 3-part workshop offered by Dmitri Tymoczko, and one tribute paper. The presentations were grouped around the following subjects: Mathematical Scale Theory and Tuning; Rhythm Analysis and Rhythm Generation; Categorical and Algebraic Approaches to Music; Quantum Music; Theory and Algorithms for Melodic/Harmonic Analysis and Generation; Geometric Approaches to Musical Algorithms and Microtonality; Fourier Analysis for Music; Similarity and Distance Measures for Music. In addition, the conference hosts two plenary talks: Norman Carey and David Clampitt present “35 Years of Well-Formed Scale Theory: Origins and Development” and William Sethares presents “The Many Tunings of Balinese Gamalean.”

MCM 2024 also integrates three concerts in its program: a concert by MCM participants as composers and performers, a concert where Moreno Andreatta will perform a selection of his “Music and Maths” repertoire, and a concert of Coimbra Fado music by the group ‘Quarteto de Coimbra’ (Fábio Almeida, Tiago Rodrigues, Simão Mota, and Vasco Rodrigues).

In preparing this conference, we have benefitted from the enthusiastic participation of dozens of colleagues to put together the present Program. We are grateful for the guidance and leadership of the SMCM board, the rigorous work of the Editorial Committee for the Proceedings Springer Volume, and the enormously generous work of the reviewers of the

Scientific Committee. And we thank the tireless and expert work of the Arrangements Committee of the Centre for Interdisciplinary Studies (CEIS20), the institutional partnership of the Faculty of Arts and Humanities of the University of Coimbra, and the financial support of the Foundation for Science and Technology (under program: IUDB/00460/2020).

We wish you a stimulating conference.  
Enjoy Coimbra!

June 2024

José Oliveira Martins  
Omar Costa Hamido  
Riccardo Wake  
Amílcar Cardoso  
Pedro Martins  
Jônatas Manzolli

## PRELIMINARY PROGRAM

TIME	DAY1 — TUESDAY JUN 18	DAY2 — WEDNESDAY JUN 19
9h00	CHECK-IN	
9h30	OPENING SESSION	CHECK-IN
10h00	KEYNOTE 01	PANEL SESSION 03
10h30		
11h00	COFFEE BREAK	COFFEE BREAK
11h30	PANEL SESSION 01	PANEL SESSION 03
12h00		
12h30		
13h00	LUNCH BREAK	LUNCH BREAK
13h30		
14h00		
14h30	<b>VIRTUAL EXHIBITION</b> (OPENING; RUNNING DURING THE 4 DAYS)	WORKSHOP 01
15h00		<b>PANEL SESSION 04</b>
15h30		
	<b>POSTER SESSION</b> (OPENING; RUNNING DURING THE 4 DAYS)	
16h00		PANEL SESSION 02
16h30		
17h00	COFFEE BREAK	
17h30	COFFEE BREAK	KEYNOTE 02
18h00	COMMUNICATION PERFORMANCE 01	
18h30	CONCERT 01	COMMUNICATION PERFORMANCE 02
19h00		CONCERT 02
19h30	WELCOME RECEPTION	
20h00		

\*All sessions take place at the Theatre Paulo Quintela (FLUC - Faculty of Arts and Humanities of the University of Coimbra) unless otherwise noted.

TIME	DAY3 — THURSDAY JUN 20	DAY4 — FRIDAY JUN 21
9h00		
9h30	<b>CHECK-IN</b>	<b>CHECK-IN</b>
10h00	<b>PANEL SESSION 05</b>	<b>PANEL SESSION 07</b>
10h30		
11h00	<b>COFFEE BREAK</b>	
11h30	<b>PANEL SESSION 05</b>	<b>COFFEE BREAK</b>
12h00		<b>COMMUNICATION PERFORMANCE 03</b>
12h30	<b>WORKSHOP 02</b>	<b>COMMUNICATION PERFORMANCE 04</b>
13h00	<b>LUNCH BREAK</b>	<b>LUNCH BREAK</b>
13h30		
14h00		
14h30	<b>PANEL SESSION 06</b>	<b>WORKSHOP 03</b>
15h00		<b>PANEL SESSION 08</b>
15h30		
16h00	<b>UC VISIT (OPTIONAL)</b>	
16h30		<b>TRIBUTE</b>
17h00		<b>COMMUNICATION PERFORMANCE 05</b>
17h30		<b>CLOSING SESSION</b>
18h00	<b>PLENARY SESSION GENERAL ASSEMBLY SMCM</b>	
18h30		
19h00	<b>CONCERT 03</b>	
19h30		
20h00	<b>GALA DINNER</b>	

**DAY 01**

**PROGRAMME**

Tuesday June 18th — Theatre Paulo Quintela, FLUC

**TIME**      **PROGRAMME**

9h00      **CHECK-IN**

9h30      **OPENING SESSION**

**João Ramalho Santos**, Vice-Rector for Research UC

**Albano Figueiredo**, Director FLUC

**Mariana Montiel**, President SMCM

**Catarina Silva**, Vice-Director CISUC

**José Oliveira Martins**, Scientific Coordinator CEIS20

10h00      › KEYNOTE 01

**35 YEARS OF WELL-FORMED SCALE THEORY: ORIGINS AND DEVELOPMENT**

**Norman Carey**, Graduate Center, City University of New York

**David Clampitt**, School of Music, Ohio State University

11h00      **COFFEE BREAK**

› PANEL SESSION 01

**FOURIER ANALYSIS FOR MUSIC**

11h30      **1.1. Fourier (Common-tone) Phase Spaces are in Tune with Variational Autoencoders' Latent Space**

— Nádía Carvalho and Gilberto Bernardes

12h00      **1.2. DFT and Persistent Homology for Topological Musical Data Analysis**

— Victoria Callet

12h30      **1.3. Fourier Qualia Wavescapes: Hierarchical Analyses of Set Class Quality and Ambiguity**

— Samuel Pereira, Giovanni Affatato, Gilberto Bernardes and Fabian C. Moss



DAY 01 | TUESDAY JUNE 18TH — THEATRE PAULO QUINTELA, FLUC

TIME            PROGRAMME

 13h00        **LUNCH BREAK**

 14h30        **VIRTUAL EXHIBITION (INSTITUTO DE PALEOGRAFIA, FLUC)**

**MatheMusical Virtual Museum & Planet Voices Interactive VR and PC exhibition**

— Gilles Baroin

 14h30        **POSTER SESSION (ATRIUM OF THEATRE PAULO QUINTELA, FLUC)**

**P1. Exploring mode Identification in Irish folk music with unsupervised machine learning and template-based techniques**

— Juan José Navarro-Cáceres, Nádía Carvalho, Gilberto Bernardes, Diego M. Jiménez-Bravo, and María Navarro-Cáceres

**P2. Mining Significant Sequential Contrast Patterns**

— Darell Conklin

**P3. Recurrence relations rhythm**

— Michael Cohen and Yasuyuki Kachi

**P4. Bits and Beats: computing rhythmic information as bitwise operations optimized for Machine Learning**

— Fernando Gualda

**P5. Regular Temperament Theory: Exploring the Landscape between JI and ETs with Linear Algebra**

— Dave Keenan and Douglas Blumeyer

DAY 01 | TUESDAY JUNE 18TH — THEATRE PAULO QUINTELA, FLUC

TIME PROGRAMME

› PANEL SESSION 02

**RHYTHM ANALYSIS AND RHYTHM GENERATION**

16h00 **2.1. On Brazilian Drum Claves and Generating Rhythm Patterns Out of Them**

— Quan Duong, Kjell Lemström, and Olli Reijonen

16h30 **2.2. Euclidean Rhythm with Palindromic Rests**

— Paraj Mukherjee

17h00 **2.3. What Are “Good” Rhythms? Generating Rhythms Based on the Properties Set Out in The Geometry of Musical Rhythm**

— Paul Lascabettes and Isabelle Bloch

17h30 **COFFEE BREAK**

18h00 › COMMUNICATION PERFORMANCE 01

**STAGES IN MY VUZA RHYTHMIC CANONS**

Violeta Dinescu

18h30 › CONCERT 01

**THE MUSIC OF MATHS**

Moreno Andreatta, piano

Gilles Baroin, video graphics

19h30 **WELCOME RECEPTION**  
**(TBA)**

**DAY 02**

Wednesday June 19th — Theatre Paulo Quintela, FLUC

**PROGRAMME**

TIME	PROGRAMME
9h30	<b>CHECK-IN (AND COFFEE)</b>
	› PANEL SESSION 03 <b>THEORY AND ALGORITHMS FOR MELODIC/HARMONIC ANALYSIS AND GENERATION</b>
10h00	<b>3.1. Towards measuring the distances of chords of different cardinalities</b> — Kristína Hurajová and Ondrej Hutník
10h30	<b>3.2. Persistent Homology and Harmonic Analysis</b> — Riccardo C. Gilblas
11h00	<b>COFFEE BREAK</b>
11h30	<b>3.3. Melody and Variation Generation Through KAM Theory</b> — Octavio A. Agustín-Aquino and Alicia Santiago-Santos
12h00	<b>3.4. Melodic Contour Generation with Spline Models of Cycles</b> — Matt Klassen and Paul Lanthier
12h30	<b>3.5. Piston Words</b> — Shawn Michael Westmoreland
13h00	<b>LUNCH BREAK</b>
14h30	› WORKSHOP <b>PART 01. GRUPOIDS AND MUSIC</b>  Dmitri Tymoczko

DAY 02 | WEDNESDAY JUNE 19TH — THEATRE PAULO QUINTELA, FLUC

TIME PROGRAMME

› PANEL SESSION 04

**CATEGORICAL AND ALGEBRAIC APPROACHES TO MUSIC**

15h00 **4.1. Hidden Categories: A New Perspective on Lewin's Generalized Interval Systems and Klumpenhouwer Networks**

— Alexandre Popoff and Moreno Andreatta

15h30 **4.2. Finding Homometric Multiplets**

— Franck Jedrzejewski

16h00 **4.3. Voice and Math: The Art of Singing in Light of Mathematical Music Theory**

— Juliana Castanho-Spector, Maria Mannone, Mariana Montiel and Francisco Gómez

16h30 **4.4. Structural and Transformational Relations Between Z-Related Hexachords**

— Qiuwan Zhao

17h00 **COFFEE BREAK**

17h30 › KEYNOTE 02

**THE MANY TUNINGS OF BALINESE GAMELAN**

William Sethares, University of Wisconsin - Madison

18h30 › COMMUNICATION PERFORMANCE 02

**OF ALL INTERVAL TETRACHORDS AND OCTATONIC SCALES**

Emmanuel Amiot

DAY 02 | WEDNESDAY JUNE 19TH — THEATRE PAULO QUINTELA, FLUC

TIME

PROGRAMME

19h00

› CONCERT 02

**MEMBERS OF THE SOCIETY FOR MATHEMATICS AND COMPUTATION IN MUSIC****Sonata, Alban Berg**

— Emmanuel Amiot, piano

**Non leggemo più, Emmanuel Amiot**

— Juliana Castanho-Spector, soprano

— Emmanuel Amiot, piano

**Not Marble, Jason Yust**

— Juliana Castanho-Spector, soprano

— Norman Carey, piano

**Amarantha, Norman Carey**

— Juliana Castanho-Spector, soprano

— Patrícia Silveira, alto

— Carlos Meireles, tenor

**O Don Fatale, Verdi**

— Juliana Castanho-Spector, soprano

— Norman Carey, piano

**Sonatina in D major, Franz Schubert**

— David Clampitt, violin

— Norman Carey, piano

## DAY 03

Thursday June 20th — Theatre Paulo Quintela, FLUC

## PROGRAMME

TIME PROGRAMME

9h30 **CHECK-IN**

› PANEL SESSION 05

### **GEOMETRIC APPROACHES TO MUSICAL ALGORITHMS AND MICROTONALITY**

10h00 **5.1. Advanced Polyphonic Music Pattern Matching Algorithms with Timing  
Invariances**

— Antti Laaksonen and Kjell Lemström

10h30 **5.2. Tonnetze and Tori for the 19-, 31-, and 53-Tone Equal Temperaments**

— Luis Nuño

11h00 **COFFEE BREAK**

11h30 **5.3. A Model of Scores as Abstract Syntactic Trees**

— Gonzalo Romero-García, Carlos Agón, and Isabelle Bloch

12h00 **5.4. I-Shaped Tiles in the Tonnetz**

— Michael Coury-Hall

12h30 › WORKSHOP

### **PART 02. GRUPOIDS AND MUSIC**

Dmitri Tymoczko

13h00 **LUNCH BREAK**

DAY 03 | THURSDAY JUNE 20TH — THEATRE PAULO QUINTELA, FLUC

TIME            PROGRAMME

› PANEL SESSION 06

**QUANTUM MUSIC**

 14h30    **6.1. Intro to Quantum Harmony: Chords in Superposition**

— Christopher Dobrian and Omar Costa Hamido

 15h00    **6.2. Quantum Memory and Mathematical Gestures: two Perspectives on Verdi and Wagner**

— Alberto Avitabile, Omar Costa Hamido, and Maria Mannone

 15h30    **6.3. Quantum Tonality: A Mathemusical Playground**

— Peter beim Graben and Thomas Noll

 16h00    **UC GUIDED VISIT** (MEET AT LARGO DA PORTA FÉRREA)

18h00    › PLENARY SESSION (THEATRE PAULO QUINTELA, FLUC)

**PLENARY MEETING OF THE SMCM**

General Assembly, SMCM

19h00    › CONCERT 03 (THEATRE PAULO QUINTELA, FLUC)

**FADO DE COIMBRA**
**Quarteto de Coimbra**

— Fábio Almeida, voice

— Tiago Rodrigues and Simão Mota, Portuguese guitar

— Vasco Rodrigues, guitar

 20h00    **GALA DINNER**  
**(TBA)**

## DAY 04

## PROGRAMME

Friday June 21st — Theatre Paulo Quintela, FLUC

TIME PROGRAMME

9h30 CHECK-IN

› PANEL SESSION 07

### MATHEMATICAL SCALE THEORY AND TUNING

10h00 **7.1. Quarter-Tone Music: A Tuning System Rooted in Natural Harmonic Series**

— Aziz Ifzarne

10h30 **7.2. The Sandwich-Lemma: The Recursive Structure of Super-Syntonic and Super-Diatonic Automorphisms**

— Thomas Noll, David Clampitt, and Mariana Montiel

11h00 **7.3. An Exploration of the Discontinuous-Continuous Fusion in Yuunohui'tlapoa for Key-board**

— Julio Estrada

11h30 COFFEE BREAK

12h00 › COMMUNICATION PERFORMANCE 03

### ADVANCED VISUALIZATION TECHNIQUES FOR MUSIC THEORY

Gilles Baroin and Richard Cohn

12h30 › COMMUNICATION PERFORMANCE 04

### SONIFICATION OF WIGNER FUNCTIONS: CASE STUDY OF INTENSE LIGHT-MATTER INTERACTIONS

Reiko Yamada, Antoine Reserbat-Plantey, Eloy Piñol, and Maciej Lewenstein

13h00 LUNCH BREAK

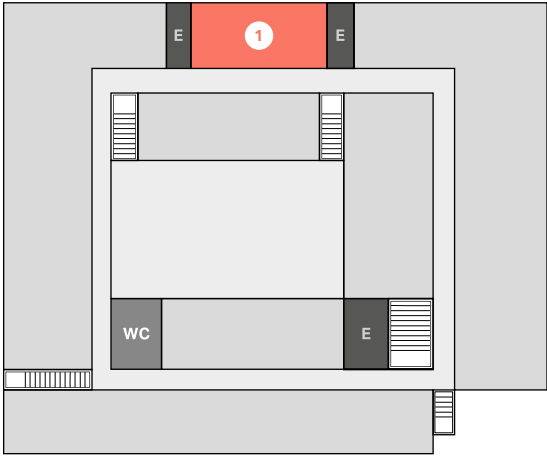


DAY 04 | FRIDAY JUNE 21ST — THEATRE PAULO QUINTELA, FLUC

TIME	PROGRAMME
14h30	› WORKSHOP <b>PART 03. GRUPOIDS AND MUSIC</b>  Dmitri Tymoczko
	› PANEL SESSION 08 <b>SIMILARITY AND DISTANCE MEASURES FOR MUSIC</b>
15h00	<b>8.1. Modal Pitch Space: A Computational Model of Melodic Pitch Attraction in Folk Music</b> — Gilberto Bernardes and Nádia Carvalho
15h30	<b>8.2. A fingerprinting-based strategy for musical genre similarity</b> — Aarón López-García
16h00	<b>8.3. Assessing the compatibility between musical performance and tuning system</b> — Brian Martínez-Rodríguez and Vicente Liern
16h30	› TRIBUTE <b>TRIBUTE TO YVES HELLEGOUARCZ</b>  Franck Jedrzejewski
17h00	› COMMUNICATION PERFORMANCE 05 <b>CONFIGURATIONS OF DISJOINT AUGMENTATION CANONS</b>  Jeremy Kastine
17h30	<b>CLOSING SESSION</b>  Representatives of CEIS20, CISUC, SMCM

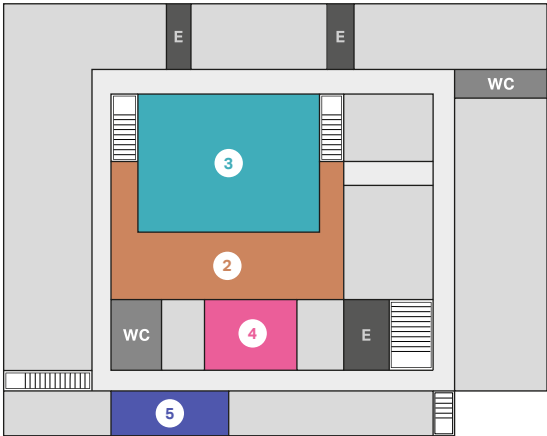
# FLUC MAP

## › 4TH FLOOR — FLUC



- 1 ENTRANCE
- 2 ATRIUM AND REGISTRATION  
(Poster session)
- 3 THEATRE PAULO QUINTELA  
(All the conferences)
- 4 COFFEE BREAK
- 5 INSTITUTE OF PALEOGRAPHY  
(Virtual Exhibition)
- WC
- E ELEVATOR

## › 3RD FLOOR — FLUC



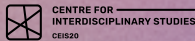


# MCM'24

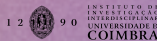
18 – 21 JUNE  
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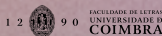
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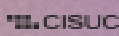
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UNIVERSIDADE D  
COIMBRA



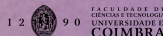
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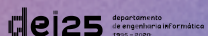
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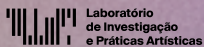
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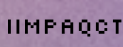
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departamento  
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1911 - 2020



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