





# CATOLICA

**CITAR** · CENTRO DE INVESTIGAÇÃO  
EM CIÊNCIA E TECNOLOGIA DAS ARTES

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PORTO



## **CITAR**

Centro de  
Investigação em  
Ciência e Tecnologia  
das Artes  
Universidade Católica  
Portuguesa | Porto  
Rua de Diogo Botelho,  
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Portugal  
[artes.ucp.pt/citar](http://artes.ucp.pt/citar)

Porto International Conference on  
***Musical Gesture as Creative Interface***

Porto, Portugal, March 17–19, 2016

***PROGRAM***

***and***

***ABSTRACTS***

# 2016 Porto International Conference on *Musical Gesture as Creative Interface*

## **Organizing Committee**

José Oliveira Martins | CITAR–Universidade Católica Portuguesa  
Sofia Lourenço | CITAR–Universidade Católica Portuguesa

## **Program Committee**

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## **Scientific Committee**

Program Committee members

Ângelo Martingo | University of Minho  
António Augusto Aguiar | ESMAE–Instituto Politécnico do Porto  
Atau Tanaka | Goldsmiths, University of London  
Carlos Guedes | New York University Abu Dhabi  
Gonçalo Vasconcelos e Sousa | CITAR–Universidade Católica Portuguesa  
Guerino Mazzola | University of Minnesota  
John Christopher Dobrian | University of California, Irvine  
Laura Castro | Escola das Artes–Universidade Católica Portuguesa  
Nuno Aroso | University of Minho & CITAR–Universidade Católica Portuguesa  
Paulo Ferreira de Castro | CESEM, FCSH–Universidade Nova de Lisboa  
Paulo Ferreira Lopes | CITAR–Universidade Católica Portuguesa  
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Rui Vieira Nery | INET-md, FCSH–Universidade Nova de Lisboa  
Salwa El-Shawan Castelo-Branco | INET-md, FCSH–Univ. Nova de Lisboa

## **Local Arrangements Committee**

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Nuno Peixoto de Pinho | CITAR–Universidade Católica Portuguesa

## **Support**

**FCT** Fundação para a Ciência e a Tecnologia

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## Schedule at-a-glance

	THURSDAY 17TH	FRIDAY 18TH	SATURDAY 19TH			
8:30	Registration (Atrium)					
9:00	W1 TANAKA (MoCap Room)	W2 ZBIKOWSKI (EC112)	S5 (ACG)			
15				S6 (EC105)	S11 (ACG)	
30						S12 (EC105)
45						
10:00						
15						
30						
45						
11:00	COFFEE BREAK		COFFEE BREAK			
15	K3 Keynote Address GUERINO MAZZOLA (ACG)		K5 Keynote Address MIGUEL RIBEIRO-PEREIRA (ACG)			
30	REGISTRATION (Atrium)					
45	--					
13:00	LUNCH (Cantina)	RECITAL (AIP)	LUNCH (Cantina)			
15			RECITAL (AIP)			
30	CONFERENCE OPENING (ACG)					
45	K1 Keynote Address MARC LEMAN (ACG)					
14:00		S7 (ACG)	S8 (EC105)			
15			S13 (ACG)			
30	S1 (ACG)		S14 (EC105)			
45	S2 (EC105)					
16:00	COFFEE BREAK		K4 Keynote Address LAWRENCE ZBIKOWSKI (ACG)			
15			K6 Keynote Address MARCELO WANDERLEY (ACG)			
30			COFFEE BREAK			
45			COFFEE BREAK			
17:00	S3 (ACG)	S4 (EC105)				
15			S9 (ACG)			
30			S10 (EC105)			
45			S15 (ACG)			
18:00			S16 (EC105)			
15	RECEPTION Porto d'Honra (Bar das Artes)		ROUND TABLE CLOSING (ACG)			
30						
45	Transportation to C da Música					
21:00			CONFERENCE DINNER (RAA)			
15	K2 Keynote Address ATAU TANAKA + DIGITÓPIA- Collective					
30						
45						
22:00						
15						

ACG – Auditório Carvalho Guerra; AIP – Auditório Ilídio Pinho; RAA – Restaurante Américo Amorim

# ***PROGRAM***

2016 Porto International Conference on  
*Musical Gesture as Creative Interface*

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# THURSDAY, March 17th

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## W1 WORKSHOP

MoCap

9:00-12:00 **Atau Tanaka** | Goldsmith, University of London, UK  
*Interactive Applications in Machine Learning*

## W2 WORKSHOP

EC112

9:00-12:00 **Lawrence Zbikowski** | University of Chicago, US  
*Mapping Gesture to Music and Music to Gesture*

12:00- **Registration Opening**

Atrium

12:00-14:00 **LUNCH**

Cantina

## OS OPENING SESSION

Auditório CG

14:00-14:30 **Sofia Lourenço** | CITAR–Universidade Católica Portuguesa, PT  
**Laura Castro** | Director, Escola das Artes–U. Católica Portuguesa, PT  
**Pedro Pestana** | Director, CITAR–U. Católica Portuguesa, PT  
**José Oliveira Martins** | CITAR–Universidade Católica Portuguesa, PT

## K1 KEYNOTE ADDRESS

Auditório CG

**Marc Leman** | Ghent University, IPEM – Musicology, BE  
14:30-15:30 *Understanding Musical Intentionality from the Viewpoint of Embodied Interactions*

## S1 CONTROLLING AND NAVIGATING MUSICAL GESTURES

Auditório CG

Chair: **Marcelo M. Wanderley** | CIRMMT, McGill University, CA  
15:45-16:15 **Christopher Dobrian** | University of California, Irvine, US  
*An Approach to Using Detected Gestures in Music as the Control Interface for Signal Processing*

16:15-16:45 **Pavlos Antoniadis** | IRCAM & Université de Strasbourg, FR  
*Gesture Cutting Through Textual Complexity: A Model and a Tool for the Embodied Navigation of Piano Notation*

<b>S2 MUSICAL GESTURE BEYOND NOTATION</b>	
<b>EC105</b>	Chair: <b>Nuno Aroso</b>   Universidade do Minho, PT
15:45-16:15	<b>Diego Castro Magas</b>   University of Huddersfield, UK <i>Towards a Mimetic/Gestural Approach to the Performance of Recent/Notated Music for Guitar</i>
16:15-16:45	<b>Sandra Fortuna</b>   Conservatory of Music at Frosinone, IT <i>Embodied Learning and Graphic Symbolisation</i>
16:45-17:15	<b>COFFEE BREAK</b>
<b>Atrium</b>	

<b>S3 MUSICAL GESTURE IN CROSS-CULTURAL PERSPECTIVE</b>	
<b>Auditório CG</b>	Chair: <b>Salwa El-Shawan Castelo-Branco</b>   INET-md, FCSH- Universidade Nova de Lisboa, PT
	Panel Leader: <b>Fabrice Marandola</b>   Sorbonne Universités, FR; McGill University, CA
17:15-17:45	<b>Fabrice Marandola</b>   Sorbonne Universités, FR; McGill University, CA <b>Frédéric Marin</b>   Sorbonne Universités: UT de Compiègne, FR <b>Khalil Ben Mansour</b>   Sorbonne Universités: UT de Compiègne, FR <b>Catherine Massie-Laberge</b>   CIRMMT, McGill University, CA <b>Marcelo M. Wanderley</b>   CIRMMT, McGill University, CA <i>Xylophone Performing Techniques: A Cross-Comparison of Stroke- and Gaze-Patterns of Performers from Cameroon, Canada and France</i>
17:45-18:15	<b>Frédéric Marin</b>   Sorbonne Universités: UT de Compiègne, FR <i>3D Motion Analysis of the Performance of Classical and Traditional Expert Musicians in Laboratory Settings</i>
18:15-18:45	<b>Marie-France Mifune</b>   Sorbonne Universités, MNHN, FR <b>Frédéric Marin</b>   Sorbonne Universités: UT de Compiègne, FR <b>Khalil Ben Mansour</b>   Sorbonne Universités: UT de Compiègne, FR <b>Melissa Moulart</b>   Sorbonne Universités: UT de Compiègne, FR <b>Lise Ochej</b>   Sorbonne Universités: UT de Compiègne, FR <i>Harp Performing Techniques as Cultural Markers in the Bwiti Cult: Comparison of Musical Practices in Three Gabonese Populations</i>

18:45-19:15 **Farrokh Vahabzadeh** | Sorbonne Universités, FR  
**Frédéric Marin** | Sorbonne Universités: UT de Compiègne, FR  
**Khalil Ben Mansour** | Sorbonne Universités: UT de Compiègne, FR  
**Melissa Moulart** | Sorbonne Universités: UT de Compiègne, FR  
*From Musical Gesture to Musical Corporality: The Case of the Long-Necked Lutes in Iran and Central Asia*

**S4 GESTURE RECOGNITION IN PERFORMANCE & COMPOSITION**

**EC105** | Chair: **António Augusto Aguiar** | ESMAC-IPP, PT

17:15-17:45 **Ben Sutherland** | Columbia College Chicago, US  
**Emma Hospelhorn** | University of Illinois at Chicago & Ensemble Dal Niente, US  
*From Gesture to Musical Gesture: The Intersection Between Composition, Musical Performance, and Gesture Recognition Software*

17:45-18:15 **Federico Visi** | ICCMR–Plymouth University, UK  
**Eduardo Miranda** | ICCMR–Plymouth University, UK  
*Instrumental Movements to Physical Models: Mapping Postural and Sonic Topologies through Machine Learning*

18:15-18:45 **George Sioros** | INESC TEC–Universidade do Porto, PT  
**Gilberto Bernardes** | INESC TEC–Universidade do Porto, PT  
*The Sostenante Pedal: A Novel Pedal for MIDI Keyboards*

18:45-19:15 **Roberto Zanata** | Conservatory of Ferrara, IT  
*Gestural Interaction using Leap Motion feat Processing and Supercollider*

**RECEPTION: PORTO D'HONRA**

**BarDasArtes**

20:45 TRANSPORTATION TO CASA DA MÚSICA

**K2 KEYNOTE ADDRESS**

**CasaDaMúsica** | **Atau Tanaka** | Goldsmith, University of London, UK

21:30-22:30 *Body as Instrument*  
with the participation of **DIGITÓPIA – Collective**, PT

23:00 TRANSPORTATION TO HOTELS

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## FRIDAY, March 18th

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<b>S5 AGENCY, IDENTITY, AND METHODOLOGIES OF GESTURE</b>	
<b>Auditório CG</b>	Chair: <b>Jorge Alexandre Costa</b>   ESE–IPP & CIPEM–INET/md, PT
9:00-9:30	<b>Diana C. Hereld</b>   University of California, San Diego, US <i>Recovering the Subject Through Sonic Gesture: Contending the Annihilation of Self</i>
9:30-10:00	<b>Cyril Délécraz</b>   C.T.E.L. lab–Université Nice Sophia Antipolis, FR <i>Analysis Methodology of Musical Gestures: Theoretical Proposals and Application to Toucher by Vincent-Raphaël Carinola</i>
10:00-10:30	<b>Megan Young</b>   Cleveland, Ohio, US <i>Amplifying Identity and Agency Through Collaborative Composition in Breakwall</i>
10:30-11:00	<b>Bernhard Steinbrecher</b>   Franz Liszt Academy, Weimar, DE <i>Analysis of Movement Patterns as Interface to Ethical and Aesthetic Criteria in Popular Music</i>
<b>S6 SPATIALIZATION AND MAPPING OF MUSICAL GESTURE</b>	
<b>EC105</b>	Chair: <b>Paulo Ferreira-Lopes</b>   CITAR–UCP, PT
9:00-9:30	<b>Balandino Di Donato</b>   Integra Lab, Birmingham City University, UK <b>James Bullock</b>   Integra Lab, Birmingham City University, UK <i>xDbox: A System for Mapping Beatboxers' Already-Learned Gestures to Object-Based Audio Processing Parameters</i>
9:30-10:00	<b>Sinan Bökesoy</b>   <i>sonicPlanet</i> Inc., Istanbul, TR <i>Presenting the sonicPlanet's GeoMap 3D sonic augmented reality editor</i>
10:00-10:30	<b>Tiago Ângelo</b>   Digitópia–Casa da Música, Porto, PT <b>José Alberto Gomes</b>   Digitópia–Casa da Música, Porto, PT <b>Óscar Rodrigues</b>   Digitópia–Casa da Música, Porto, PT <i>Sonorium - the Transformation of Movement into Musical Gesture in a New Virtual Interface (Case Study)</i>
10:30-11:00	<b>Rui Penha</b>   INESC TEC & FEUP, University of Porto, PT <i>Can spatialisation gestures be lost in translation?</i>

11:00-11:30	<b>COFFEE BREAK</b>
Atrium	

<b>K3</b>	<b>KEYNOTE ADDRESS</b>
Auditório CG	<b>Guerino Mazzola</b>   University of Minnesota, US

11:30-12:30 *Mathematical Theory of Musical Gestures*

12:30-14:00	<b>LUNCH</b>
Cantina	

<b>R1</b>	<b>Lunch-time RECITAL</b>
A. Ilídio Pinho	

13:00-13:30 **Felipe Verdugo**, piano | Université de Montréal, CA  
*Kreisleriana op. 16, Robert Schumann*

13:30-14:00 **Marine Blassel**, piano | Université de Montréal, CA  
*Sonata in B minor S. 178, Franz Liszt*

<b>S7</b>	<b>GESTURE IN DIFFERENCE AND THERAPY</b>
Auditório CG	Chair: <b>Shersten Johnson</b>   University St. Thomas, St. Paul, MN, US

14:15-14:45 **Andreas Bergsland** | Norwegian University of S&T, NO  
**Robert Wechsler** | Motion Composer, Weimar, DE  
*MotionComposer - a device for persons with (and without) disabilities. Any gesture can be musical. Affording difference in musical interaction design.*

14:45-15:15 **Erik Christensen** | Aalborg University, DK  
*Embodied Meaning in Musical Gesture: Cross-Disciplinary Investigations on the Basis of Intensive Listening, Music Therapy, and Neuroscience*

15:15-15:45 **George Higgs** | Trinity College Dublin, IE  
**Dermot Furlong** | Trinity College Dublin, IE  
*The Sense Ensemble: Music Composition For The Deaf*

15:45-16:15 **Miguel Pais Clemente** | Fac. Engenharia, Universidade do Porto, PT  
**Sofia Lourenço** | CITAR–Universidade Católica Portuguesa, PT  
**Joaquim Gabriel** | Faculdade Engenharia, Universidade do Porto, PT  
*Articulating Research in Medicine of Performing Arts with Musical Performance and Gesture*

**S8 AUDIENCE, DIGITAL INSTRUMENTS, AND MOCAP**

<b>EC105</b>	Chair: <b>Carlos Caires</b>   CITAR/EA–UCP, PT
14:15-14:45	<b>Marcelo Gimenes</b>   Plymouth University, UK <i>Crossing Musical Frontiers with Audience Participation and Smartphones</i>
14:45-15:15	<b>Slavisa Lamounier</b>   CITAR–Universidade Católica Portuguesa, PT <b>Paulo Ferreira-Lopes</b>   CITAR–Universidade Católica Portuguesa, PT <i>Study and Development of Digital Musical Instruments with an Emphasis on Gestural Interface, Motion Analysis and Interactivity</i>
15:15-15:45	<b>Sergio Núñez</b>   Universidad de Chile, CL <b>Javier Jaimovich</b>   Universidad de Chile, CL <b>Jorge Pepi</b>   Universidad de Chile, CL <i>Design and Application of a Motion Capture System for Piano in Music Composition</i>
15:45-16:15	<b>José Antonio Martín Salinas</b>   London Metropolitan University, UK <b>Lewis Jones</b>   London Metropolitan University, UK <i>Towards a Standard Musical-Expression-Gesture Interface for Conducting Instruments and Scores</i>

**K4 KEYNOTE ADDRESS**

<b>Auditório CG</b>	<b>Lawrence Zbikowski</b>   University of Chicago, US
16:30-17:30	<i>Gesture, Analogy, Extension</i>
17:30-18:00	<b>COFFEE BREAK</b>
Atrium	

**S9 TEACHING MUSICAL GESTURE AND DANCE**

<b>Auditório CG</b>	Chair: <b>Mario Baroni</b>   University of Bologna, IT
18:00-18:30	<b>Caitlin Cowen</b>   Northwestern University, US <i>Simulated Sound-Producing Gestures Interwoven into Sound-Accompanying Gestures—the Power of Sound Effects in Nappytabs’ Hip-Hop Routine ‘Scars’</i>
18:30-19:00	<b>Andrea Giomi</b>   Université Nice Sophia Antipolis, FR <i>Awareness of gestures. Interactive sound practice and multimodal feedbacks in experimental pedagogy of dance</i>
19:00-19:30	<b>José Carlos Godinho</b>   Instituto Politécnico de Setúbal &

INET-md/CIPEM, PT

*Physical Gesture and Musical Gesture as Metaphors of Each Other*

19:30-20:00 **James A. W. Gutierrez** | University of California, San Diego, US  
*Refiguring Music Theory Curriculum as Embodied, Integrated, and Applied*

**S10 GESTURE, EMOTION, AND EXPRESSION IN MUSICAL STRUCTURE**

EC105 | Chair: **Fabrice Marandola** | Sorbonne U. FR & McGill Univ., CA

18:00-18:30 **Erica Bisesi** | University of Graz, AT  
*Historical Changes in the Imagery and Gesture Evoked by Piano Music: Schubert, Wagner, Liszt, Schoenberg*

18:30-19:00 **Catherine Massie-Laberge** | CIRMMT, McGill University, CA  
**Isabelle Cossette** | CIRMMT, McGill University, CA  
**Marcelo M. Wanderley** | CIRMMT, McGill University, CA  
*Motion Analysis of Romantic Piano Performances: Incidence of the Musical Structure on Expressive Gestures*

19:00-19:30 **Simonetta Sargenti** | Conservatorio "G. Cantelli", Novara, IT  
**Erica Bisesi** | University of Graz, AT  
*Communication of Structure, Gesture, Emotion and Imagery in Different Interpretations of Solo by Karlheinz Stockhausen*

19:30-20:00 **Miloš Zapletal** | Czech Academy of Sciences & Masaryk University, CZ  
*Music – Sport – Experience: "Sport Compositions" in the Czech Interwar Music*

21:00-22:30 **CONFERENCE DINNER**

Américo Amorim

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## SATURDAY, March 19th

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### S11 ERGONOMICS AND THE ECOLOGY OF MUSICAL GESTURE

Auditório CG | Chair: **Christopher Dobrian** | University of California, Irvine, US

- 9:00-9:30 **Felipe Verdugo** | Université de Montréal, CA  
**Sébastien Bel** | Université de Montréal, CA  
**Caroline Traube** | Université de Montréal, CA  
*Gesture-sound Relationship in a Holistic Approach to Piano Technique: the Role of Pelvic-region Gestures and the Impact of Weight in the Double Escapement Mechanism*
- 9:30-10:00 **Marine Blassel** | Université de Montréal, CA  
**Caroline Traube** | Université de Montréal, CA  
*Seeing Gestures in the Score”: Towards a Symbolic Notation System for a Gestural Analysis of the Score*
- 10:00-10:30 **Randall Harlow** | University of Northern Iowa, US  
*Direct Action and the Primacy of Gesture in the Ecology of Performance*
- 10:30-11:00 **Esthir Lemi** | Helsinki University, FIN  
**Stefania Serafin** | Aalborg University in Copenhagen, DK  
*Haptic Diary: Researching Gesture as a Multi-Sensory Haptic Feedback*

### S12 GESTURE IN CONTEMPORARY MUSIC

EC105 | Chair: **Francisco Monteiro** | ESE–Instituto Politécnico do Porto, PT

- 9:00-9:30 **William Teixeira** | Universidade de São Paulo, BR  
**Silvio Ferraz** | Universidade de São Paulo, BR  
*Musical Gesture: from Composition to Performance*
- 9:30-10:00 **Tatiana Tsaregradskaya** | Gnesins Russian Academy of Music, RU  
*Visual Gesture and Music: on Kaia Saariaho`s “Nymphéa”*
- 10:00-10:30 **Joana Sá** | INET-md–Universidade de Aveiro, PT  
*Important Body/Movement Relations in a Trilogy for Semi-Prepared Piano and Extended Techniques by Joana Sá*
- 10:30-11:00 **Maria Mannone** | University of Minnesota, US  
**Guerino Mazzola** | University of Minnesota, US  
*Physical String Theory for Creative Gestural Performance and Composition in Music*

11:00-11:30	<b>COFFEE BREAK</b>
Atrium	

<b>K5</b>	<b>KEYNOTE ADDRESS</b>
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Auditório CG	<b>Miguel Ribeiro-Pereira</b>   ESMAE–Instituto Politécnico do Porto & CITAR–Universidade Católica Portuguesa, PT
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11:30-12:30 *Harmonic Dissonance as Musical Gesture: Quiet yet Dynamic*

12:30-14:00	<b>LUNCH</b>
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Cantina	
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<b>R2</b>	<b>Lunch-time RECITAL</b>
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A. Ilídio Pinho	
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13:30-14:00 **Robert Wechsler** | Motion Composer, Weimar, DE  
*The Motion Composer: A Mini Performance and Installation*

<b>S13</b>	<b>MUSICAL GESTURE IN OPERA AND THE MUSICAL THEATRE</b>
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Auditório CG	Chair: <b>Sofia Serra</b>   EA–Universidade Católica Portuguesa, PT
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14:15-14:45 **Shersten Johnson** | University of St. Thomas, St. Paul, Minnesota, US  
*Performance Gestures and Idealized Listening in the Met's Pasquale Simulcast*

14:45-15:15 **Leena Seneheweera** | University of Peradeniya, Sri Lanka, LK  
*Musical Gesture in the Semi Classical Genre of Nurthi in Sri Lanka*

15:15-15:45 **Filipa Magalhães** | CESEM: FSCH-Universidade Nova de Lisboa, PT  
*The Gesture on the Musical Theater Compositions of Constança Capdeville*

15:45-16:15 **Mario Baroni** | University of Bologna, IT  
**Roberto Caterina** | University of Bologna, IT  
**Fabio Regazzi** | University of Bologna, IT  
*Sound Gestures in XVIII Century Music*

**S14** **CONCEPTUALIZATION AND INTENTIONALITY OF MUSICAL GESTURE**

EC105	Chair: <b>Rui Penha</b>   INESC TEC–Universidade do Porto, PT
14:15-14:45	<b>Anne-Sylvie Barthel-Calvet</b>   Université de Lorraine, IRCAM, and Université de Strasbourg, FR <i>Between Empirical Criticism and Interdisciplinary Influences: Theorizations of Gesture in Musical Composition</i>
14:45-15:15	<b>Giusy Caruso</b>   Ghent University, IPEM – Musicology, BE <i>Musical Gestures as an Interface of Cultural Identity in Musical Performance: Western Embodiment of Karnatic Music</i>
15:15-15:45	<b>Natasa Crnjanski</b>   University of Novi Sad, SRB <i>Embodying Musical Gesture in Performance: The case of Prokofiev</i>
15:45-16:15	<b>Ângelo Martingo</b>   Universidade do Minho, PT <i>Musical gesture as reified expression: Body discipline, interpretation, and civilizing processes</i>

**K6** **KEYNOTE ADDRESS**

Auditório CG	<b>Marcelo M. Wanderley</b>   CIRMMT, McGill University, CA
16:30-17:30	<i>Digital Musical Instruments: Gestures, Sensors and Mapping</i>
17:30-18:00	<b>COFFEE BREAK</b>
Atrium	

**S15** **GESTURE AND INTERFACES FOR MUSICAL EXPRESSION**

Auditório CG	Chair: <b>Pedro Pestana</b>   CITAR Universidade Católica Portuguesa, PT
18:00-18:30	<b>Henrique Portovedo</b>   CITAR–Universidade Católica Portuguesa, PT <b>Paulo Ferreira-Lopes</b>   CITAR–Universidade Católica Portuguesa, PT <i>Conceiving Involuntary Movements as Musical Performance Tools</i>
18:30-19:00	<b>Michael J. Lyons</b>   Ritsumeikan University, Kyoto, JP <b>Alexander Refsum Jensenius</b>   University of Oslo, NO <i>An Anthology of Fifteen Years of Musical Interface Research and Practice</i>

**S16** **GESTURE ELECTRONICS AND METAPRAXIS IN MUSIC**

EC105	Chair: <b>Ângelo Martingo</b>   Universidade do Minho, PT
18:00-18:30	<b>François-Xavier Féron</b>   Laboratoire Bordelais de Recherche en Informatique, FR

**Baptiste Bacot** | IRCAM, FR  
*Gesture as a Musical Parameter: Conducting with Live Electronics in Sculpting the Air (2015) by Jesper Nordin*

18:30-19:00 **Varvara Gyra** | Paris, FR  
*Gesture and metapraxaxis in Anaparastasis III: The Pianist (1968) by Jani Christou*

**RT - CC** **ROUND TABLE - CONFERENCE CLOSING**

Auditório CG

19:00-19:45 *Round Table Discussion:*  
***The State and Future of Research in Musical Gesture–Retentions and Potentions***

*Moderators:* **José Oliveira Martins** | CITAR–Universidade Católica Portuguesa, PT  
**Sofia Lourenço** | CITAR–Universidade Católica Portuguesa, PT

*Participants:* **Marc Leman** | Ghent University, IPEM – Musicology, BE  
**Guerino Mazzola** | University of Minnesota, US  
**Lawrence Zbikowski** | University of Chicago, US  
**Miguel Ribeiro-Pereira** | ESMAE–IPP & CITAR–UCP, PT  
**Marcelo M. Wanderley** | CIRMMT, McGill University, CA

19:45-20:00 ***Closing Remarks***

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**THURSDAY, March 17<sup>th</sup>**

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## ***Workshops***

<b>W1</b>	<b>WORKSHOP</b>
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<b>MoCap</b>	
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9:00-12:00 **Atau Tanaka** | Goldsmith, University of London, UK  
*Interactive Applications in Machine Learning*

A variety of artistic, musical, and interactive applications in which machine learning can help participants create new things: showcase of some of the technologies (combinations of the Myo sensor band, Bitalino, Wekinator and mobile devices), and how to use them for gestural interaction with music.

<b>W2</b>	<b>WORKSHOP</b>
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<b>EC112</b>	
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9:00-12:00 **Lawrence Zbikowski** | University of Chicago, US  
*Mapping Gesture to Music and Music to Gesture*

The workshop will explore analogical correspondences between music and gesture, and how they constrain correlations between physical movement and sound sequences. The workshop includes a brief introduction to cognitive processes related to analogy, and lead to explorations of how gestures can be correlated with music and how music can be correlated with gestures (including analyses of music put to Warner Bros. cartoons). The topic of the workshop also connects with ways technological interfaces can be used to implement/ enhance/ realize music-gesture connections.



***Keynote Speaker***  
***ABSTRACTS***

2016 Porto International Conference on

## **Musical Gesture as Creative Interface**

**K1** KEYNOTE ADDRESS

**Marc Leman** | Ghent University, IPEM – Musicology, BE

### ***Understanding Musical Intentionality from the Viewpoint of Embodied Interactions***

New developments in the cognitive science of music have stressed the role of corporeal articulations, gestures, and embodied interactions with music. This development was mainly due to new technologies that made it possible to measure music performances in terms of movement. However, being able to measure is only a pre-condition for science. The question is: what do we want to measure and why? In this talk I argue that the ultimate goal of this research domain is to understand the mechanisms of musical intentionality: how is music related to intentions, how are the listener's intentions related to the player's intentions, what is the role of expression? and so on. Based on my new book called "The expressive moment", MIT Press, 2016 currently in press, I propose a model of musical intentionality drawing on the concept of enactment and alignment. I illustrate and support this viewpoint with results of a number of recent empirical and computational studies, including video animations, which illustrate core ideas of the approach. This approach also includes our so-called performer-based analysis approach, in which we involve performers in score analysis, gesture analysis, and assessments of expressive intentions.

**Marc Leman** is "Methusalem" research professor in systematic musicology and director of IPEM, the research center of the musicology department at Ghent University. He holds MA degrees in musicology and philosophy, and did his PhD on computer modeling of tonality perception. He published more than 350 articles, and several books (among which the monograph "Embodied music cognition and mediation technology", MIT Press, 2007; and the co-edited book "Musical gestures: sound, movement, and meaning", Routledge, 2010) on topics related to embodied music cognition. His lab is an international meeting place for researchers working on expressive interactions with music, using embodiment, sensorimotor theory and action theory as a point of departure. In 2007 he became "professor of the Methusalem", renewed in 2015. In 2014 he was holder of the Franqui chair at the Université de Mons. In 2015 he became laureate of the FWO (Flemish Fund for Scientific Research) Excellence Award John-Ernst Solvay. *E-mail: Marc.Leman@UGent.be*

### ***Body as Instrument***

This talk will consider the human body as musical instrument. To do so, we look at the use of physiological signals, notably the electromyogram, as a way to capture the gestural intention and effort of the performer. The use of biomedical technologies as computer interfaces, however, do not automatically comprise a musical instrument. To imagine a system that affords expressive musical performance, we will think about the notion of the “instrument”, and contrast it with concepts of the “tool” predominant in our technoculture. We will also consider the word, “performance” and its various artistic, technical, and social meanings. Through this extended vision of musical instruments, we will consider how biosignals provide a virtual instrument, or perhaps even turn performer into instrument.

### **Le Loup | Lifting**

These two short pieces are taken from a suite of etudes for biosensor performer. The sensor interface captures forearm electromyogram biosignals reflecting muscle tension. The system renders as musical instrument the performer’s own body, allowing him to articulate sound through concentrated gesture. The sources are natural and synthetic sounds - howling wolves are stretched and sculpted, while whistling oscillators modulated.

### **Myogram**

Myogram is an 8-channel sonification of muscular corporeal states. By placing a ring of four electrode channels on each forearm of the performer, we hear the neuron impulses of muscle exertion from the shoulder through the hand. The multiple electrodes on the forearm report on voluntary muscle activity causing wrist rotation and finger movement. These rings of sensors on each arm, left and right, are mapped to dual quadraphonic speaker spaces, a ring on the left wall and a ring on the right wall. First a direct audification of motor unit action potentials is heard as spikes. This stochastic pulse train reflects performer limb activity. The pure spikes then feed resonators and filters, resulting in a sonification by sound synthesis that responds to the musician’s gestural language. This piece was created in musical collaboration with Miguel Ortiz.

Professor of Media Computing at Goldsmiths, University of London and CTO of Clicmobile. **Atau Tanaka** was born in Tokyo, and was raised in the U.S. He bridges the fields of media art, experimental music, and research. He moved to Paris with a residency at the Cité des Arts to work at IRCAM, was Artistic Ambassador for Apple France, and was researcher at Sony Computer Science Laboratory Paris. He was also active in the Tokyo noise music and media

arts scenes. Atau creates sensor-based musical instruments for performance and exhibition, and is known for his work with biosignal interfaces. His recent work seeks to harness collective musical creativity in mobile environments, seeking out the continued place of the artist in democratised digital forms. His work has been presented at Ars Electronica, SFMOMA, Eyebeam, V2, ICC, and ZKM. His work is supported by the Daniel Langlois Foundation, UK and French research funding bodies, and the European Research Council (ERC). He has been mentor at NESTA, Artistic Co-Director of STEIM in Amsterdam, and Director of Culture Lab Newcastle. *E-mail: [a.tanaka@gold.ac.uk](mailto:a.tanaka@gold.ac.uk)*



casa da música

**DIGITÓPIA**

**Digitópia Collective.** A project dedicated to the research of new paradigms on how to make music, composed by artists and developers associated with Digitópia/Casa da Música (artistic platform dedicated to the creation of music in technological format). This collective supports the concept of free exploration, combining the design of digital instruments, the conception of hardware and circuit-bending, the analysis of the relations between image and sound, the practice of VJs and DJs, digital media and interactive digital systems. Electronic and digital music with a performative nature results from the confluence of resources and processes, and also from the different languages brought by each member of the group. The second album will be released in 2016. For the *Porto International Conference on Musical Gesture as Creative Interface*, the Digitópia Collective created an original performative moment which explores artistically how new musical instruments and interfaces influence the interpretation and musical creation, and how to point towards new aesthetic universes.

**Musicians:** Óscar Rodrigues, Tiago Ângelo e José Alberto Gomes/Digitópia Collective.

### K3 KEYNOTE ADDRESS

**Guerino Mazzola** | University of Minnesota, US

#### ***Mathematical Theory of Musical Gestures***

We present the conceptual framework, some important theorems and applications of the mathematical theory of musical gestures. This theory has been developed since 2002 and has been applied to embodied music theory, to the theory of performance gestures, and to the implementation of the gestural composition module BigBang in the Rubato software environment.

The conceptual framework is based upon by the category of local and global gestures. Gestures are essentially digraph morphisms between an abstract digraph, the gesture's "skeleton", and the digraph of curves over a topological category, the gesture's "body". Using compact-open topologies, spaces of gestures

define topological categories, and therefore enable the recursive construction of gestures of gestures, so-called hypergestures.

This approach can be extended to include parametrized gestures, which means to introduce functorial constructions, singular homology of gestures, having applications to embodied counterpoint and harmony.

Hypergestures apply to the performance theory of gestures when world-sheet techniques of physical string theory, including Lagrange formalism and variational calculus, are introduced. This theory yields a canonical set of performance operators for gestures that extends the classical formalism for performance of score objects.

*Some references:*

- G Mazzola and P Cherlin: *Flow, Gesture, and Spaces in Free Jazz—Towards a Theory of Collaboration*. Springer Series Computational Music Science, Heidelberg et al. 2009.
- G Mazzola: Categorical Gestures, the Diamond Conjecture, Lewin's Question, and the Hammerklavier Sonata. *Journal of Mathematics and Music* Vol 3/1, 2009.
- G Mazzola and M Mannone: Hypergestures in Complex Time: Creative Performance Between Sybmbolic and Physical Reality. Springer proceedings of the *MCM15* conference, 2015.
- G Mazzola et al.: *The Topos of Music II: Gestures*. Springer Series Computational Music Science, Heidelberg et al., to appear Fall 2016.

Born 1947, **Guerino Mazzola** qualified as a professor in mathematics (1980) and in computational science (2003) at the University of Zürich. Visiting professor at the Ecole Normale Supérieure in Paris in 2005. Since 2007 professor at the School of Music, University of Minnesota. He developed a Mathematical Music Theory and software presto and Rubato. Since 2007 he is the president of the Society for Mathematics and Computation in Music. He has published 24 books and 130 papers, 25 jazz LPs/CDs/Videos, and a classical sonata. *E-mail: [mazzola@umn.edu](mailto:mazzola@umn.edu)*

<b>K4</b>	<b>KEYNOTE ADDRESS</b>
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	<b>Lawrence Zbikowski</b>   University of Chicago, US
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### ***Gesture, Analogy, Extension***

It seems quite evident that there are any number of relatively simple and direct connections between sequences of musical events and the spontaneous gestures that accompany or supplement speech: thinking about a smooth, connected musical phrase as a kind of gesture is, to all appearances, thoroughly natural. In this paper I suggest that connections between music and gesture are a bit more complex, and propose that it is humans' capacity for analogy that makes it

possible to connect the relatively abstract and often insubstantial domain of musical sound with the embodied experience of physical gesture. This exploration encourages us to think of the conceptualization of music-as-gesture as a highly creative act; it also invites us to think about how physical gestures could be represented through sequences of patterned sound. Building upon the latter, I shall also consider ways music—gestural or otherwise—makes it possible to extend our cognitive processes beyond our bodies, and thus to offer singular resources for creative interfaces.

**Lawrence M. Zbikowski** is an Associate Professor in the Department of Music at the University of Chicago. He has served as Chair of the Department of Music, and also as Deputy Provost for the Arts. His research focuses on the application of recent work in cognitive science to various problems confronted by music scholars, including the nature of musical syntax, text-music relations, the relationship between music and movement, and the structure of theories of music.

He is the author of *Conceptualizing Music: Cognitive Structure, Theory, and Analysis* (Oxford, 2002), which was awarded the 2004 Wallace Berry prize by the Society for Music Theory, and *Toward a Cognitive Grammar of Music* (under review). He has contributed chapters to *The Cambridge Handbook of Metaphor and Thought*, *Communication in Eighteenth Century Music*, *New Perspectives on Music and Gesture*, *Music and Consciousness*, *Bewegungen zwischen Hören und Sehen*, *Speaking of Music*, the *Oxford Handbook of Topic Theory*, and *Music, Analysis, Experience*, and has published articles and reviews in *Music Humana*, *Musicae Scientiæ*, *Music Analysis*, *Music Theory Spectrum*, *Ethnomusicology*, the *Dutch Journal of Music Theory*, and the *Journal of Musicological Research*.

He was co-chair, with David Huron, of the 2009 Mannes Institute on music and the mind, at which he also served on the faculty. During the 2010–11 academic year he held a fellowship from the American Council of Learned Societies, and was also Fulbright Visiting Research Chair at McGill University. *E-mail: [larry@uchicago.edu](mailto:larry@uchicago.edu)*

<b>K5</b>	<b>KEYNOTE ADDRESS</b>
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	<b>Miguel Ribeiro-Pereira</b>   ESMAE–Instituto Politécnico do Porto & CITAR–Universidade Católica Portuguesa, PT
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***Harmonic Dissonance as Musical Gesture:  
Quiet yet Dynamic***

Curiously — nay, symptomatically! — the words “movement” and “moment,” meaning radically different phenomena, derive from the same etymology, Latin *movimentum*. Now, the question is, which of them comes actually first? And how to account for movement in music in the first place, for tones do not actually move; they remain in place, then fade or “die” away: *soni pereunt*, wrote Saint Isidore of Seville. In tonal music, particularly, what is the cognitive process that

allows us to perceive certain harmonic progressions not only as movement, but as directed motion? This *will* to move is imaginary — intentional, that is — something we hear *in* real sounds, a gesture imprinted on our full being's experience of tonal music.

I shall focus on the phenomenon of *dissonance*, an essentially musical concept with major cognitive and cultural resonances, which reflects the sensibility of human society and the historical evolution of our consciousness — prophetic, indeed, claims French economist Jacques Attali. Following in “giant steps” the main stages of its theoretical and aesthetical progress all the way through its eventual “emancipation,” I will first set forth a *modulatory* paradigm for tonal syntax based on a growing, relentless dissonant context up to the final cadence — a plastic, dynamic Gestalt — then concentrate on the musical analysis of two instances from nineteenth-century Romanticism: Schumann's lied “Auf einer Burg” and Wagner's opening of the prelude to *Tristan und Isolde*. In them both, at the motivic as well as formal level, gesture is foremost expressive of a new stage of our evolving *consciousness*.

**Miguel Ribeiro-Pereira** is Professor and Head of the postgraduate Music Theory program at the Higher School of Music and the Performing Arts (ESMAE/ Instituto Politécnico do Porto); integrated researcher and associate director of the *Theory of the Arts Journal* at the Research Center for Science and Technology of the Arts (CITAR/ Universidade Católica Portuguesa); author of the book *A Theory of Harmonic Modulation* (Politema, 2005).

His main research interests include the development and application of a new *modulatory paradigm* of music cognition defined as a transformative process of “harmonic plasticity”; a *holistic approach* to musical analysis which advances a gradual interiorization by means of “meditative listening”; an *evolutionary understanding* of modern Western culture manifested in, and homologous with, our “tonal consciousness”.

He studied law at the University of Coimbra (Portugal), and philosophy at the University of Paris VIII-Vincennes, along with music (organ diploma, M.C. Braga; B.A. in music, U. Paris VIII); was awarded a *Premier Prix* in musical analysis by the Conservatoire National Supérieur de Musique de Paris; has received his M.A. and Ph.D. degrees in music theory from Columbia University in the City of New York; was appointed a visiting scholar to the Music Department at Yale University. *E-mail: miguel.rp@me.com*

**Marcelo M. Wanderley** | CIRMMT, McGill University, CA

### ***Digital Musical Instruments: Gestures, Sensors and Mapping***

In this talk I will present several aspects of ongoing research on Digital Musical Instruments (DMIs) at the Input Devices and Music Interaction Laboratory, McGill University. First I will discuss the use of theories from Human-Computer Interaction (HCI) in order to propose a coherent view on the various uses of DMIs for musical performance, covering the main uses of computer technologies in current music practices.

I will then discuss various aspects of the design of DMIs, including the analysis of performers gestures, the design of input devices for music performance and dance, and the choice of mapping strategies to link device outputs to sound generation algorithm inputs.

Examples of research outcomes in each of these directions will be presented, including the use of motion capture to accurately track performer movements, the development of novel paper-based sensors, the design of fMRI-compatible musical instruments and open-source tools for the quick prototyping of mapping strategies for DMIs and large collaborative projects.

**Marcelo Mortensen Wanderley** (CIRMMT, Director, William Dawson Scholar, Associate Professor, Music Technology, IDMIL, Director. McGill University, CA) holds a Ph.D. degree from the Université Pierre et Marie Curie (Paris VI), France, on acoustics, signal processing, and computer science applied to music. His main research interests include gestural control of sound synthesis, input device design and evaluation, and the use of sensors and actuators in digital musical instruments. Dr. Wanderley has chaired 2003 International Conference on New Interfaces for Musical Expression and co-authored the textbook “New Digital Musical Instruments: Control and Interaction Beyond the Keyboard”, A-R Editions.

He is currently William Dawson Scholar and Associate Professor in Music Technology at the Schulich School of Music, McGill University, Montreal, where he directs the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT).

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# ***ABSTRACTS***

2016 Porto International Conference on  
***Musical Gesture as Creative Interface***

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# THURSDAY, March 17th

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## S1 CONTROLLING AND NAVIGATING MUSICAL GESTURES

Chair: **Marcelo M. Wanderley** | CIRMMT, McGill University, CA

**Christopher Dobrian** | University of California, Irvine, US

[dobrian@uci.edu](mailto:dobrian@uci.edu)

*An Approach to Using Detected Gestures in Music as the Control Interface for Signal Processing*

### ABSTRACT

In addition to, or in place of, tracking the physical gestures of music performers, one can track the gestural quality embodied in the music itself—i.e., the implication of gesture found in the sound. That gestural kinetic quality in the sound can in turn be used for the control of digital audio synthesis and/or processing. The author has already described a real-time computer methodology for defining, segmenting, and characterizing "gesture" in music. This article will elaborate that method in greater detail and explain the use of those characterizations—"analysis vectors"—to guide a computer's musical improvisation, and/or as the control interface for audio signal processing that varies responsively to current and prior sonic inputs.

By means of computer analysis of salient aspects of a live musical performance such as its pitch fluctuations, variances in dynamics, and the inter-onset interval between events, the music can be empirically segmented as a sequence of perceived "gestures". The gestures thus found in the music, and the analytic descriptors derived from them, may be considered as a type of musical motive, a pattern or characteristic that is recognizable by the listener when it is recalled, even with variations. When these gesture descriptions are applied to control the computer's actions and/or parameters of its digital signal processing, the resulting computer music may seem to have an "embodied" and "expressive" quality that is appropriately related to that of the live performer, leading to a more responsive interactive computer music system.

KEYWORDS: gesture; analysis; improvisation; interactivity

**Christopher Dobrian** is Professor of Music, with a joint appointment in the Department of Informatics, at the University of California, Irvine. He is a composer of instrumental and electronic music, and directs the Realtime Experimental Audio Laboratory (REALab), the Gassmann Electronic Music Studio, and the Gassmann Electronic Music Series. He conducts

research on the development of artificially intelligent interactive computer systems for the cognition, composition, and improvisation of music. He has published technical and theoretical articles on interactive computer music, and is the author of the original reference documentation and tutorials for the Max, MSP, and Jitter programming environments by Cycling '74. He holds a Ph.D. in Composition from the University of California, San Diego, where he studied composition with Joji Yuasa, Robert Erickson, Morton Feldman, and Bernard Rands, computer music with F. Richard Moore and George Lewis, and classical guitar with the Spanish masters Celin and Pepe Romero.

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**Pavlos Antoniadis** | STMS Ircam-CNRS UPMC

LabEx GREAM, Université de Strasbourg, FR

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*Gesture Cutting Through Textual Complexity: A Model and a Tool for the Embodied Navigation of Piano Notation*

#### ABSTRACT

The proposed talk introduces a model of embodied interaction with complex piano notation and a prototype system for gestural processing and control of musical scores. In the first part, post-cartesian concepts- ranging from Gibson's ecological psychology, Rowlands' externalism, Lakoff's metaphor theory and dynamic systems to Leman's embodied mediation theory- are applied to notations by Iannis Xenakis and Brian Ferneyhough, offering an embodied and extended alternative to traditional interpretation models. In particular, performance will be conceptualized as embodied navigation in a non-linear space of notational affordances, representable as a multi-layered tablature. The act of navigating this space constitutes an example of mediation between symbolic signification, action-oriented descriptors and physical energy. In this sense, gesture acts as an interface for notation processing and notation forms part of the dynamic system "body-instrument-notation", rather than the composer's "brain in a vat". The second part proposes a technological application of the model: a recently developed prototype for the processing and control of notation through gesture. This system, by the name *GesTCom*, implements tools such as Fober's *INScore* (GRAME) and Bevilacqua's *motionfollower* (IRCAM). Multimodal data are captured, correlated to the score and mapped on it, transforming it into a personalized interactive tablature. Its uses include: performance analysis and documentation, learning through augmented feedback, further design of interactive multimodal systems. The presentation affirms the centrality of gesture as an interface between physical energy and symbolic representations and hopes to contribute in the discussion

concerning the ontological status of gesture and notation in a digitally mediated world.

KEYWORDS: complex notation; embodied navigation; gesture capture; interactive tablature; mediation

**Pavlos Antoniadis** is a Berlin-based pianist for contemporary and experimental music and a doctoral researcher at Ircam and LabEx GREAM, Université de Strasbourg. He has performed in Europe, the Americas and Asia with the new music ensembles Work in Progress-Berlin, KNM and as a soloist. He has recorded for Mode (2015 Deutscheschallplattenkritikpreis) and Wergo records. He has published on embodied cognition and piano performance and has been invited for lecture-performances at European institutions (HfM Dresden, INMM Darmstadt, Ircam Paris, Orcim Gent, Goldsmiths London, Trinity Dublin, Aristoteleio Thessaloniki, Cité de la Musique et de la Danse Strasbourg). He was a Musical Research Residency fellow at Ircam in 2014. Pavlos holds degrees in piano performance (MA, UC San Diego) and musicology (Athens National University). He has studied on LabEx GREAM, Fulbright, UC San Diego, Nakas conservatory and Impuls Academy Gratz scholarships.

Acknowledgments: My participation is enabled by the financial support of LabEx GREAM at the Université de Strasbourg. Special thanks to Frédéric Bevilacqua, the Ircam's Musical Research Residency, and last but not least to Dominique Fober, for their ongoing support.

## S2 MUSICAL GESTURE BEYOND NOTATION

Chair: **Nuno Aroso** | Universidade do Minho, PT

**Diego Castro Magas** | University of Huddersfield, UK  
[dcastromagas@gmail.com](mailto:dcastromagas@gmail.com)

*Towards a Mimetic/Gestural Approach to the Performance of Recent/Notated Music for Guitar*

### ABSTRACT

Drawing upon Theodor Adorno's theory on musical reproduction, and particularly on his embodied concept of mimesis, I propose a gesture-based approach to the performance of recent guitar music of complex notation.

Adorno claims that 'true reproduction' is the 'x-ray image' of the work of music: a rendition of all the aspects that lie hidden beneath the surface of perceptible sound. My claim is that the domain for such an attempt is that of musical gesture. Hence, I explore a set of interpretative choices arising from the interplay between the music-immanent demands of the work of notated music and other semiotic properties beyond the score itself. In doing so, analogical

bridges from notation to performance are proposed by means of the application of body schema and the four main functional categories of musical gestures into interpretative processes, exposed in this presentation through examples of live performance from relevant case studies.

KEYWORDS: gesture; mimesis; embodiment; performance; guitar

**Diego Castro Magas** (b.1978) is a Chilean guitarist and practice-led researcher currently based in Huddersfield, UK. He holds degrees in guitar performance from Catholic University of Chile and Ramon Llull University in Spain. Diego has been recognised in numerous international guitar competitions and has appeared as soloist in more than eighteen countries throughout Europe, the Americas and Oceania, with a particular interest in new music. He has collaborated with composers including Aaron Cassidy, James Dillon, Brian Ferneyhough, Michael Finnissy, Bryn Harrison, Wieland Hoban, Clemens Gadenstätter and Matthew Sergeant, amongst others. His research interests are concerned with performing issues in complex notation, musical gesture, physicality as musical material and critical theory. Currently, he is a PhD student in Contemporary Music Performance at the Centre for Research in New Music (CeReNeM) at the University of Huddersfield, supervised by Dr Philip Thomas.

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**Sandra Fortuna** | Conservatory of Music at Frosinone, IT  
[sandrafortuna@tiscali.it](mailto:sandrafortuna@tiscali.it)

*Embodied Learning and Graphic Symbolisation*

#### ABSTRACT

Multimodal musical experiences and the transposition into movements and singing could be considered a means to express own musical ideas, physically. An additional and symbolic means to experience music is to invent graphic notation. Several authors emphasized the importance of using singing and movements to support instrumental learning. So far graphic notation was studied only in relation to visualise sounds heard. The aim of the present study is to describe the learning process whilst integrating these embodied and symbolic means. The purpose of this case study is to analyse individual processes of learning to play a new melody on the violin and singing, movements, and graphic symbolisation are used to instruct the learning of a new melody.

Microanalyses of video recorded case studies are carried out. In order to analyse the structural changes between three performances of two children, a specific amount of parameters are considered. The structural changes are analysed by using software for viewing, analysing and comparing audio data.

Results show that the two children's performances gradually differentiated during the process as can be shown by detailed acoustic and corresponding musical features, as well as by correspondences with child's own graphic representation of her musical imagination. Such descriptions allow for a better understanding of an individual child's strategies of building up a mental model of a melody and by revealing analogies between physical and symbolic means.

KEYWORDS: embodied learning; symbolisation; movement; instrumental learning

Lecturer of Pedagogy and Psychology of Music at the Conservatory of Music Frosinone (Italy), **Sandra Fortuna** holds MA degrees in Musicology, Music Education and in Violin Performance. She has been teaching pedagogy and the psychology of music since 1997 in the Conservatories of Music and Universities in Italy. Fortuna has published several studies in the field of music education, music and audiovisual communication, and multisensory approach and invented notation during the instrument lessons. Her work focuses mainly on integrated activities in instrument lessons with children and adults, and the role of the voice and body during the process of learning music and the relationships between bodily movement, music visualization and expressivity. She has presented her works at several international and National conferences, some of the most notable include: EuNet Meryc 2015, The 2nd International Conference of Dalcroze Studies, Vienna 2015; ISME, 2014; Gorizia 2000.

### S3 MUSICAL GESTURE IN CROSS-CULTURAL PERSPECTIVE

Chair: **Salwa El-Shawan Castelo-Branco** | INET-md, FCSH-  
Universidade Nova de Lisboa, PT

Panel Leader: **Fabrice Marandola** | Sorbonne Universités, FR;  
McGill University, CA

*Studying Musical Gesture in a Cross-Cultural Perspective: a Multi-Disciplinary Approach Based on Laboratory and Field-Research Experiments*

#### ABSTRACT

This panel is based on a research project dedicated to the study of musical gesture (GeAcMus "Gesture-Acoustic-Music", Sorbonne Universités). Grounded on a multidimensional approach bringing together ethnomusicologists, historical musicologists, acousticians, biomechanists, performers and music pedagogues, this project offers a unique comparative perspective on the topic of musical gesture. The aim of the project is threefold:

1. To study the playing technique of an instrument according to its

functional, aesthetic and socio-cultural dimensions. Our approach includes: a) the analysis of the morphology and manufacturing of the instrument and its acoustics, b) the quantitative and qualitative analysis of musical gesture, c) a comprehensive knowledge of the musical language and its related learning processes, d) and the cultural representations associated with instrumental practices.

2. To develop new experimental methods to collect and analyze musical gesture data. Our approach focuses on the study of instrumental gesture in various contexts of production ranging from laboratory conditions to field research in Central Africa and Central Asia, to live performances in French conservatories. Our data collection includes interviews with performers and instrument makers, audio recordings, 2D and 3D motion captures, and eye-tracking measurements.

3. To compare four types of instruments (drum, percussion keyboard, lute, harp) from different geo-cultural areas (Europe, Central Asia, Central and West Africa). The aim is to understand the different principles underlying the interactions between the musicians and their instruments. For each instrument, our research involves comparisons within each geo-cultural area, and between areas.

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**Fabrice Marandola** | Chaire thématique Sorbonne Universités /  
Muséum National d'Histoire Naturelle, Eco-anthropologie et  
Ethnobiologie, Paris, FR; Schulich School of Music & CIRMMT, McGill  
University CA  
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*Xylophone Performing Techniques: A Cross-Comparison of Stroke- and Gaze-Patterns of Performers from Cameroon, Canada and France*

#### ABSTRACT

This research is based on a comparative study of xylophonists from Cameroon (Bedzan Pygmies, Eton and Tikar ethnic groups) on one side, and from Canada and France on the other side. The goal is to identify similarities and dissimilarities regarding: 1/ body positions, 2/ mallet grips, 3/ stroke patterns and 4/ eye-hand coordination practices, within each geo-cultural area and across cultures.

Several sets of data were gathered, in laboratory conditions in France (UTC) and Canada (CIRMMT), and in the field in Cameroon (5 ensembles of 3 to 6 xylophones for the Eton, and 6 ensembles of banana-trunk xylophones among Bedzan Pygmies and Tikar). Musicians performed excerpts from their usual repertoire, as well as musical tasks crossing cultural boundaries - typically

scales in alternate strokes, and double-stop strokes in parallel and/or contrary motion.

3D motion capture data was collected in laboratory conditions, while field recordings included a set of three Go-Pro cameras running at 240 frames per second and placed in sagittal, frontal and transversal plans. In both conditions, stereo or multi-tracks audio recordings were captured, and an eye-tracking device (ASL MEGX-60) was used to simultaneously collect gaze-data. Quantitative data was complemented by interviews with the xylophonists focusing on their learning practices and the mental representation of their own performing techniques. Preliminary results demonstrate a high-level of gestures reproducibility across cultures, and a remarkable integration of the keyboard in performer's mental representation of space that seems to be independent from the learning context (oral tradition versus score-based learning).

KEYWORDS: xylophone; comparative study; ethnomusicology; eye-tracking; performance studies

**Fabrice Marandola** is an Associate Professor of Percussion and Contemporary Music at the Schulich School of Music of McGill University (Montreal). Previously, he was a professor of percussion at the conservatories of Angers and Grenoble in France, a pedagogy instructor at the Conservatory of Paris, and an invited professor at the Crane School of Music (SUNY-Potsdam, NY). A founding member of Canadian percussion ensemble *Sixtrum*, he has an active career on the New Music scene, commissioning, performing and recording new works for solo and chamber ensembles. Marandola holds a Ph.D. in Ethnomusicology from Paris IV-Sorbonne and has conducted in-depth field-research in Cameroon. He is a member of the Centre for Interdisciplinary Research in Music Media and Technology of Montreal (CIRMMT) of which he was Associate Director/Artistic Research from 2009-2014. Marandola currently holds a Senior Research Chair position at Sorbonne-Universités to lead a multidisciplinary research project on Musical Gesture (*Geste-Acoustique-Musique*).

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*3D Motion Analysis of the Performance of Classical and Traditional*

## Expert Musicians in Laboratory Settings

### ABSTRACT

3D motion capture is a mature technology to quantify and analyse human posture and movement. Motion analysis can have various domains of application, such as sports, health, ergonomics, videogames but also music making. It was the objective of the investigation of the motion of musicians when playing an instrument, to get quantitative data for the qualification of the performance, in particular in terms of precision and reproducibility. Taking place in the framework of an interdisciplinary project between biomechanists and ethnomusicians. For the current project, and due to their representativeness in terms of gesture, the Gabonese harp, Dotar luth and Xylophon have been studied.

KEYWORDS: motion capture; performance analysis; musician; kinematics

Since 2009, **Frédéric Marin** is Professor in the Laboratory for Biomechanics and Biomechanical Engineering at the University of Technology of Compiègne (UTC), France. He received the Ph.D. degree from Ecole Nationale Supérieure des Arts et Métiers of Paris, France, in mechanical engineering related to biomechanics in 2000. After working in industry, he joined the Institute of Orthopaedic Research and Biomechanics, Medical University of Ulm, Germany, as a researcher. In 2004 he became associate Professor at UTC and in 2007 he received his Habilitation diploma. His main research interests are centered on the motion analysis of the human joints and musculoskeletal modeling.

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*Harp Performing Techniques as Cultural Markers in the Bwiti Cult:  
Comparison of Musical Practices in Three Gabonese Populations*

### ABSTRACT

The eight-string harp is a fundamental component of the *bwiti* cult in Gabon. Several populations practice the *bwiti* cult. It has been transformed during its

circulation among Tsogho, Myene and Fang populations. We also observe variations of the ritual across communities within each group. Borrowing and using the same instrument in the same ritual context could lead musicians to borrow the musical language and meaning associated. This is not obviously the case here. Indeed, we previously observed variations of the shape and decoration of the harp, but also of its repertoire and associated meanings. What about the musical gesture?

We studied and compared the musical gesture of several harpists from different communities to interrogate how the circulation of the same instrument allows *bwiti* communities to build a shared identity, albeit distinct. Based on this multidimensional analysis of the instrumental gesture, we aim to show that it is through the interrelation of the instrument, the musical gesture, the music and associated meanings that each musician builds his own identity.

For each musician, we collected and analyzed 2D and/or 3D motion data to identify similarities and dissimilarities of the musician's posture and the kinematic of his hands and fingers. We then correlate the analysis of musical gesture with the analysis of musical language, its related learning processes and the cultural dimensions of the harp in the *bwiti* cult.

KEYWORDS: harp, Gabon, motion capture, Ethnomusicology, learning process

**Marie-France Mifune** is an ethnomusicologist from the Eco-anthropology and Ethno-biology Laboratory (UMR 7206) at the National Museum of Natural History in Paris. She got her PhD in anthropology at the School of Advanced Studies in Social Sciences in Paris. She studied the role of ritual performance in the construction of the initiates' identity in the *bwiti* cult among the Fang in Gabon. She analyzed the ritual as performance in an interdisciplinary perspective by taking into account the three modes of expressions, music, language and dance. Since 2007, she participated in 5 interdisciplinary research programs on the origin and diversity of Central African populations, the musical heritage of Gabon and South Cameroun, the automatic indexation and analysis of ethno-musicological sound archives and on the study of voice in an interdisciplinary perspective. She is currently a postdoctoral fellow of the Chaire GeAcMus « Gesture-Acoustic-Music » from Sorbonne Universités.

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*From Musical Gesture to Musical Corporality: The Case of the Long-Necked Lutes in Iran and Central Asia*

ABSTRACT

The paper approaches the question of musical gesture in a particular angle of the comparative study of the instrumental gestures and techniques, combined with the question of the cultural image of the body. By analyzing the instrumental playing gestures of *dotâr*, a long-necked lute from Iran and Central Asia, as well as other lutes from the region such as *setâr*, *târ*, *rubâb* and *tanbur*, our approach focus on the study of instrumental gesture in various contexts of production, ranging from laboratory conditions to field research. It contains data both from the regional musics and the canonic repertoires of the traditional music. Our data collection includes interviews with performers, video recordings in 2D and 3D motion capture and analysis. Our approach uses an adaptation of the methods mainly used in linguistics, specially the paradigmatic analysis, applied to the domain of musical gestures study.

According to our analysis, we find a series of common playing techniques shared between different traditions but also techniques that are associated with a specific tradition and which can not be found in the other neighboring cultures. So in a broad continuum, which includes various musical traditions in contact in the region, some techniques are the "distinctive features," which allows us to distinguish between different traditions. However, each musician develops his own technique to create his own « signature ». These features manifest not only by the particularities in the musical gestures but also by a whole different corporality and cultural image of the body of the musicians.

KEYWORDS: musical gesture; embodiment, motion capture; Ethnomusicology; Cross-Cultural studies

**Farrokh Vahabzadeh** holds the junior research chair Gestures-Acoustics-Music (GeAcMus), Sorbonne Universités / MNHN. He is also invited assistant professor in ethnomusicology in Musée de l'Homme in Paris. His main research areas are the Iranian and Central Asian musical traditions. He is interested in musical gestures, corporality and performance studies as well as various anthropological fields related to music. At GeAcMus research chair, Farrokh Vahabzadeh continues his researches on the following themes: comparative musical gesture studies, aesthetics, performance and cultural-musical identity. Among his publications, the articles: "Se démarquer de l'Autre: du geste instrumental à la corporalité musicale", in *Quand la musique prend corps*, (Presses de l'Université de Montréal, 2014); "Étude comparative des gestes instrumentaux: Le jeu du *dotâr* en Iran et en Asie centrale", in *Musicultures*, (Société Canadienne de la Musique Traditionnelle, 2012).

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*From Gesture to Musical Gesture: The Intersection Between  
Composition, Musical Performance, and Gesture Recognition Software*

#### ABSTRACT

An essential design element of any gesture-driven interactive computer music system or work is the mapping of the gestural data, along with the results of its analysis, onto musical elements and parameters, constituting the bridge between Wessel and Wright's "controller" and "generative algorithm" (2002). In its ability to tether potentially any measurable movement to potentially any musical response, this gesture mapping process can be seen as way of creating from scratch a set of conceptual metaphors, in which source domains and target domains are mapped onto each other, such that two domains may be completely different, but evoke one another (Johnson, 2010). Zbikowski (2008) claims that once a performing group has succeeded in achieving a "successful" performance, these conceptual metaphors are responsible for giving music its power.

While significant study has been conducted on creating taxonomies, strategies, and evaluation methods related to gesture and gesture mapping (Caramiaux et al, 2014), the creation of any new performance system presents a unique set of design and implementation challenges, based on a complex web of factors that include performer characteristics, sonic/musical intentions, and performance/expressive goals.

We confronted many of these challenges in our development of an ongoing camera-based (Microsoft Kinect) interactive computer music project, in which one of our central goals is to translate gesture as embodied metaphor into musical (and linguistic) expression, simultaneously creating and refining a gestural interface, controller, and a series of compositions. In the first year of this project, we created and presented seven compositions, each with a unique design interface and set of gestural controls, but with a common gestural "language." In this paper, we describe our process, the problems we encountered, and some of the solutions we have discovered along the way, with a focus on the iterative process that we used as well as the challenges of creating a gestural interface that evokes coherent conceptual metaphors.

KEYWORDS: musical gesture; interactive computer music; embodied metaphor; gesture recognition

**Ben Sutherland**, Ph.D., is a composer and professor of Audio Arts & Acoustics at Columbia College Chicago. His contemporary classical works have been performed by the Pacifica String Quartet, the Contemporary Chamber Players, and the Aspen Contemporary Ensemble, among others. He holds a B.A. in Music from Oberlin College, and his M.A. and Ph.D. in Music Composition from the University of Chicago.

**Emma Hospelhorn** is a flutist and doctoral candidate in Learning Sciences at the University of Illinois at Chicago, where her research focuses on spatial and embodied group learning in musical contexts. She is a member of Ensemble Dal Niente, the first ever ensemble recipient of the Kranichstein Music Prize for interpretation at the International Summer Courses for New Music in Darmstadt, Germany.

Together, Ben and Emma form *The Machine Is Neither...*, a computer music collaboration that pushes the boundaries of live electronics processing through sonic and gestural control. Learn more at [www.themachineisneither.org](http://www.themachineisneither.org)

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*Instrumental Movements to Physical Models: Mapping Postural and Sonic Topologies through Machine Learning*

#### ABSTRACT

We describe an approach for mapping body motion data to sound synthesis based on machine learning and inspired by studies of topology and embodied music cognition. This approach aims to move away from a low-level movement representation constrained by a Cartesian coordinate system and obtain a control paradigm that is less dependent on it. A system based on orthogonal axes is indeed a convenient way to digitize movement. However, meaningful conceptualization that help interpreting the expressivity that body movement conveys may be hindered if subordinated to a highly disciplined method of quantitative representation. Topology studies intrinsic geometric properties of the objects (which do not depend on a chosen set of coordinates) in a context informed by qualitative observations. This approach provides very useful notions for interpreting movement data generated by music performance gestures. In fact,

such body movements are bound to multimodal expressive features, which are inherently qualitative. To put these concepts into practice, we used machine-learning algorithms to define interaction models based on different postures a saxophonist may adopt during a performance. These postural topologies are then mapped to different states of a physical modeling algorithm that is controlled by the performer's movements. A research musical piece was composed using the technology, with body movement articulations included in the score. The piece served as a test bed for the software developed as well as a practice-as-research work, showing how different multimodal musical features are inherently entangled as each one mutually influence the other.

KEYWORDS: musical instrument; wearable sensors; performance; machine learning; topology

**Federico Visi**, researcher, composer and performer. After obtaining his master's degree in communication, multimedia and design, he studied music for image in Milan and composition at the music academy Accademia Pianistica in Imola. He is currently based in Plymouth (UK) where he is conducting his doctoral research at the Interdisciplinary Centre for Computer Music Research (ICCMR). His research focuses on body movement in performances with traditional musical instruments. He has composed music for films and installations, performed live in solo sets, with bands and in contemporary theatre and dance performances, and presented his research at several international conferences. He has worked and is currently working on collaborative interdisciplinary projects with researchers in Europe (Ghent University, University of Bologna), North America (NYU, UCLA) and South America (Universidade Federal do Rio Grande do Sul). – [www.federicovisi.com](http://www.federicovisi.com)

**Eduardo Miranda** is Professor of Computer Music, and head of the Interdisciplinary Centre for Computer Music Research (ICCMR) at Plymouth University. He is a composer of chamber and electroacoustic music and he is most notable for his scientific research into computer music, particularly in the field of brain-computer interfacing, evolutionary computing and artificial intelligence.

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*The Sostenante Pedal: A Novel Pedal for MIDI Keyboards*

## ABSTRACT

We present a novel sustain pedal for digital pianos. The pedal selectively controls which MIDI notes are sustained and which are released. The power and novelty of the pedal comes from an intelligent algorithm that releases notes that stand out as dissonant when compared to the harmony formed by the sustained notes. In that way, the pedal adapts to the “overall consonance” of the performance; when the performance is highly consonant, even slightly dissonant notes are released. As the performance becomes less consonant, dissonant notes are more tolerated. At the core of the algorithm lies the Tonal Interval Space (TIS) in which every note or chord is represented by a 12-dimensional vector. In the TIS, the consonance between pitch configurations is relative to their proximity in the space. During a performance, the pedal automatically releases some of the sustained notes or chords based on the relation of their positions in the TIS. The effect of the “Sostenante” pedal is essentially different from the traditional sustain pedal. For instance, playing loud the notes of a melodic phrase that do not necessarily belong to the harmony of the accompaniment might result in dissonance using the traditional pedal. However, our pedal releases those dissonant notes resulting in a cleaner result while allowing for more expressive performances. The pedal is aimed at professional musicians, prompting them to explore new compositional strategies and musical idioms, as well as amateurs who do not fully master the traditional pedaling techniques.

KEYWORDS: consonance; tonal interval space; pedal; sustain; piano.

**George Sioros** is a Researcher and Musician. He is currently a Ph.D. candidate in digital media at the University of Porto, Faculty of Engineering, and a member of the Sound and Music Computing group at INESC TEC (Porto). He holds a master in Physics from the National Technological University of Athens. He studied Physics in the University of Ioannina and classical Piano at the Orfio Conservatory (Athens, Greece). His research focuses on algorithms for automatic music generation and rhythm perception and analysis.

**Gilberto Bernardes** is a Portuguese saxophonist and researcher. Bernardes holds a Ph.D. in digital media from the University of Porto, a Master in Music from the Conservatory of Amsterdam, a Bachelors in Music from the Superior School of Music and Performing Arts (Porto, Portugal), and a "Premier Prix" in saxophone and chamber music from the ENM d'Issy-les-Moulineaux. Bernardes is a founding member of the Oporto Saxophone Quartet. He is currently a Senior researcher at the INESC TEC and an Associate Professor at the Superior School of Applied Arts of Castelo Branco.

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*Gestural Interaction using Leap Motion feat Processing and  
Supercollider*

#### ABSTRACT

In recent years, hand gesture recognition has attracted a growing interest due to its applications in many different fields, such as human-computer interaction, robotics, computer gaming, automatic sign-language interpretation and so on. I'll examine the project of a PARTICLE SYSTEM and the approaches to the Leap Motion applied to a multimedia interactive performance done with Processing and Supercollider.

The Leap Motion offers features for image segmentation (due to its depth sensors), enabling the development of interactive, gesture-controlled applications at a considerably lower cost, without degrading accuracy (or resolution). Supercollider is a programming language for real time audio synthesis and algorithmic composition. Processing is an open source programming language and environment for people who want to create images, animations, and interactions". It is designed to be used by artists, therefore does not require deep programming knowledge and it makes the task of practical implementation of ideas rather simple and immediate.

A particle system is a collection of many minute particles that together represent a fuzzy object. Over a period of time, particles are generated into a system, move and change from within the system, and die from the system.

KEYWORDS: audiovideo; gesture; leap motion; processing; supercollider

**Roberto Zanata** born in Cagliari, Italy where he graduated in Philosophy. He is a composer and audiovisual artist. He studied and graduated in composition and electronic music at the Conservatory of Cagliari. In the middle of nineties Roberto became active in Italy and abroad. He wrote chamber music, music for theatre, computer music, electroacoustic and acousmatic music as well as multimedia works. In International competitions his works have been awarded *Grands Prix Internationaux de Musique Electroacoustique* (Bourges), *Interference Festival* (Poland), *Sonom Festival* (Mexico). Presentations, concerts and conferences at International festivals, universities, associations and reserch centres include Citem (Argentina), Emufest (Italy), New York Electroacoustic Festival (Us), Simultan (Romania), Wocmat (Taiwan), FILE (Brasil), Zagreb Biennal of Contemporary Music (Croatia), EAW 2015 (Portugal) and others. He actually teaches Mulimedia at the Conservatory of Ferrara and he works for Associazione Spaziomusica.

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## FRIDAY, March 18th

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### S5 AGENCY, IDENTITY AND METHODOLOGIES OF GESTURE

Chair: **Jorge Alexandre Costa** | ESE-IPP & CIPEM-INET/md, PT

**Diana C. Hereld** | University of California, San Diego, US

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*Recovering the Subject Through Sonic Gesture: Contending the Annihilation of Self*

#### ABSTRACT

Jungian analysis understands the psyche as encompassing all psychic processes, both conscious and unconscious. Jung maintained that like the body, the psyche is a self-regulating system and is subject to change. In much of modern neuroscience, notions of personality and the self go hand in hand as a set of neural processes in constant flux due to their capacity to learn and remember (LeDoux, 2002). When psychic illnesses attack the emotional brain and these processes deteriorate, one's sense of self -- one's very *form* may soon follow suit. How does one contend this potential annihilation of being; this fragmenting of self-becoming? As pathological plasticity threatens the very desertion of subjectivity (Malabou, 2012), this contention must be done via consciousness, responsibility, and intentionality. Looking to the arts as an aid to regulating this process, we consider how elements of music appending to identity and emotion may feed off of and complement one another. Music functions as a sign of self-identity and cultural identity. It therefore also functions as a self-object as it reinforces its function as a sign of identity. Most importantly, music as self-signifier thrives on emotional qualities that we experience rising from the inner psyche and body. Just as traumatic experience affects the plastic psyche, music may provide an invaluable capacity to mediate the gulf between affect and the self, profoundly improving self-regulation.

KEYWORDS: plasticity; trauma; music and affect; emotion-regulation

**Diana Hereld** is a Tribal Membership Initiatives Fellow of music and integrative studies at the University of California, San Diego. Her experience with music, mind, and the brain drives her current research: discovering how various affective dispositions respond emotionally to music; how this response changes over time in tandem with emotion- regulation techniques; and implications for psychological and neurological affect and resilience. Diana's primary

postgraduate research interest focuses on the way at-risk youth respond emotionally to music, and the implications for psychological resilience. She works under the supervision of Dr. David Borgo and Dr. Nicholas Christenfield to complete her thesis on the implementation of self-regulation techniques and the affective neurological and psychological role music holds for those who suffer from affective disorders. Her PhD proposal includes qualitative and quantitative research concentrations in affective disorders, auto-destructive behavior, and potential interventions employing extreme music.

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*Analysis Methodology of Musical Gestures: Theoretical Proposals and Application to Toucher by Vincent-Raphaël Carinola*

#### ABSTRACT

The analysis methods of the gesture I am using build upon the works of Rudolf von Laban, Pierre Schaeffer, Stéphane Roy and the M.I.M. *Toucher* (2009) is a solo piece by French composer Vincent-Raphaël Carinola for theremin and electronics. Laban's theory on "effort" is built on four motion factors (Weight, Space, Time, Flow), which are not dependent on contact between a subject and an object. The application of the categories of effort to *Toucher* allows us to extract specific effort qualities, such as the superiority of the Weight factor over Space and Time. Although Laban's theory on effort helps us identify some of the vital and kinetic qualities of musical gestures, the analysis would be incomplete without a perceptive study of gestures and the functions and meanings they may carry. When transposed in the field of gesture and applied to *Toucher*, Temporal Semiotic Units demonstrate the misconception that there would be a naive correspondence between a gesture unit and its alleged correspondence with the same type of sound unit. In addition, the functional analysis of Stéphane Roy includes a rhetoric class, which gives us some basic relational elements such as "anticipation" or "affirmation", and some basic break elements such as "index" or "retention". It helps us clarify the meaning of musical gestures that have a specific function within the musical discourse independent of the sonic result. The analysis of musical gestures in *Toucher* sheds light on the creating process in a work where free movement is the only expression vector.

KEYWORDS: gesture; methodology; analysis; Carinola; Toucher

**Cyril Délécraz** was born in 1988 in Nice. He graduated from the University of Nice Sophia-Antipolis with an M.A. degree in Mathematics in 2011. He then decided to continue his studies

in Musicology in order to be engaged in research. He is currently a second year Ph.D. student under the supervision of Jean-François Trubert (C.T.E.L. lab, University of Nice Sophia-Antipolis), whose field of research deals with the analysis methodology of the musical gestures. To do so, he mainly uses Rudolf von Laban's theory, with the influence of Schaeffer's spectromorphology, and applies it to a scenic musical repertoire, ranging from Musical Theater and Instrumental Theater to electroacoustic music. Essentially a self-taught artist, Cyril performs as a singer and guitarist, chorister and disc jockey. He also attends Michel Pascal's electroacoustic composition class at the *Conservatoire à rayonnement régional* of Nice.

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*Amplifying Identity and Agency Through Collaborative Composition in Breakwall*

#### ABSTRACT

This article examines the interdisciplinary sound installation and performance venue, titled *Breakwall*, from development through presentation in the critically acclaimed Site:Lab – Rumsey Street Project in ArtPrize 2015. *Breakwall* is posited as a site of exchange with strong emphasis placed on inclusion and openness. It pays homage to the history of feminist, and resistive methodologies that also utilize the body as instrument. The augmented sound system invites participating bodies onto the naturally resonant installation of sand and wood, then amplifies, loops, and assembles inputs from multiple participants. The responsive media environment is semiautonomous in that it cycles through content from previous participants when active bodies are not present and layers those sonic histories into original compositions with new participants. The installation features an exceptionally easy to learn interface, highly legible physical to aural correlations, and discrete collaborative possibilities. The project counters gesture control interfaces that, through their construction, either uphold rigid gender binaries or actually attempt to erase the markers of identity.

KEYWORDS: collective sound creation; identity; processing; agency

**Megan Young** is part-time faculty at Kent State University and founder/director of MegLouise, a movement and new media collaborative. Her research on choreography as system design has been presented at the Workshop on Movement and Computing (MOCO'15) - International Symposium on Electronic Art, and in the 2014 American College Dance Festival at Ohio University. She has presented workshops at University of Illinois in Chicago (UIC), Columbia College Chicago, Dance in the Annex, and Chicago Cultural Center. Young has recently been awarded a Creative Workforce Fellowship and an ArtPrize Seed Artist Grant. She has been

awarded two *In The Works Residencies* toward the development of new work through the Chicago Department of Cultural Affairs & Special Events and a residency at Prairie Center of the Arts. She completed her MFA in interdisciplinary arts & media from Columbia College on a Follet Fellowship; BFA in dance from Ohio University.

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*Analysis of Movement Patterns as Interface to Ethical and Aesthetic Criteria in Popular Music*

#### ABSTRACT

Common musical analytical approaches tend to ‘freeze’ a piece of music with the purpose to make statements about its abstract-from-time entirety. As opposed to traditional methods, process-oriented analyses take aspects of human cognition into account more strongly and try to retrace the immediate listening experience. This only rarely applied analytical concept seems especially applicable for the examination of musical movements and the question how they progress from moment to moment.

My general approach to the notion of musical gesture is based on the assumption that movement patterns can be a decisive factor in the valuation of music, that they can reflect ethical and aesthetic criteria by which listeners judge an artist or a band, with regards to the ‘right’ and ‘good’ ways of production, perception and lifestyle.

In my talk, I am going to present possibilities on how movement patterns in a piece of music can be systematically described, visualised and interpreted, guided by empirical findings from a qualitative content analysis of amateur reviews. This includes a discussion of the overall as well as the single voice movement specifics of the song *Turnover* from the US-Indierockband Fugazi. The necessity for such analyses is supported by the observation that the reviewers’ arguments strongly relate to their own bodily experiences, processed through episodic rather than semantic memory, and also that the imagination of how the musicians interact with their instrument’s interface seems to play a major role in the appreciation for the band, for example when pointing out passion and physically-palpable intensity.

KEYWORDS: process-oriented analysis; movement patterns; bodily experience; musical valuation; Fugazi

**Bernhard Steinbrecher** finished his PhD studies in Musicology at the 'Hochschule für Musik Franz Liszt Weimar' in 2015. His academic interests lie in the field of systematic music analysis and interpretation, focusing on the sounds, the *music* of popular music. He is working on perspectives on how musical analysis can help to understand one's acquaintance with music, and on how far musical analysis is a suitable tool for the search for knowledge relevant to society. He is especially interested in questions regarding musical valuation and in examining the reasons for our musical preferences and aversions and on how far they are reflected in what we hear on recordings.

## S6 SPATIALIZATION AND MAPPING OF MUSICAL GESTURE

Chair: **Paulo Ferreira-Lopes** | CITAR-UCP, PT

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*xDbox: A System for Mapping Beatboxers' Already-Learned Gestures to Object-Based Audio Processing Parameters*

### ABSTRACT

Human Beatboxing is a musical artform born to overcome the lack of electricity to power drum machines to accompany rappers performing during street performances. Many beatboxers now rely on technology to effect vocal sounds, which surfaces problems regarding availability, portability, appropriateness and usability.

We approach these problems by researching and developing “xDbox”, a system involving mobile devices and wearable technology tailored to the established requirements of the beatboxing artform. The system is able to (1) map beatboxers' already learnt gestures into acoustic features (sound source's dimensions, position and orientation, first and second order spatial trajectories, reverb) and consequentially (2) to elaborate beatboxers' vocal sound considering it as a sound source within a virtual environment, where the sound source's characteristics are established in (1). The beatboxer can reproduce the processed sound by choosing between three reproduction modalities: mono, stereo, or binaural.

An early-stage design of such a system is presented, along with underlying design principles. The software's design has been informed by a number of individual interviews. These were used for investigating not only gesture-to-sound mappings and the use of technology in human beatboxing performance, but also to consider its socio-cultural context and links with other

art forms. These insights provided us with knowledge to design user interaction modalities (touch, and touch-less), devise a gestural analysis system (extraction of gestural features) and provide relevant visual feedback. We describe the initial design of this system in detail, and present directions for future work.

KEYWORDS: gestural control; auditory display; object-based audio; human Beatboxing; mobile devices.

**Balandino Di Donato** is a PhD Student at Integra Lab, Birmingham City University (UK). He accomplished his undergraduate studies at A.Casella Conservatoire of L'Aquila (Italy), with a thesis regarding the use and development of the Tangible User Interface (TUI) Metis. During his undergraduate studies, he has been working at the Centro Ricerche Musicali di Roma (CRM) as artistic and informatics assistant. At the same time he was involved in national and international productions as sound engineer. In 2013, he worked on the development of Integra Live at the Integra Lab, where he is conducting his Ph.D. research since 2014. His current work is focused on object-based audio processing using gestural control.

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**Jamie Bullock** is co-founder of Integra Lab, a world-leading music interaction and design research group based at Birmingham Conservatoire. He has a background in sound art, electronic music, software development and interface design. His current work explores the application of digital technologies in enhancing musical creativity.

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**Sinan Bökesoy** | *sonicPlanet* Inc., Istanbul, TR

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*Presenting the sonicPlanet's GeoMap 3D sonic augmented reality editor*

#### ABSTRACT

Sound has significant perceptual and interactive power to absorb the listener on any augmented reality situation providing an absolute spatial immersion within its host. *sonicPlanet* has developed 3D audio frameworks to create sonic augmented reality scenes by integrating the virtual sound sources combined with space interaction (virtual/real) and body movement. They do synchronise the viewer - listener as an immersed participant, and the viewer acts as the active listener delivering the gestural interactions and communication in a continuous perceptual loop. Hosted with an editor app and a player app on the iPhone these frameworks help to build augmented reality applications created so that we can comprehend and envision our surroundings within artistic formations of

augmented reality. The presentation will focus on the development the free sonicPlanet GeoMap editor, and it is player app. The GeoMap framework can convert any outdoor space to a sonic augmented reality scene by defining virtual sound objects with advanced sonic features such as directivity pattern or dispersion characteristics, placing them at physical locations and the ability to choose from a variety of interactive features. A platform dedicated to artistic works on space interactive sonic augmented reality without writing a single line of code. Embedded in an app environment with dedicated back end services, and with production quality binaural 3D sound rendering, the purpose here is proposing a robust system for artists and creators who would like to explore new territories of sonic augmented reality design by just using their iOS device.

KEYWORDS: *sonic augmented reality; binaural 3d audio; geo located sonic interaction; active listening*

**Sinan Bökesoy** has obtained his Ph.d. at the University of Paris8 under the direction of H.Vaggione on computer music research, and his Bc.S. at ITU on electronics engineering. Active as an artist and developer of professional audio applications, he has also participated as performer and published on numerous international events and conferences dedicated to computer music such as the ICMC, DAFX, NIME and JIM. He is the founder of sonicPlanet™ and sonicLAB™ focusing on sound synthesis and augmented reality applications.

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*Sonorium - the Transformation of Movement into Musical Gesture in a New Virtual Interface (Case Study)*

#### ABSTRACT

*Sonorium* is a virtual musical instrument that interprets the performers/ participants' position in a physical space, inviting free body expression and the creation of spontaneous choreographies that result in musical compositions. The software, makes use of a MS Kinect camera to map a tridimensional space into sound, allowing users to musically interact and compose, individually or in groups, using the space and their bodies' movement as a mean for musical creativity.

This application was developed at Digitópia Casa da Música, a digital music platform, based at the concert hall Casa da Música in Oporto. Digitópia encourages the act of listening, performance and musical creation, through the promotion and development of new technologies.

Sonorium is currently displayed as an interactive installation at the Orange Room of Casa da Música since 2013.

Even though it was developed originally as an installation, Sonorium quickly revealed its potential as an instrument/interface, and has also been extensively used for educational and performative purposes in many workshops and concerts, such as Sem Dó nem Piedade (in this case involving a community of people with special needs), Caça-Sons, Música a Metro and No Mundo dos Sons.

This article consists of two large sections: 1) The technical and conceptual development description of Sonorium; 2) Sonorium' artistic and practical use experience. Through educational practices, as an interactive installation and performative instrument, it will be described as different users, with different backgrounds and purposes, use and react to a process that transforms their body into music and how movement can have a musical gesture translation.

KEYWORDS: spatial mapping; perspective distortion compensation; Microsoft Kinect; MaxMSP/Jitter

**Tiago Ângelo** is a composer, sound artist and creative coder working in the intersection of music and technology. His works span from the development of novel instruments and musical interfaces to compositions and interactive media for theatre and sound installations. Born in 1985, he attended the Musical Conservatoire of Coimbra and completed the bachelor in Electronic Music and Musical Production in 2010. In 2012 he finished his master's degree in Multimedia focusing on interactive music and sound design. [tiagoangelo.tk](http://tiagoangelo.tk)

**José Alberto Gomes** completed a degree in Composition at ESMAE–Instituto Politécnico do Porto (2007, Porto), where he created strong bonds with new technological possibilities and the role of music in music theater, film, installations and electronic improvisation. In 2015 has completed his Ph.D. in Computer Music at Catholic University of Portugal with an FCT scholarship (Dissertation: “Composing with Soundscapes. Capturing and Analysing Urban Audio for a Raw Musical Interpretation”). Currently he is the curator of the project Digitópia Casa da Música where he investigates and guides projects in computer music creation, education and performances. He is a professor in the Composition course at ESMAE-IPP - Portugal, and invited professor at University of Saint Joseph - Macau. He is a creator in music and sound design for theater plays and videos; creation and programming of interactive sound installations; composer for electronic and instrumental ensembles; and electro-acoustic performer. [www.jasg.net](http://www.jasg.net)

**Óscar Rodrigues** studied classical guitar and composition at the Porto Conservatory of Music with Paulo Peres and Fernando Lapa (respectively). After finishing a degree in Economics (FEP - University of Porto, 2009) and in Musical Composition (ESMAE – Instituto Politécnico do Porto, 2013), he is currently finishing his Masters in Composition and Music Theory, in the field of Real-Time Composition. A teacher since 2006 (Porto's Conservatory of Music, Curso de Música Silva Monteiro), and a member of Casa da Música's educational department since 2010, he has seen his work regularly performed by a great variety of musical groups.

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*Can spatialisation gestures be lost in translation?*

#### ABSTRACT

When a composer starts to work with moving sound sources, it is safe to presume that he or she has previously listened to several real examples of moving sound sources. He or she is less likely, however, to have had hands-on, real-time experience with the intentional movement of sound sources inside a given acoustic space. The spatial cognition is, therefore, there to drive the spatial imagination of the composers - as Francis Dhomont writes, “the space, too, belongs to memory” - but they might miss an intuitive, embodied control over sound spatialisation. Whilst composers often describe the gesture they want to imprint to sound sources using dynamic terms or poetic intentions, they often need to resort to geometrical descriptions of these ideas in order to be able to implement them using common sound spatialisation software. That incoherence becomes particularly incisive when we become aware of the fact that a significant part of the composers are unsatisfied with their current tool for sound spatialisation. This paper presents a comparison between the analysis of relevant compositional perspectives on spatialisation gestures, their musical consequences and the most common tools that composers use to spatialise sound. Finally, it presents how some of those issues were addressed during the development of spatium, a set of free and open source software tools for sound spatialisation.

**KEYWORDS:** composition; electroacoustic music; sound spatialisation; musical software; user interface

Composer and performer of live electroacoustic music, **Rui Penha** was born in Porto, in 1981. He completed his Ph.D. in Music (Composition) at the University of Aveiro, where he worked under João Pedro Oliveira. His music was performed by Arditti Quartet, Peter Evans, Remix Ensemble or the Gulbenkian Orchestra. He was a founder and curator of Digitópia (Casa da Música) and has a deep interest on music technology. His recent production includes

interfaces for musical expression, sound spatialization software, interactive installations, musical robots, autonomous improvisers and educational software. He taught at several Portuguese Institutions (DeCA - UA, ESMAE - IPP, ESART - IPCB, ULP), and is currently an Assistant Professor at FEUP and researcher at INESC TEC.

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## S7 GESTURE IN DIFFERENCE AND THERAPY

Chair: **Shersten Johnson** | University St. Thomas, St. Paul, MN, US

**Andreas Bergsland** | Norwegian University of S&T, NO.

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**Robert Wechsler** | Motion Composer, Weimar, DE.

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*MotionComposer - a device for persons with (and without) disabilities.  
Any gesture can be musical. Affording difference in musical interaction design.*

### ABSTRACT

Motion Composer is a device that turns movement into music through motion tracking technology, developed with a special regard for people with different abilities (a term we prefer to use instead of the adjective "disabled"). In our presentation we would like to discuss a series of design principles applied in the development to afford different abilities. Central among these principles is the view that there is musical potential in any gesture. This implies that no matter the range of abilities a user possesses, the Motion Composer device should be able to translate that into a musical gesture that feels interesting and relevant to the user. The blinking of an eye, the shaking of the head, the falling to the floor, the rotation of the hips - all those gestures/actions can render interesting musical results with the appropriate design, in our view. Other design principles we discuss are 2) Expressivity does not necessarily depend on skills and virtuosity; 3) Aesthetic, social and health issues can go hand in hand; 4) Non-intended usage as well as technical flaws and errors can prove to be valuable in the design process; 5) The interaction design should allow for different degrees of control over the musical parameters; 6) Stillness is just as interesting as movement; 7) We aim for rich and interesting musical sounds; 8) Since user evaluation of what is rich and interesting varies, our device needs to encompass a wide range of music and interaction possibilities. In our discussion we will relate the principles to experiences from the over 50 workshops with users with different abilities we have had across Europe during the last 3-4 years. Moreover, we will relate our discussion to two notions we have introduced earlier, instrumental and open

affordances. Video examples and pictures + description of the device can be found at [www.palindrome.de/guthman](http://www.palindrome.de/guthman) and [www.palindrome.de/motioncomposer](http://www.palindrome.de/motioncomposer)

KEYWORDS: Interactive music, persons with disabilities, affordance

**Andreas Bergsland** holds an associate professor position at the music technology program at Norwegian University of Science and Technology. His research interests in recent years have included voice in electroacoustic music (PhD entitled "Experiencing voices in Electroacoustic Music" from 2010), live-electronics from a performative perspective and movement-sound interaction for users with and without disabilities. Bergsland has also been involved in composition and sound design for exhibitions, installations, large scale multi-media events, in addition to doing live-electronics performances and working with computer instrument design for motion capture systems. In addition, he has recently composed several pieces for interactive dance that have been presented in Denmark, Germany, Greece, Italy, Canada and the US in collaboration with choreographer Robert Wechsler.

**Robert Wechsler** is a choreographer, dancer and developer of interactive methods of performing. A Fulbright Fellow, he studied ten years with Merce Cunningham and John Cage. He is the director of Palindrome Dance Company and holds degrees from State University of New York at Purchase and New York University. In 2002, he won first prize at the Berlin Transmediale for "best interactive art". He has written numerous articles on dance and technology and is co-author of the book, "Disability Informatics and Computer Access for Motor Limitations". He lives in Weimar, Germany where he directs the MotionComposer project. [www.motioncomposer.org](http://www.motioncomposer.org)

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*Embodied Meaning in Musical Gesture: Cross-Disciplinary Investigations on the Basis of Intensive Listening, Music Therapy, and Neuroscience*

#### ABSTRACT

Different approaches, methods and technologies contribute to the study of musical gesture. As every single method implies limitations of perspective and possible outcome, it is suggested that cross-disciplinary investigations will contribute to a deeper and more substantial insight into the nature of embodied meaning in musical gesture. Combinations of phenomenology, music therapy and neuroscience permit the integration of first, second and third person perspectives. Intensive listening, which is a phenomenological procedure based on multiple repeated listenings, represents the first person approach of describing the personal

musical experience, as well as the second person approach of intersubjective evaluation of descriptions and interpretations of musical gestures.

In expressive music therapy, musical improvisations between client and therapist integrate bodily gestures with musical and emotional expression, and audio and video recordings permit subsequent systematic analyses. In receptive music therapy based on the client's verbal descriptions of a therapist-guided listening experience, audio recordings permit the investigation of correlations between musical gestures and experienced imagery and narrative. Neuroscience, which represents the third person perspective of investigation, has uncovered several neural functions, which indicate connections between body movement and musical gesture, including activations of the premotor and supplementary motor cortex areas, the basal ganglia, and the cerebellum. The presentation will include a brief introduction to intensive listening, and a discussion of possible strategies for the integration of phenomenology, music therapy and neuroscience in practice.

KEYWORDS: musical gesture; intensive listening; Phenomenology; Music Therapy; Neuroscience

**Erik Christensen** is a Danish musicologist PhD, specialized in music listening, phenomenology, and music related neuroscience. He held a post in the Danish Broadcasting Corporation 1978-2007 as a producer of contemporary music programs, and worked as a lecturer at the University of Copenhagen 2007-08. He has been invited as a guest lecturer to universities in the U.S., Mexico, and Argentina. In 2012, he defended his PhD thesis "Music Listening, Music Therapy, Phenomenology and Neuroscience" at Aalborg University, Denmark. Currently, he is affiliated with Aalborg University as a visiting researcher. Erik Christensen has published *Olivier Messiaen – a Handbook* (1977), and *The Musical Timespace. A Theory of Music Listening* (Aalborg University Press, 1996). His recent publications include Danish book chapters on "Music in the Body and Brain" (2014) and "Perceptions, Emotions and Networks in the Brain and Body" (2016, forthcoming).

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*The Sense Ensemble: Music Composition For The Deaf*

#### ABSTRACT

Music composition for the deaf is considered with a view to broadening the understanding of composition in general by regarding the musical experience as a 'sense ensemble'; involving all the senses in its creation and appreciation.

The composer worked in a deaf school for girls in order to: 1) observe the deaf musical experience 2) explore extra-auditory approaches to music 3) create a deaf music ensemble 4) build an instrument 5) and compose a piece of music for the ensemble to perform on the instrument.

A more open approach was ultimately pursued when creating the instrument and a composition, three senses being equally addressed: hearing, sight and touch. Students were taught and encouraged to identify with different rhythmic patterns using their entire body. The composer wove these patterns into a composition, which allowed for a powerful performance.

The composer recounts his experiences in the school, and accounts for many of his observations in that period by drawing on Embodied Music Cognition research. The theory of motor mimesis (Godøy 2000; Cox 2011) accounts for a deep gestural connection between sound and sound production. Arguably, this connection allows the deaf performers a way into the music that is not solely 'visual' or 'tactile', to the extent that gesture itself represents the sound.

Studying how the different sensory modalities collaborate in the whole body musical experience offers a deeper understanding than that offered by 'abstract' music theory. Working as a composer with hearing impaired performers provides a unique vantage point for such exploration.

KEYWORDS: music; composition; deaf; sense-ensemble; deaf-receivers

**George Higgs** is pursuing a Ph.D. at Trinity College Dublin relating to music composition for the deaf. As a composer his work includes opera, symphony, compositions for small ensemble, music for experimental theatre, work for installation and a number of HIGGSTRUMENTS which he has designed for the performance of certain compositions: DOOR (a musical door which two musicians wheel around a city stopping periodically to perform a composition); The Jimmy Rig Slip Jig (an instrument which performers build in the act of playing a composition); The Jocularator (an electro-acoustic vehicle which the composer powers by his own pedaling); Kahoogaphone (a machine designed not to work); The Evolvaphone (a booth which creates a musical composition from participants' initials using the process of Natural Selection).

[www.georgehiggs.com](http://www.georgehiggs.com)

**Dermot Furlong** is Music and Media Technologies Course Director, Trinity College Dublin. His research interests focus mostly on auditory spatial perception and embodied music cognition.

*Machine of Song* performance (The Contemporary Music Centre of Ireland, May 19, 2011): [www.cmc.ie/articles/article1956.html](http://www.cmc.ie/articles/article1956.html)

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*Articulating Research in Medicine of Performing Arts with Musical Performance and Gesture*

#### ABSTRACT

This paper intends to enhance the importance of an interdisciplinary research team in the analysis of Performing Arts. To fully understand the student as a performer, the Musical Teacher should focus on the musical performance and gesture, the health professional on the biomechanical and anatomy, and finally the engineer on the measuring and quantification of the music and performer movement. A complete and detail analysis of this information is an added value not only to the performance itself, but also to the long term health of the performer. The acquired information can include not only the traditional systems for motion and music capture, but also other technics that are now-a-days easier and cheaper to use, like MEMS (Micro Electro Mechanical) Inertial Motion Units (IMU) or infrared thermal cameras.

The articulation of these three areas of interest, musical performance, performing arts medicine and engineer will eventually give a better understanding of gesture during the musical activity of a string or wind instrumentalist. Thus, the present study will correlate some information regarding a pianist's performance and the association between head and neck posture focusing on the relationship of the cranium-cervical-mandibular complex with the pianist's musical activity.

It is quite often in performing arts to have neck, jaw or facial pain, resulting from the adoption of certain postures that are maintained for long periods of practicing that can induce fatigue and overloading of certain muscular groups with direct implications on the musculoskeletal system.

In conclusion, when regarding to orofacial pain, in this case of piano players, it is important the investigation of a medical doctor, in perfect articulation with a piano teacher and an engineer where thermography and 3D sensors can be applied in order to better understand the biomechanics an anatomy-physiology of musical performance and gesture.

**Miguel Pais Clemente.** Dentistry Degree in 2002. Diploma in Implant Dentistry, by the Department of Biomaterials University Gotemborg, 2004. Master of Science in Conservative Dentistry in Faculty of Dentistry University of Porto (FMDUP), 2006. Postgraduate course in Orthodontics by Faculty of Medicine in University of Porto (FMUP), 2007. Postgraduate course in Prosthodontics and Implant Dentistry by FMUP, 2008. Postgraduate course in Acupuncture by Instituto Ciências Biomédicas Abel Salazar, (ICBAS), 2009. Ph.D. student in FMDUP. Invited teacher of Occlusion, TMJ and Orofacial Pain in FMDUP 2008-2014. LABIOMEPE and external investigator in FEUP. Founder of the Portuguese Performing Arts Medicine Association. Associação Portuguesa de Medicina e Artes do Espectáculo (APMAE). More than 100 scientific presentations in nacional/internacional congresses. Attribution of 1st Prize for better oral presentation in 7 scientific congresses. Author/co-author of internacional and nacional publications. Co-Editor of the book “ArtiCOLAR Saúde oral e Arte”- BIAL.

**Sofia Lourenço** See Organizing Committee.

**Joaquim Gabriel** is a Mechanical Engineer (Faculty of Engineering at U. Porto), specialized on machine design; a post-graduated in Industrial Automation and Process Management; Master in Industrial Computing, and PhD in Industrial Electronics. He was research fellow of JNICT in the Development of Virtual Instrumentation, researcher from the Japanese Ministry of Industry EU-STA at Kanagawa Science Park, Japan (1995-97), and invited researcher at Yokohama City University, Japan. Currently he is researcher of the FCT Unit - UISPA - Integration Unit Systems and Process Automation integrated in INEGI Research Laboratory - Institute of Science and Innovation in Engineering Integrated Mechanical and Industrial Engineering associated with LAETA - Laboratory for Energy, Transport and Space. Since 2003 is assistant professor of FEUP, integrated in the group of automation, instrumentation and control. His main interests are instrumentation, data acquisition, industrial automation, medical devices and thermography.

## S8 AUDIENCE, DIGITAL INSTRUMENTS, AND MOCAP

Chair: **Carlos Caires** | CITAR/EA-UCP, PT

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*Crossing Musical Frontiers with Audience Participation and Smartphones*

### ABSTRACT

This research investigates how new technological tools can be used to enhance and, to a certain extent, expand our natural ability to communicate musically. In this context, music is not passively experienced but collectively made, resulting from the interaction between a sound producing machine and the audience, who

contributes with the diverse and rich personal backgrounds of each one of its members. This paper introduces Levinsky Music (LM), a distributed interactive computer system especially designed for the *Embodied iSound* installation, premiered in 2016 at the Plymouth University Peninsula Arts Contemporary Music Festival (“Frontiers: expanding musical imagination”). *Embodied iSound* embraces the idea that the body plays a central role in our musical experiences, being a natural mediator between the physical and psychological worlds. The LM system includes a bespoke smartphone app for iOS devices that captures the audience’s movements (including an indoor positioning), used to control the performance of the composition consisting of algorithmic and electroacoustic modules. The performance space defines a number of regions with particular sound properties that are reinforced as a result of the participants’ movements. A central server running on a desktop computer is responsible to capture the control signal produced by the smartphones and to manage the communication between all the system’s components. In summary, LM works as a hub where performance data is transmitted, received and processed. As real instruments, smartphones become an extension of the audience/performer’s bodies.

KEYWORDS: audience participation; smartphones; sound installation

Pianist and composer **Marcelo Gimenes’** career includes a comprehensive array of activities in different settings and styles, from classical to contemporary music and jazz improvisation. He is particularly interested in exploring music as an interactive medium through which people communicate and interconnect. Marcelo is currently at the Interdisciplinary Centre for Computer Music Research at Plymouth University, developing computer music systems and mobile device apps that incorporate unique intelligent generative tools. His research interests include music cognition, evolution and machine musicianship.

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*Study and Development of Digital Musical Instruments with an Emphasis on Gestural Interface, Motion Analysis and Interactivity*

#### ABSTRACT

Our research project is focused on DMI Design (digital music instruments) and this paper describes the some preliminary research processes – gesture interpretation and gesture translations methods - for the implementation of our

prototype Digital Sock: a digital music instrument where sound is controlled through feet movements. This preliminary research aims to investigate body movements with no sound synchronization and consequently without a sound/body movements significance and also observe how casual body movements driving the body itself to a transitory space of relationships.

The gesture interpretation and translations methods process was divided on two major research parts: (1) The gesture capture, and (2) The gesture analysis. The first part our research was realized with help of a Motion Capture System (vicom T40S-NR18 - 4 Mega pixel cameras) on the Motion Capture Lab at the School of Arts (Portuguese Catholic University) and CITAR among 2015.

On a secondary instance we carried the extracted data from MoCap system to Autodesk Maya 3D animation software and Kinovea 8:20. The kinematics data analysis carried us to observe and reflect about gesture significance and his interaction with the space. The analysis of biomechanical aspects also helped us to establish a comparative observation of participants actions and the relationship between body and space, as well the analysis of interactional cycle that guides gesture in their different growth levels.

The results of this part of our research, contributed, to understand the geometry of the movement during the realization of expressive gesture in everyday gesture in order to explore the fine motoric skills of the feet, the body-space relationship among interactive processes, as well as aspects intentional underlying of gesture development without sound/musical meaning.

**KEYWORDS:** gesture analysis; expressive and musical gesture; motion capture; digital musical instrument (DMI); interactivity

**Slavisa Lamounier** is a dancer, choreographer, journalist and specialist in media education. As a researcher whose main field is the analysis of expressive and musical gestures during interaction processes, they, artistic performances, pedagogical practices and / or motor rehabilitation therapies. Currently is part of the PhD Program in Science and Technology of Arts, the School of Arts (Portuguese Catholic University) and CITAR, having been awarded a scholarship by the Foundation for Science and Technology – FCT with the project DIGITAL SOCK: study and development of digital musical instruments with an emphasis on Gestural Interface, Motion Analysis and Interactivity.

Between 1988 and 1991, **Paulo Ferreira Lopes** studied in Lisbon composition with Constança Capdeville. In 1994 Paulo Ferreira-Lopes moved to Paris. Between 1995 and 1997 studied in Paris composition with Emmanuel Nunes, Antoine Bonnet and Computer Music with Curtis Roads. In 2004 he received the Doctor degree from the University of Paris VIII. Since June 2004, Director from the Research Centre for Science and Technology in Art CITAR and Professor at Portuguese Catholic University. Between 2010/2013 Music Departmenhead - Portuguese Catholic University. Since 2007 invited Professor at Karlsruhe Music University. In

2004 his work was selected by the International Society for Contemporary Music to represent Portugal in the World Music Days 2004. Paulo Ferreira-Lopes works has been produced in international festivals - Musica STRASBOURG, MUSICAVIVA, Estoril Summer Festival, documenta X - Essen, Biennial S. Paulo, ZKM-Karlsruhe, World Music Day's, Gulbenkian Fondation, Expo 98 Portugal.

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*Design and Application of a Motion Capture System for Piano in Music Composition*

#### ABSTRACT

This presentation is a research-in-progress about the design of a motion capture system based in computer-vision technology of the Kinect depth camera, programmed for mapping piano gestures to control data and audio parameters in order to transform the performer's body into an interface for musical expression and incorporate it in 2 micro-studies for piano and mixed electronics. The research discussed in this presentation encompasses motivation, decision on the piano as the instrument of study and the chosen gestures, and mapping strategies among other issues. Main concepts, characteristics of motion capture systems based in computer-vision technologies and applications in music composition are reviewed and used as references. Four "plug and play" applications are compared according to calibration simplicity, continuity and accuracy of hand tracking and data acquisition.

The design of the motion capture system based on a "blob detection" technique through the use of an external object and library for image/video processing in Max/Jitter, among other considerations regarding the use of the Kinect in performance, are described in detail. Finally, video samples of the current operation of the motion capture system are presented, where an interactive design for gestural control of data and audio parameters is exemplified. The presentation includes future work and a discussion of the shortcomings that the system has in terms of accuracy of motion capture, pixel smoothing, and continuous labeling of blob tracking, and how these are intended to be enhanced

through their incorporation to the composition and the score of the micro-studies for piano.

[vimeo.com/137697326](https://vimeo.com/137697326)

**KEYWORDS:** motion-capture system; blob detection; gestural control; mapping; interaction

**Sergio Núñez** is composer and researcher focused on the study of the issue *notation-gesture-sound* in the field of instrumental music through the use of interactive systems. His work has been developed both in instrumental music and interdisciplinary works, with emphasis on the use of new media. He holds a B.A. in Music Composition and he is student of the M.A. in Music Composition at the University of Chile under the supervision of composer/pianist Jorge Pepi and researcher/sound artist Dr. Javier Jaimovich. He serves as Teaching Assistant of professor Jorge Pepi for the B.A. in Music Composition at the University of Chile.

**Javier Jaimovich** is a researcher and sound artist based in Santiago, Chile. Javier holds a B.A. in Music Technology from Universidad de Chile, an M.A. and a Ph.D in Sonic Arts from the Sonic Arts Research Centre (SARC) at Queen's University Belfast. His research interests encompass the development of Digital Musical Instruments, Music and Emotion, BioMusic and BioSignals, Interactive Sound Art and Interactive Systems. Javier has participated in the creation of several interactive sound art installations and interactive performances that share an interest in the use of biosignals and the human body (such as such as *Ground Me!* (2008), *Chains of Emotion* (2010), *Sound on a String* (2012), *Emovere* (2015)). He is currently working as an Assistant Professor in the Music and Sonology Department at Universidad de Chile. Here, he teaches modules for the Music Technology and Composition pathways, as well as directing both research and creative-practice projects.

**Jorge Pepi** is a composer and pianist based in Santiago, Chile. He studied music in Argentina and Europe, where he studied piano with Edith Fischer, chamber music at the Menuhin Academy in Gstaad, and composition with Eric Gaudibert in Geneva. As a composer, he has been awarded with several prizes: in 1990 by the Swiss Musical Edition for his piece "Metamorfosis I"; in 1991, by the Swiss Authors Society for his chamber opera "La Caccia al Tesoro"; in 1993, by the International Tribune of Composers in Argentina for "Metamorfosis I", and the first prize of the Composition Competition of Gerona, Spain, for his piece "Estravagario"; in 1995, the Association of French Speaking Radio Networks commissioned him the piece "Amalgama" for the Prix Gilson, among others. He currently teaches piano with Edith Fischer in Barcelona, and he is Professor in the Music and Sonology Department at Universidad de Chile.

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**José Antonio Martín Salinas** | London Metropolitan University  
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*Towards a Standard Musical-Expression-Gesture Interface for  
Conducting Instruments and Scores*

ABSTRACT

An increasing demand among contemporary composers to use MIDI instruments (e.g. Disklavier™ piano) and digital scores, anticipates the development of standard technology that can interpret the conductor. This study proposes such a standard and aims to inspire and guide a potential team of researchers, composers, theorists, instrument developers, programmers and conductors in the development of such equipment. For this purpose, a wide range of possible new musical practices, in an ideal technological scenario is considered. This is schematically approached by analysing musical parameter from microdiscrete and dynamic perspectives in an instrument-concept-based framework of composition. Pitch, amplitude, durations (and tempo), timbre, and spatialization are treated separately, in relation to the role of the conductor, interface, instruments and score. This study leads to an open-ended formulation of requirements for an ideal interface and for collaborative development, for which a concluding round-table discussion among interested attendants and a post-lecture on-line discussion list has been arranged.

KEYWORDS: conducting; interface; scores; instruments; composition

**José Martín** is a composer and instrument developer. Lectured at the London Metropolitan University and South Thames College (London) in “Music Technology”, “Musics of the World” and “Scales, Tunings and Temperaments”. AB (Hons) Contemporary Arts (with major in composition) from Nottingham Trent University. PhD from London Metropolitan University: *“Pitch Resources in New Music: An Integrated Approach to Instrument Development and Composition”*. Creator of the *conic bellophone*, a 96-equal-temperament instrument with glissando capabilities. Solo and ensemble works for the *conic bellophone* have been performed at several UK venues together with lecture presentations.

**Lewis Jones** teaches music and music technology and is Research Degrees Coordinator at The Cass Faculty of Art, Architecture and Design. He studied music at the University of York (composition with Bernard Rands and Richard Orton; performance with Alan Hacker and Graham Treacher) and musicology at King’s College, London. As Professor of medieval and Renaissance music at the Royal College of Music in the eighties and nineties, he advanced novel approaches to teaching founded on deep reading of historical sources, improvisation,

and critical listening. In 1990, he introduced and led the first BSc course in Music Technology. He is a designer and maker of musical instruments, both new instruments for new music and pioneering reconstructions of historical examples; and from 2000-2002 was Director of the Centre for New Musical Instruments of London Guildhall University. From 2002-2010 he convened the Music, Technology and Culture Research Group and its regular research seminar. Lewis' current undergraduate teaching includes musical instrument history, design analysis, and the conservation and restoration of instruments; and he coordinates music-related dissertations. He contributes to the teaching of research methods to students of the MA by Project (a research masters course), in which he supervises a wide range of music-related research.

## S9 TEACHING MUSICAL GESTURE AND DANCE

Chair: **Mario Baroni** | University of Bologna, IT

**Caitlin Cowen** | Northwestern University and Nicholls State University  
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*Simulated Sound-Producing Gestures Interwoven into Sound-Accompanying Gestures—the Power of Sound Effects in Nappytabs' Hip-Hop Routine 'Scars'*

### ABSTRACT

Gestures, which range in spontaneity and planning, may be scripted by someone other than the performer, named the choreographer, who has the ability to shape and perfect specific gestures, sometimes furthermore mapping them onto sounds. The choreographer's influence upon a performance of a dance may also extend into the music as they make deliberate choices in choosing musical tracks, possibly even remixing the song for their use. This study, in sum, assesses an example of this creative process comparatively by the addition of sound effects in a hip-hop routine in relation to their accompanying sound-producing gestures. In their hip-hop routine 'Scars', Choreographers Nappytabs' seemed to envision the addition of sounds in time to the choreographed sound-producing gestures. The intentions of the choreographers in their addition of sound effects, including knocking, punching, smashing, and balloon popping, are made clear in comparison to the choreographed gesture, which could have induced a mimetic process. Choreographers 'Nappytabs' exploited the interplay of classifications of gestures by overlapping sound-accompanying gestures and sound-producing gestures. This research project investigates the effectiveness of the added sound effects in relation to its performed gestures. Did the choreographer's deliberate choices influence the audience's perception? Three tracks- the original performance, the original minus the sound effects, and a version amplifying the original sound effect locations by

sounds extracted from the track- were compared. The results supported that the sound effects could have altered the viewer's emotional perception of the dance, and of the impact of gestures in relation to each other.

KEYWORDS: dance; choreographer; gesture; sound-producing; sound-accompanying

**Caitlin Cowen**, native of Louisiana, United States, graduated with a Bachelor of Music and Bachelor of Interdisciplinary Studies (Nicholls State University) while also exploring other interests in the arts and humanities. She completed a semester of graduate study at the University of Louisiana Lafayette, furthering her honors thesis, comparing traditional ledger line notation with a circular pitch-class space notation. This project was expanded for a presentation given at the biannual conference for the Society of Music Perception and Cognition (2015). Her interests include visual representations of music, dance, multi-sensory integration, and music cognition, among many pending interests in music theory.

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**Andrea Gioni** | Université Nice Sophia Antipolis, FR  
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*Awareness of gestures. Interactive sound practice and multimodal feedbacks in experimental pedagogy of dance*

#### ABSTRACT

In the past ten years, motion capture technologies finally became easily available and familiar to masses. Thanks to this new technological accessibility, the artistic domain has incorporated digital interactive media in order to elaborate expressive multimodal grammars. A particular example of the creative use of interactive technologies is represented by experimental pedagogy in performing arts.

This study would like to formulate a research framework on musical gesture multi-modality starting from personal experience about digital interactivity in dance pedagogy. This investigation started during “Movement's Analysis” classes at “Sophia Antipolis” Nice University. The goal of these sessions was to evaluate how interactive sound feedback can improve gesture awareness in students. Specific exercises has been proposed to students in order to experiment different levels of sensorial immersion in the responsive environment.

The interactive applications developed were based on different low-cost motion capture technologies that were combined in order to obtain a “hierarchical” responsive system. Real time sound processing software has been developed, in regard to phenomenological similarities between sound processes morphology, and gestural kinetic qualities.

From this it has been possible to highlight some interesting conclusions: 1. Transition and the alternation between three typical attitudes when interacting with sounds: a. repulsive, b. ludic, c. immersive; 2. precise and effective sound feedback can improve gesture awareness. 3. Different interactive sounds influence different proprioceptive status; 4. Three macro-categories can be detected in gesture-sound relation: a. instrumental paradigm, b. body-sound paradigm, c. environmental paradigm.

KEYWORDS: pedagogy; interactivity; dance; musical gesture; proprioception

**Andrea Giomi.** Electronic musician, multimedia artist and Ph.D. Candidate at Nice “Sophia Antipolis” University where he teach electronic music composition. He obtained his BA in Aesthetic Philosophy and his MA in Anthropology of Music at Università degli Studi of Milan, where he also earned a Diploma in Electronic Music. His artistic and academic research focus on experimentation with interactive systems for the gestural control of musical processes. He worked as sound designer with several dance and theatre company like Ariella Vidach, Moogger Fogger, Akesi, Kokoschka Revival. As performer, his major interests involve improvisational processes in electroacoustic and mixed music. He participated to many electronic music festivals like Festival Manca (Nice), MIRA Festival (Barcelona), Festival Polline (Rome), NAO Performing Festival (Milan), Dissidance Electronic Music Fest (Parma). He is also involved in electronic music production, particularly techno, ambient and dub and his music is currently released on RXSTNZ and Syntheke Records.

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**José Carlos Godinho** | Instituto Politécnico de Setúbal &  
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*Physical Gesture and Musical Gesture as Metaphors of Each Other*

ABSTRACT

Grounded on some classical models of human and artistic development (e.g. Piaget; Swanwick), this paper focuses on the individuals' processes of adaptation to and transformation of the environment. It is suggested that musical development involves a combination of two opposing psycho-philosophical directions: physical gestures adapt as metaphor of music (developing technical meaning) and musical gestures are transformed as metaphor of the body (developing expressive meaning). The study aimed to verify to what extent do verbal and physical instructions shared in educational contexts exhibit this two-way process. Some videos of Master Classes led by classical musicians, available in

the Internet, were subject to a process of content analysis. The two-way process could be observed: the professional musicians use verbal instructions and physical gestures (a) to guide students in correcting technique and in adapting posture, fingering, breath control, etc. and (b) to invite students to imagine stories and dramatic scenes or even to search for inner feelings that might give meaning and “body” to music. In developmental terms, the musicians tend to draw progressive attention to (1) the postural and technical procedures for sound production, (2) the technical adaptation to convey different expressive gestures, (3) the sequential combination of expressive gestures to promote interesting and stylistic ‘storytelling’ and (4) the individual search for meaningful commitment and communication. This study might contribute to bring more light both to the nature and to the teaching of artistic development in music, namely to the role played by the metaphorical interaction between physical and musical gestures.

KEYWORDS: physical and musical gesture; technical and metaphorical meaning; artistic development

**José Carlos Godinho** graduated at Conservatório Nacional de Lisboa and post-graduated at the Institute of Education, University of London, with MA and Ph.D. in Music Education, under the supervision of Keith Swanwick and the teaching of Charles Plummeridge, Lucy Green and Susan Hallam. He is professor in music education at the Escola Superior de Educação, Instituto Politécnico de Setúbal, Portugal, since 1986, where he has coordinated master degrees in teaching music in secondary schools and in conservatoires. He also collaborates on a regular basis as a visiting professor with Escola Superior de Artes Aplicadas, Instituto Politécnico de Castelo Branco. He is member of the research group INET-md/CIPEM and has published numerous musical compositions and pedagogical materials for children and music educators.

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**James A. W. Gutierrez** | University of California, San Diego, US  
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*Refiguring Music Theory Curriculum as Embodied, Integrated, and Applied*

#### ABSTRACT

Transforming Music Study from its Foundations: A Manifesto for Progressive Change in the Undergraduate Preparation of Music Majors is the recent report from the Task Force on the Undergraduate Music Major (TFUMM) sponsored by the College Music Society. Its primary contributors articulate the many failings of conventional music curriculum, as well as the inability of previous correctives to address the fundamental priorities at its heart. The declining enrollment and

decreasing opportunities for gainful employment following graduation is a direct result of a pedagogical tradition increasingly at odds with research of cognitive science of music, and learning. At the center of the crosshairs is music theory, which above all lacks integration into students' embodied creative development, and the connection to the historical context of its core principles. This paper presents the results of a pilot study that compares the effects of linguistic frames between conventional curricula, a 'student-centered' curriculum, and a control group, on student creative intentionality. Using recent studies in cognitive science that explore the effects of linguist framing this paper argues that 1) conventional language of music theory curricula discourages creative intentionality and 2) fixed-rule/ punishment-framed instruction disincentivize musicality (Delalande, 2009). Heuristic language frames were also no less effective in transmitting specific procedural knowledge that is foundational to the study of music theory. This study provides support for TFUMM, and the refiguring music theory as an embodied, applied endeavor that integrates directly into students' musical expression and understanding.

**James Gutierrez** is a Southern California native. He completed his B.A. in Music Theory in 2006, and an M.M. in Music Composition in 2009, both from Azusa Pacific University. James is a doctoral candidate and Cota-Robles Fellow at the University of California, San Diego. Part of the Integrative Studies of Music program, James studies with David Borgo. He has presented for the American Musicological Society, the Society for Music Perception and Cognition, and the International Conference for New Music Concepts including, among others, on such topics as music theory pedagogy, embodied music cognition, music therapy, and the commercialization of sacred music. While an active composer and keyboardist in the Los Angeles area, James has also lectured at Chapman University, Life Pacific College, and Azusa Pacific University, where recently he designed the first all-digital music theory curriculum.

## S10 GESTURE, EMOTION, AND EXPRESSION IN MUSICAL STRUCTURE

Chair: **Fabrice Marandola** | Sorbonne U. & McGill University, CA

**Erica Bisesi** | University of Graz, AT

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*Historical Changes in the Imagery and Gesture Evoked by Piano Music:  
Schubert, Wagner, Liszt, Schoenberg*

### ABSTRACT

Are changes in musical structure (i.e. the progressive decreasing of tonal stability and increasing of chords' unfamiliarity, dissonance and harmonic tension) accompanied by consistent changes in the emotion, associations and gesture that

are typically evoked in communicating the musical experience? We focused on the historical trajectory connecting Schubert, Wagner, late Liszt and early Schoenberg. We first performed computational analyses of representative piano examples (or piano transcriptions), considering questions of structural continuities, transitions and breaks, both within and between the works of each composer. Second, we asked 24 musicians and non-musicians to rate each of the pieces in terms of the 1st and 2nd order emotion labels predicted by the GEMS multidimensional model of music emotions. We found that the progressive variation of the combined effects of vertical (simultaneous) and horizontal (successive) tension along the proposed trajectory is related with the progressive increasing of emotional aspects like tension and surprise. In this study, participants further described the repertoire (i) in a free, native language interview – by indicating associations with gesture and other metaphors that came to their mind when listening to the music, and (ii) in a listening test – by continuously rating the changing intensity of previously selected descriptors as the music progressed. To analyse empirical data we mixed qualitative and quantitative research methods (grounded theory, correspondence analysis). We investigated correlations between categories for living/non-living things, gesture (body, movement), personal involvement (positivity/negativity, motion/commotion, memories), space, time, the outside world (social interactions, nature), descriptors related to senses different from hearing (bright/dark, soft/hard).

KEYWORDS: musical influence; post-tonal music; music analysis; computational musicology; imagery/gesture

**Erica Bisesi** received her first musical education at the age of five. She holds a Ph.D. in Mathematics and Physics, a M.A. Degree in Piano Performance and is currently completing a M.A. Degree in Music Theory and Analysis. Her career as a systematic musicologist began in 2007, first at KTH-Stockholm, and then in several projects collaborating with the Universities of Graz, Lugano (CSL), Stockholm, Jyväskylä, Bologna, Como (Conservatory), Padua, Udine, Montreal and Rochester. Erica was awarded a 2-year Lise Meitner postdoctoral fellowship by FWF Austria in 2009, and a three-year FWF Stand-Alone project in 2011. She is currently a senior postdoctoral researcher at the Centre for Systematic Musicology at the University of Graz, where she is also lecturer on psychoacoustics and music cognition. Her research lies mainly in the area of music performance, expression, emotion, music theory and analysis. Erica is performing professionally as soloist and in chamber music ensembles.

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**Marcelo M. Wanderley** | CIRMMT, McGill University, CA  
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*Motion Analysis of Romantic Piano Performances: Incidence of the  
Musical Structure on Expressive Gestures*

ABSTRACT

Thompson and Luck (2012) used various conditions (immobile, deadpan, standard, exaggerated) to evaluate the relationships between pianists' gestures, expression, and musical structure. QoM was associated with articulation and dynamics. Wanderley et al. (2005) showed a discrepancy in timing between the conditions at phrase boundaries, and at places with harmonic tension (Teixeira et al., 2014). The objectives of this work were to identify the main physical features of pianists' gestures in terms of motion cues (quantity, velocity, periodicity, force), and the relationship between gestures and the compositional structure. Three pianists performed an excerpt from a well-learned piece of the Romantic repertoire in the conditions used by Thompson and Luck. A 3D motion-capture system tracked pianists' movements, and a force plate measured their weight distribution. Analysis methods were tied to the computational extraction of specific features related to kinematic properties of the movements. The deadpan performances were played faster than the normal ones by pianists. QoM of the wrists and mean acceleration of the head were higher in the exaggerated performances than in other conditions, and QoM of the head was the lowest for the immobile performances. Pianists applied greater changes in force on the piano stool in the exaggerated condition. Head velocity and QoM were associated to phrases boundaries, modulations, chromaticism, sound dynamics, and articulation; and periodicity of the head motion was related to similarity in rhythmic patterns. Tempo mainly communicated phrasing, while dynamics conveyed intensity of expressions. Results indicate that pianists' ancillary gestures are closely linked to their expressive intentions and to musical structure.

KEYWORDS: expressive gestures; piano performance; motion capture; musical structure; performance conditions

**Catherine Massie-Laberge** is a Ph.D. candidate in Music Technology at McGill University under the supervision of Professors Isabelle Cossette and Marcelo M. Wanderley. She also

holds a Master degree in Music Education from McGill University and a Bachelor in piano performance from Université de Montréal. Working at IDMIL (Input Devices and Music Interaction Laboratory) and MPBL (Music Performance and Body Laboratory) on piano pedagogy, pianists' expressive gestures, and motion capture techniques, her research aims at understanding further musicians' gestures and their meaning in order to design and implement pedagogical software using real-time feedback. She seeks to define better the role of the body in various performance styles, as well as how those gestures are perceived and interpreted by audience members. Her findings and software will help students develop strategies to enrich expression in performance. Catherine Massie-Laberge is recipient of the Joseph-Armand Bombardier Graduate Scholarship, and is student coordinator of axis 3, Cognition, Perception and Movement at CIRMMT.

Director of the Centre for Interdisciplinary Research in Music Media and Technology (CIRMMT) and professor in Music Education at McGill University, **Isabelle Cossette's** research focuses on the performer-instrument interaction, the biomechanical phenomena used during music performance and the ways these are integrated in instrumental pedagogies. Her training in flute performance and respiratory mechanics, and her international collaborations led her to publish in scientific journals such as 'Respiratory Physiology and Neurobiology', 'Acta Acustica United with Acustica', 'Perceptual and Motor Skills' and 'Journal of New Music Research'. Over 20 research trainees and graduate students have worked with her on topics such as respiratory mechanics and pedagogical approaches, performance gesture and expressivity, and music performance optimization strategies. She co-organised the conference 'Learning and Teaching Music in the 21st Century: The Contribution of Science and Technology' (LTM21) held in Montreal in November 2015.

**Marcelo M. Wanderley** is William Dawson Scholar and Professor of Music Technology at McGill University, Canada. His work made early contributions to several Music Interaction topics such as the evaluation of musical interfaces, mapping and the quantification of movement in performance. He co-edited the electronic book "Trends in Gestural Control of Music", 2000, co-authored the textbook "New Digital Musical Instruments: Control and Interaction Beyond the Keyboard", 2006 and chaired NIME 2003.

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*Communication of Structure, Gesture, Emotion and Imagery in Different Interpretations of Solo by Karlheinz Stockhausen*

ABSTRACT

The question why post-tonal repertoire induces a lower emotional response is related to listeners' higher unfamiliarity with the underlying structure, and their lower acquaintance with performance techniques (Daynes, 2011; Gabrielsson et al., 2010). In a previous study (Sargenti & Bisesi, 2015), we discussed similarities and striking differences in the segmentation of contrasting performances of *Solo* by Stockhausen.

In this study, we further investigate differences in interpretations of *Solo* by relating score segmentation with the analysis of performers' gestural interaction with the electronics. We also explore the effect of musical structure on communication of emotion.

We ask musicians with different familiarity with post-tonal music to listen to different interpretations of *Solo*, to (i) spontaneously describe the performances in an interview in their native language, and (ii) continuously rate on graduate scales the changing intensities of previously selected descriptors for musical surface, emotion, meaning and movement as the music progresses. The analysis involves qualitative and quantitative methods (grounded theory, Strauss, 1987; constant-Q time-frequency representation for analysis of audio files, (Schörkhuber et al., 2010).

While expert listeners make larger use of descriptors concerning the music surface, less-experts focus mostly on gesture and metaphors. Free associations are generally neutral and include concepts like life, movement and visual experiences. Many participants experience negative emotions. Some very positive. Fundamental role proves the gesture made with the use of technology.

KEYWORDS: interpretation; structure; gesture; emotion; imagery

**Simonetta Sargenti** was born in Milan. She completed a M.A. Degree in Violin , in Composition and in Electroacoustic Music at the Conservatory "G. Verdi" in Milan, and holds a M.A. Degree in Philosophy and Musicology at the Università Statale di Milano e Università di Bologna. As a professional performer, her interests mainly lie in the application of technology to the musical domain, with a special focus on the 20<sup>th</sup>-century repertoire. Her compositions involve several instrumentations, including live electronics and magnetic tape, and have been performed in several European countries. She recently contributed to audio-visual installations at the Villa Simonetta in Milan. She is active as a musicologist and researcher in electroacoustic music and music theory and analysis. She teaches History of Music at the Conservatory of Novara and History and Analysis of Electroacoustic Music at the Conservatory of Pesaro. Correspondence: Conservatorio di Musica 'Guido Cantelli' Novara, Italy Viale Bianca Maria 11, 20122, Milano, Italy.

**Erica Bisesi.** See above.

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*Music – Sport – Experience: “Sport Compositions” in the Czech Interwar Music*

#### ABSTRACT

The paper deals with “sport compositions” (Bateman), ergo musical reflections and representations of sports, in the Czech interwar music. The examined sample consists of these compositions: Josef Suk: *Towards a New Life* (1919); Bohuslav Martinů: *Triumphal March of the Sport Club R.U.R. in Polička* (1921); *Half-time* (1924); *La Baggare* (1926), *Le Raid merveilleux* (1927); *Festive Overture for Sokol Festival 1932* (1931); Pavel Haas: *String Quartet No. 2* (1925); Leoš Janáček: *Sinfonietta* (1926); Boleslav Vomáčka: *Aeroplan* (1926); Vilém Petrželka: *The Relay* (1927); Pavel Bořkovec: *Stadium* (1929); *Start* (1929); Jaroslav Ježek: *Bugatti-Step* (1930). For the purpose of comparison, I have also taken similar works of the European and American avant-garde into account. The analysis of this symptomatic musical and cultural phenomenon of the interwar era was conducted with a special focus on issue of musical representation, monitoring the musical structures on transitions between the levels of iconicity, indexicality and symbolicity, but not in terms of a naïve “depiction” of sport as physical process, but rather in terms of specifically musical representation of sport as complex corporeal (thus both physiological and psychological) experience. In no less degree, I am interested in how meanings are produced by collisions of these music structures with “reference schemas” (for representations of agonal and locomotive processes) created in the 19<sup>th</sup> century programmatic and operatic music. I have also dealt with history of reception and examined temporary Czech public discourse on sports, on Sokol movement, and on the “sport” (or “physiological”, or “civilistic”) compositions themselves.

KEYWORDS: sport and music; Czech interwar music; Czech avant-garde; musical civilism; Bohuslav Martinů.

**Miloš Zapletal** (\*1987) studied musicology, film studies, and political economy at Masaryk University in Brno, Czech Republic. Recently, he has been working at the Department of Music History of the Czech Academy of Sciences in Prague and finishing his PhD theses on reception

of Janáček's music at the Musicological Department of Masaryk University in Brno. He is a coauthor of collective monograph *Nationality vs. Universality: Musical Historiographies in Central and Eastern Europe* (ed. by S. Žeraňská-Kominek; Cambridge Scholars Publishing, 2016) and of three monographs on film music history (*The Fireman's Ball*, 2012; *Closely Observed Trains*, 2014; *The Old Czech Fables*, 2015). He has published several articles in peer-review journals on cultural and musical history of interwar Czechoslovakia, musical semiotics and hermeneutics, and philosophy of history; he has also participated in several international conferences (KeeleMAC; Tracking the Creative Process in Music; Nationality/Universality; Sounding Czech; Pavel Haas Study Day).

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# SATURDAY, March 19th

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## S11 ERGONOMICS THE ECOLOGY OF MUSICAL GESTURE

Chair: **Christopher Dobrian** | University of California, Irvine, US

**Felipe Verdugo** | LRGM, OICRM, Université de Montréal, CA

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**Sébastien Bel** | Université de Montréal, CA

**Caroline Traube** | Université de Montréal, CA

*Gesture-sound Relationship in a Holistic Approach to Piano Technique: the Role of Pelvic-region Gestures and the Impact of Weight in the Double Escapement Mechanism*

### ABSTRACT

The approach to piano technique developed at University of Montreal by Marc Durand is founded on a holistic organization of gesture, which aims both to serve expressivity and to minimize injuries. This innovative approach proposes, among others, a systematic and coordinated use of whole-body gestures (from the pelvis region to the fingertips) as well as a particular understanding of the piano mechanisms in order to control keystroke's parameters such as attack speed and weight. Based on the contributions of this approach, the present paper is divided in two sections. Employing a qualitative biomechanical analysis perspective, the first section offers a description and a four-fold typology of pelvic-region gestures included in Marc Durand's approach. Additionally, it shortly discusses links between the technical recommendations exposed and recent advances in the biomechanics of piano performance. The second section explores the different characteristics of the gesture-sound relationship as established in the context of the abovementioned approach. In particular, this section evaluates the effect of the variation of the weight applied during the keystroke on both the piano mechanics and the produced sound. According to the preliminary results from a study realized on a sensor-equipped and computer-controlled acoustic piano (piano Bösendorfer CEUS), the amount of weight impacts on the brightness of the sound, independently of the dynamic level, as revealed by principal component analysis of the data. This timbral variation may be due to a different behaviour of the double escapement mechanism, as suggested by Professor Durand.

KEYWORDS: piano technique; Marc Durand; pelvic-region gestures; weight; double escapement mechanism.

Pianist **Felipe Verdugo** holds a Doctor of Music degree from Université de Montréal, is a member of the Laboratoire de recherche sur le geste musicien (LRGM), directed by Prof. Caroline Traube, and teaches at the McGill Conservatory. After graduating under renowned Chilean pianist María Iris Radrigán, he was awarded full scholarship from the Chilean government to pursue a Master's degree at Université de Montréal under the guidance of acclaimed pianist and pedagogue Marc Durand, with whom he studied for more than six years. As soloist, Mr. Verdugo has performed in diverse contexts including an appearance with the Orchestre de l'Université de Montréal under the baton of Jean-François Rivest. In the research field, he has been invited by the London International Piano Symposium 2015 to participate as an expert at its inaugural round-table and to publish an article treating the biomechanical aspects of a holistic approach to piano technique.

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**Marine Blassel** | LRGM, OICRM, Université de Montréal, CA

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**Caroline Traube** | Université de Montréal, CA

*Seeing Gestures in the Score": Towards a Symbolic Notation System for a Gestural Analysis of the Score*

#### ABSTRACT

Pianists trained by Professor Marc Durand at University of Montreal, in Canada, spontaneously decode the score on the basis of a gesture-based holistic technique, which relies on choosing and coordinating various body movements and gestures at the service of the desired sounds. To learn this technique, students first have to assimilate the rules of this gesture-based approach and then have to acquire the ability to physically embody the score. Teachers and students who are acquainted with Marc Durand' approach notate gestures in various ways, but no formal notation system for these gestures has emerged so far. Based on a field survey conducted among several University of Montréal's pianists who are familiar with Marc Durand's approach, we propose a standardized symbolic notation system for the principal gestures (wheel, down-up, rotation, arm stroke, etc.). In this presentation, these gestures and their corresponding symbolic notation will be illustrated through excerpts from the piano repertoire. We will then show how the proposed notation system can be used to produce a gestural analysis of the score which can be incorporated in the first stage of the work on a piece. We suggest that this gestural analysis can allow the conscious and explicit elaboration of a pianistic "choreography" entirely oriented towards sound production. As a result, the pianists would obtain a much better understanding of the score by establishing concrete links between their own musical conception (the "what") and their

technique (the “how”).

KEYWORDS: gestural analysis, ergonomic gestures, Marc Durand, holistic approach, symbolic notation

Originally from France and living in Montreal since 2006, **Marine Blassel** is a doctoral student in piano performance at the University of Montreal under the supervision of Dang Thai Son and Caroline Traube. She is a member of the Laboratoire de recherche sur le geste musicien (LRGM) and conducts research on musical gesture and notation. Recently, Marine played in recitals and with orchestra in several french festivals. In March 2015, she won 1st prize at the Concerto Competition with the Orchestre de l'Université de Montréal (OUM). Recipient of several scholarships from University of Montréal, Marine disseminates her research on pianistic gestures and notation in Québec and in Europe. In particular, she participated in the London International Piano Symposium in February 2015. Being also passionately dedicated to piano teaching, Marine founded the Studio Saint-Henri in 2014 and regularly attends master classes in Europe and in Quebec.

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*Direct Action and the Primacy of Gesture in the Ecology of Performance*

#### ABSTRACT

This paper presents a picture of musical performance as an ecological situation fundamentally rooted in the equivalency of cognitively unmediated musical gesture with kinesthetic gestures constrained by the affordances of an instrument. The ecological model proposed here draws from the work of Gibsonian Ecology and Eric Clarke’s theories of ecological listening (Clarke 2005), the neuroscience of Common Coding, the empirical study of musical gesture, and the techniques of Actor-Network Theory as explicated by Bruno Latour. Empirical research illustrates a deep connection between the haptic and topological properties of an instrument and the gestures utilized in performance (Goebel and Palmer 2009), and paints a picture of performance as embodied in and emergent from a unified instrument-performer dynamic (Repp and Knoblich 2004). Consequently, I argue that performers interface kinesthetically with their instruments at the level of embodied gesture through unmediated “Direct Action,” a principle analogous to and the reverse of Gibson’s “Direct Perception” and supported by findings of common coding of Perception and Action in the brain. Furthermore, taking into consideration the manifold physical, psychological, pedagogical, aesthetic, and social actors shaping Perceptual Learning, I propose that the act of performance

amounts to the construction of what I call “Ecologies of Practice,” a concept more fully encompassing the psychological and cultural complexities of performance than traditional notions of performance practice.

KEYWORDS: embodied gesture; ecology; mediation technology; performance; actor-network theory

**Randall Harlow**'s research focuses on gesture and ecology in empirical performance study and hyper-acoustic music mediation technology. He has presented papers at conferences at Cornell and Harvard Universities, the Eastman School of Music, American and international conferences on music perception and cognition (SMPC and ICMPC), and the Göteborg Organ Art Center (GOArt) in Sweden. He recently presented a keynote address at an interdisciplinary Musicology and Science and Technology Studies conference at Orgelpark in Amsterdam. His work has been published in the journal *Keyboard Perspectives* and he is currently working on a monograph presenting an Ecological Theory of Music Performance. In 2015 he served as a Guest Professor on a Diesterweg Fellowship at the University of Siegen, Germany. Randall Harlow holds the Doctor of Musical Arts degree from the Eastman School of Music and is currently Assistant Professor of Organ and Music Theory at the University of Northern Iowa.

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*Haptic Diary: Researching Gesture as a Multi-Sensory Haptic Feedback*

#### ABSTRACT

"Haptic diary: The sound of water" is an artistic project work-in-progress. As an approach and research in human perception, art and technology, this diary-project has the form and the functionalities of an haptic book that aims to engage haptics in an engaging process following necessities that amateur users wish for.

The first is the significance of pseudo-haptic in order for the amateur to feel engaged and follow the link of interaction. When the user presses a button he/she gets feedback information. In this sculpt-book and within its pages, feedback occurs mechanically, both digitally and analogue. Within the book there are materials that give a tactile feedback and some form of interaction with the aim to stimulate the user continue and connect all parts together creatively by following the pages. In this effect, the series of feedback encourages the users to absorb the information from their diverse range of senses and “read” the “text”

that is neither written nor narrated. Similar to poetry, this book is a manual of the epicurean regard that “all senses are true”. The elements of the book are: vibration, buttons, audio samples, percussion, texture variety, poetry, fragrance, sculpt elements and colors.

The second is to connect classic rules of on-stage performance knowledge concerning interaction and failure (A.Boal, E. Ionesko, P.Schumann). The problem with failure is that it is unpredictable, while in the artistic demonstrations and through the use of technology the wish is the most spontaneous interaction to be achieved. In case of a software bug a performance fails -unless the feature of failure is pre-programmed and periodical. The insecurity of a possible flaw is a main problem in engineering. The purpose of this artistic-(haptic)-object is the technological part to get emerged by the aesthetic, e.g. the book will remain functional and give feedback even if it is damaged as a feature. Moreover, the aim of the process is to connect this constructive procedure with reference to Adorno’s terminology to gesture and Nietzsche’s *Hautlichkeit* (epidermality, possessing a skin).

KEYWORDS: haptic; gesture; *Hautlichkeit*

**Esthir Lemi** is an artist and researcher in haptics and postdoctoral fellow in the arts at the Helsinki Collegium for advanced studies at the Helsinki University. Her work focuses on documentation of the artistic process and reality (Masters UdK Berlin in public events and multimedia arts) as well as on the complementarity of art forms, and how technology interferes with its schemes (PhD, Department of Philosophy, Music Studies, University of Athens). Her research, based on haptics, is aimed at a broad public in order to create an easily accessible innovative platform for both artist/engineers and the audience.

**Stefania Serafin** is Professor with special responsibilities in sound in multimodal environments at Aalborg University in Copenhagen. She has been Associate Professor (2006-2012), and Assistant Professor (2003-2006) at Aalborg University Copenhagen. She received a Ph.D. in Computer Based Music Theory and Acoustics from Stanford University in 2004, and a Master in Acoustics, Computer Science and Signal Processing Applied to Music from Ircam (Paris) in 1997. Her main research interests are sound models for interactive systems and multimodal interfaces, and sonic interaction design. A significant part of the preparation of the project mostly theoretical concerning human perception and sensors, supported by Fyllbright-Schuman Program, has been made under the supervision of Prof. S. O’Modhrain at the Performing Arts Technology Department, University of Michigan.

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*Musical Gesture: from Composition to Performance*

ABSTRACT

In an interview to Richard Toop, Brian Ferneyhough proposes a threefold comprehension of music listening and composing: figure, texture and gesture. In his point of view, gesture and texture are both articulated by a figural substrate. It means that gesture and texture are both resultant of a figural manipulation, which comprehends a parameterization of the sonic fluxes according to articulations, instrumental activities and notes parameters. In this sense, it is not possible to separate gesture from other musical aspects. In this paper we will present the idea of an unfolding gesture in two aspects: motor or energetic aspect (performance gestuality) and symbolic aspect (historical dimension of a specific sonic flux). If the first aspect can be related to Ferneyhough musical thought, the second one has Luciano Berio as a main reference. After that, we will present an interpretation of gesture as a non-abstract musical aspect and as a compositional and performance tool. It means that we shall include time as a main feature for musical analysis.

One of the most important issues for contemporary music is the gestural heterogeneity of its repertoire, that makes parametric dimensions differ greatly from composer to composer and piece to piece. On the one hand this kind of variety makes rich the listening within the symbolic aspect, on the other, it makes understanding more difficult in the energetic aspect to the interpreter, impeding, thus, the *prägnanz* of sense that the gesture carries within. This is important, therefore, to establish an analytical pattern to consider the individuality of compositional processes, enabling performance that takes into account each of those figural manipulations, thereby generating even greater wealth within the motor or kinetic aspect of gesture. We believe so that understanding musical structures after those three elements could establish a better communication between composition and performance, resulting in a actual gestural performance. To effectuate this, we will use as the main object of analysis, to illustrate those relationships, the Sonata for Solo Cello by Bernd Alois Zimmermann, making use also of writings by the composer himself as an analytical background.

KEYWORDS: musical figure; gesture; musical performance; contemporary music; Bernd Alois Zimmermann

**William Teixeira** holds a BA in Cello Performance by São Paulo State University (UNESP) and a MA in Musicology by Campinas University (UNICAMP). He was professor of cello and music history at Fukuda Institute and principal cellist for São Paulo University Chamber Orchestra beyond his work as soloist and contemporary music performer. He is currently a candidate for PhD at São Paulo University (USP) with scholarship by FAPESP.

**Silvio Ferraz** studied composition at São Paulo University (USP) with Gilberto Mendes and Willy Corrêa de Oliveira, completing his studies at Foundation Royaumont with Brian Ferneyhough and James Dillon and at IRCAM's "Académie d'Été", with Gerard Grisey and Jonathan Harvey, Doctor in Semiotics by the Catholic University of São Paulo (PUC/SP) with a thesis about difference and repetition in music. Currently, he is professor of musical composition at São Paulo University (USP) and researcher of FAPESP and CNPq.

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*Visual Gesture and Music: on Kaia Saariaho's "Nymphéa"*

ABSTRACT

Kaia Saariaho's approach to composition is an interdisciplinary one: it embraces a number of art forms – visual, literary and musical – in works that explore a creative dialog between image, continuity and time. Being a synesthetic person, Saariaho often takes her musical inspiration from visual stimuli and one of her most explicit “visualizations” is “Nymphéa” string quartet (1987). The source of inspiration was famous series of Claude Monet's paintings known as “Nymphéas”. This sort of ekphrasis raises a lot of questions, among them is: where the resonance between painting and music happens? In our presentation we propose a rather specific list of factors to be considered as provoking the imagination of a composer by visual stimuli. The most important one is the gestural character of Monet's paintings with their exquisite technique of brush strokes which themselves form complex entities on different levels. This approach makes possible to consider brush strokes as micro gestures with their own dynamic, direction, intensity and density. Therefore the idea of “temporal narrative” acquires a new impulse. In Saariaho's piece music arises from tiny musical gestures shaped by string bowing technique.

Another level of Monet's technique is a special sort of stroke combination. Monet places them one onto another thus making multilayered vibrating texture. Saariaho's compositional technique tends to develop this factor into polyphonic layering of four lines with a sophisticated design of sounds and

rests, thick and thin textures. Gesture becomes the instrument of translating a piece of visual art into music.

**Tatiana Tsaregradskaya** is a professor of Music Theory at the Gnesins Russian Academy of Music, Moscow. Being interested in post-tonal theory, she lectures on contemporary compositional techniques as well as on theoretical concepts in music research. Her major publications include “Time and Rhythm in Olivier Messiaen’s Music” (Moscow, 2002, in Russian). Her next book “Musical Gesture in the Realm of Post-Tonal Composition” is now in press.

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*Important body/movement relations in a trilogy for semi-prepared piano and extended techniques by Joana Sá*

#### ABSTRACT

Wittgenstein, among other authors, approaches thought as an interior movement. On the other hand, M. Tavares, referring to Bachelard, describes movement as “acting thoughts”, or as “thought made visible”. In my opinion one of the most remarkable aspects in the 20th century music - and the growing abstraction of its musical thought - is the discontinuity between these two kinds of movement. A gap emerged between interior movement (musical idea) and external movement (musical performance), permitting other kinds of musical discovering and languages.

In my own music, body and movement play a very important role: the musical idea comes along with physical gesture, the latter playing with or even against the piano body. There is the musical thought and, as Jean Luc Nancy puts it, “the weight of the thought”.

In this trilogy I develop a personal language encompassing multiple dimensions and forms of expression (music, visuals, movement, words), where music undertakes a central role, articulated with Novalis’s notion that: “the exterior is an interior distributed through space”. The body in performance is thought as a “spatial body” and movement as “acting thoughts”, influencing and getting influenced by space and scene.

Peter Szendy’s idea of “phantom members”, “improbable bodies” “with no shape or destination” created through “effiction” in musical performance seems to make particularly sense in this music. Sound, movement, words and scene are approached as a structure, where listening and seeing are interlocked,

using Bachelard's idea of "dreaming devices: to see and listen, ultra-see and ultra-listen, listen to yourself seeing".

KEYWORDS: body in music; movement vs. thought; Peter Szendy; Membres Fantômes; Jean Luc Nancy.

Pianist and composer **Joana Sá** works in the field of new music/contemporary music. She is currently enrolled in a doctoral program in music (performance) at the University of Aveiro, as an FCT (Fundação para Ciência e a Tecnologia) fellow. Joana Sá is particularly interested in incorporating other means and artistic areas in her works. Her first solo, 'through this looking glass', shot by filmmaker Daniel Costa Neves, was released as a dvd+cd by the German label 'blinker - Marke für Rezenten' in 2011. 'In Praise of Disorder'- second solo - was released by Shhpuma in 2013. Both were premiered in Teatro Maria Matos (Lisboa). Joana Sá has performed in several festivals and as part of season programs of renowned institutions both in Portugal and abroad. She is one half of the duo Almost a Song (with Luís José Martins), and one third of powertrio (with Luís José Martins and Eduardo Raon).

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*Physical String Theory for Creative Gestural Performance and  
Composition in Music*

#### ABSTRACT

Musical performance theory deals with notes and gestures. The latter, when interacting with an instrumental interface, determine the acoustic characteristics and expressivity of sounds. At the level of the notes the theory uses performance operators involving Lie derivatives of analytical weight functions, acting on performance fields. At the level of gestures, the theory uses the formalism of physical string theory, where world-sheets connect symbolic and physical gestures. In this context, potentials are used instead of weight functions. From a Lagrangian with complex time, minimizing the action, we found a Poisson equation, whose solution is the world-sheet. The complex time comprises the time of the mind, flowing in the symbolic score, and the time of physics (the real performance).

Here, we present the new result of the functional relation between the Fourier transforms of the physical gesture  $F_\phi$ , of the symbolic gesture  $F_\sigma$ , and the gradient of the potential  $V$ :  $F_\phi = M(F_\sigma) + Q(V)$  with linear operators  $M$  and  $Q$ . This constitutes a remarkable formal analogy with the note-performance Lie operators.

General gestures can be composed of different parts: They can be branched according to digraph schemes. Moreover, gestures can be covered by subgestures to define a global theory of gestural performance. The Lagrangian formalism applies to each chart of the covering. Future development of these ideas includes an inverse gesture theory, i.e., back from physical to symbolic reality, research which relates to gestural creativity in composition. We exemplify the last ideas with two short compositions.

KEYWORDS: Lagrangian; gesture operators; world-sheet; performance; composition

**Maria Mannone** earned masters in Theoretical Physics, Orchestral Conducting, Composition and Piano in Palermo, Italy; in Paris, France, master ATIAM at IRCAM-UPMC Sorbonne. She studied Film Music Composition at *Accademia Musicale Chigiana di Siena*. Author of a lyric opera, her compositions have been performed at *Festival delle Orestiadi di Gibellina* and by the *Orchestra Sinfonica Siciliana*. She is PhD student in Composition at the University of Minnesota, where she works with Guerino Mazzola, investigating musical gesture theory. She has been awarded of the Interdisciplinary Doctoral Fellowship for a collaboration with the Fine Institute of Theoretical Physics of the University of Minnesota. She's author of the book "From Music to Image, from Image to Music: Mathematical Relations between Musical Composition and Figurative Arts" and coauthor, with Mazzola and Yan Pang, of "Cool Math for Hot Music — A first introduction to Mathematics for Music Theorists," published by Springer (to appear 2016).

**Guerino Mazzola** qualified as a professor in mathematics (1980) and in computational science (2003) at the University of Zürich (two habilitations). Visiting professor at the École Normale Supérieure in Paris in 2005. Since 2007 professor at the School of Music, University of Minnesota. He developed a mathematical music theory and software Presto and Rubato. Since 2007 he is the president of the Society for Mathematics and Computation in Music. He has published 24 books and 130 papers, 25 jazz LPs/CDs/Videos, and a classical sonata.

### S13 MUSICAL GESTURE IN OPERA AND THE MUSICAL THEATRE

Chair: **Sofia Serra** | EA—Universidade Católica Portuguesa, PT

**Shersten Johnson** | University of St. Thomas, St. Paul, MN, US  
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*Performance Gestures and Idealized Listening in the Met's Pasquale Simulcast*

## ABSTRACT

The Metropolitan Opera's *HD* productions reconfigure traditional opera house audiovisual spaces, not only letting us see close-ups of characters but also glimpses of behind-the-scenes musicians and stagecraft. These documentary-like investigations support a second diegesis or storyline woven through gaps in the operatic narrative. Although the two worlds often remain separate and jumping between them can be jarring at times, at other times they come together in interesting ways. Such is the case with the production of *Don Pasquale* (2010), which mixes close-ups of pit and stage in a way that – while likely unintentional – sparks interdiegetic references between musicians and characters.

This paper considers similitudes between musicians in the pit and on the stage in the *Pasquale* production, particularly those of performance and listening gestures, asking: How might observers be motivated to map further characteristics between musicians in these two spaces? How might the associations between musicians be extended to one's own mimetic behavior as a listener? How might they deepen the already immersive quality of the intimate camerawork of the HD productions? Observations from recent work on gesture (Kozak 2015, Zbikowski 2011) and mimetic listening (Cox 2011) help investigate these questions and point to future explorations of play between diegetic worlds in opera. The results of this investigation show how clusters of emergent meaning spring from the generic commonalities of the gestures.

KEYWORDS: gesture; idealized listening; Metropolitan Opera; Donizetti; Pasquale

**Shersten Johnson** is Associate Professor of Music Theory at the University of St. Thomas in St. Paul, Minnesota, where she teaches courses in music theory and composition for both undergraduates and graduates. Her interests include twentieth-century opera and art song, as well as cognitive-linguistic, gender, and narrative theories. She has presented her research in the United States, Canada, Australia, Hong Kong, and the United Kingdom, and her publications appear in *Music Theory Spectrum*, *Music & Letters*, *Music Theory Online*, *Opera Today*, *PsyArt*, *Music Educator's Journal*, *The Journal of Music and Meaning*, and *Engaging Students: Essays in Music Pedagogy*. She is author of "Understanding is Seeing: Music Analysis and Blindness" in the *Oxford Handbook of Music and Disability Studies*. In addition to teaching and research, Dr. Johnson is active in the Society for Music Theory and Music Theory Midwest.

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*Musical Gesture in the Semi Classical Genre of Nurthi in Sri Lanka*

## ABSTRACT

The study demonstrates musical gesture in semi classical music genre of *Nurthi* in Sri Lanka. *Nurthi* is a music theatre in Sri Lanka and it was introduced from Indian *Baliwala* theatre troupe at the end of the 18th century. Melodies of songs were created in accordance with a particular raga or the combination of few ragas. In addition, the North Indian classical *tala* (beat) was used as a rhythmical pattern to the accompaniment of *Harmonium, Violin and*. Even today, the performance of *nurthi* is popular in the music theatre as well as in the semi classical music tradition. The gestural style of *nurthi* songs conveys emotion, mood and cues of the North Indian classical music experiences between performer and listener. Particularly, gesture of body and psychological cues are represented as a collection of sound and image of cultural interaction with the skill of singers, music players and actors. However, the objective in this study is to introduce the musical gesture of *nurthi* as a new concept of music culture in Sri Lanka., and the study highlights how the body and mental musical gestures contribute to develop any music tradition.

I will address the issue using qualitative analysis methods. Primary data will be collected from selected *nurthi* songs. This study will introduce new factors of music culture and aesthetic practices and new methodologies to develop the Sri Lankan music culture.

KEYWORDS: musical gesture; semi classical; Nurthi

**Leena Seneheweera** is Senior Lecturer at the Department of Fine Arts Faculty of Arts, University of Peradeniya, Sri Lanka. Her teaching experience include Sri Lankan, Chinese and Indian Music, Art and Aesthetics, Art in Early Human Societies, Art and Disability for undergraduate program and performing art, Research Methodology, and intangible cultural heritage for postgraduate program. Her research interests include Music and Visual Art, Music and Society, Music History As well as involved research relating to Buddhist Music, Buddhist philosophy and Buddhist art.

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*The Gesture on the Musical Theater Compositions of Constança Capdeville*

## ABSTRACT

Constança Capdeville, a well-known Portuguese artist/composer, wrote relevant works within the mixed music context, including musical theater. Capdeville had

overseen her writing through the consciousness, observation and practice, relations between the musical gesture, the sound of words, the texture of sounds, movement and physical spatialization of bodies, displacing all these elements from their natural context to other universes assuming new meanings. Some of Capdeville compositions comprise live instrumental performances and sounds recorded in magnetic tape. The study of such works, composed around the 70s and 80s, is of utmost importance because are an example of an innovative period in the framework of the experimental music in Portugal. In this paper, we'll focus on Capdeville work "Don't, Juan", composed for voice, piano, double bass, percussion, magnetic tape, mime, dancer and lights. It's a paradigmatic work since integrates fragments of texts, citations from other composers in several languages, vocal and instrumental music live and spread, theatrical games, mimicry, movement, lights, props, instruments used as characters or scenic elements. Moreover, considering the pre-preparation of the tape, we could propose that it operates as an interface between creativity and the final performance. Also in "Don't, Juan", the particular treatment of all elements expresses two tendencies: one direct, embracing objects, instruments and lights; one non-direct, including the chaining and interdependence of all compositional elements. In this paper we'll reflect about the gesture on the musical theater compositions of Capdeville, analyzing, in a musicological context, the music, mimicry and voice presented in the work "Don't, Juan".

KEYWORDS: Constança Capdeville; gesture; magnetic tape; musical theater; electroacoustic music

**Filipa Magalhães** was born in Coimbra in 1979. In 2006, she concluded a degree in Musicology at FCSH – Nova University of Lisbon. Since 2013, she holds a Master Degree in Musical Arts: Studies in Music and Technology, under the theme "Survey on Magnetic Tape Collections: Evaluation of the Conservation State of the Tapes". This work led her to perform in 2011 an internship at the Vienna Phonogrammarchiv, in Austria, under the guidance of Nadja Wallaszkovits, international specialist in audio restoration and archiving. Recently she has received a Scholarship within the PhD program in Music as Culture and Cognition supported by FCT, at FCSH-UNL, focusing her research in the restoration, digitisation and archiving of magnetic tape collections. Other interests are related to the study of mixed music, including audio recordings on magnetic tape, while she is looking for new methodologies to study these works in a musicological context.

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*Sound Gestures in XVIII Century Music*

ABSTRACT

Our paper derives from different discipline areas: music analysis, musical semiotics, music and emotion, music gestures and performance expressiveness. Historical tradition was considered as well. We examined Händel's opera *Giulio Cesare* and we analyzed arias belonging to three different emotional categories: fury, love and pain. A first analysis of composition was done in order to get information concerning the expressive intentionality of the composer: time, rhythm regularity, tonal, harmonic and melodic aspects that could be different in the three emotional contexts. A second analysis concerned performance: "sound gestures" of the singers when their voice intended to represent moments of fury, love or pain. A third analysis was done concerning the body gestures of the interpreters when they sing their arias: we considered gesture energy as well as observable muscle tensions and facial expressions. A semantic definition of the three emotions was possible only within the opera context. Without characters and words, a listener could recognize the emotional aspects of musical passages, but could not give them a precise verbal definition. At the end of our work we considered three fragments taken from Vivaldi's concerts where structure and performance features almost exactly correspond to the three categories described in Händel's arias. However, they could not be correctly described just as fury, love or pain. Therefore we proposed the final hypothesis that the musical gestures we can recognize in listening instrumental works have their roots in the actual gestures present in the realm of opera.

KEYWORDS: gestures; Handel; listening; opera; performance

**Mario Baroni** has been full professor, and former director in the Department of Musicology of the University of Bologna. At present he is retired. In 1990 he founded the Italian association for the analysis and theory of music (Gruppo Analisi e Teoria Musicale). He was one of the promoters of the foundation of ESCOM (European Society for the Study of Cognitive aspects of Music). He published works on music analysis, emotional aspects and social impact of music, music education, and historical topics.

**Roberto Caterina** is associate professor of Psychology of perception, Psychology of Music and Psychology of Communication at Bologna University. He got a PhD in Psychology in 1993 (Bologna University). He is clinical psychologist and psycho-therapist. He is member of AIM (Italian Association of Psychologists) and of ESCOM (European Society of Cognitive Music). He published several works on nonverbal communication, expression and communication of emotions in music performance and in music therapy.

**Fabio Regazzi** obtained degrees in piano, electronic music and composition. At present he works as a technician expert on sound analysis and computer music in the Department of the Arts of the University of Bologna. He is also the author of software for the catalogue of tapes and documents in a number of Italian theatres. In the last five years he collaborated with professors Caterina and Baroni in research projects presented in international conferences and took part in the European project “Mirror” on the use of technology in music education.

**S14 | CONCEPTUALIZATION AND INTENTIONALITY OF MUSICAL GESTURE**

EC105 | Chair: **Rui Penha** | INESC TEC–Universidade do Porto, PT

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*Between Empirical Criticism and Interdisciplinary Influences:  
Theorizations of Gesture in Musical Composition*

ABSTRACT

As a complex and polysemous concept used nowadays in abounding - and sometimes clichéd - ways in composition, performance and musicology, ‘musical gesture’ is reliant on several factors, involving the historical conditions of its emergence at the end of the fifties, the crossings and potential influences of several disciplinary perspectives (from humanities and cultural studies to human-computer interaction), and even ‘ideological’ point of views of composers concerning this ubiquitous notion in current discourse on musical creation and performance.

Considering the multiple meanings of this word, this paper aims at examining the unfolding of its theorization on compositional standpoint. It will turn the spotlight on landmarks like the first attempts in gesture theorization by composers Schnebel and Berio, related to their own compositional practice, the moment then where gesture became a genuine catchword especially in the french review *Musique en Jeu* and in the debates of the *Tel Quel* group, and, as a critical turning point, the construing of gesture in music technology. Questioning theoretical texts and composers pamphlets will involve opening up a dialogue with their cultural and intellectual background and bringing to light the connections

between different disciplinary approaches around gesture notion. From this study of gesture related to its context in an historical overview, it will be possible to highlight the red fades of its evolution, even in its contradictory aspects.

KEYWORDS: gesture theorization; Dieter Schnebel; Luciano Berio; *Musique en Jeu*; music technology

**Anne-Sylvie Barthel-Calvet** is Maître de Conférences in Musicology of Contemporary Music, at the Music Department of the Université de Lorraine (France). She is currently Invited Researcher at the IRCAM (Paris) in the team 'Analyse des Pratiques Musicales', as member of the program GEMME (Geste Musical: Modèles et Expressions), supported by the french National Research Agency, and also Associated Researcher at the Labex GREAM in the Université de Strasbourg (France). Specialist in the life and music of Iannis Xenakis, she investigates analytical, historical and aesthetical aspects of his works, about which she has written numerous articles and book chapters. She is currently focusing on creative processes by Xenakis and preparing two books – including a biography for the French publisher Fayard. She is also involved in other research fields like musical gesture in contemporary music, historiographical criticism of the avant-garde and cultural politics in the twentieth century.

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*Musical Gestures as an Interface of Cultural Identity in Musical  
Performance: Western Embodiment of Karnatic Music*

#### ABSTRACT

Insights about the embodied nature of music cognition consider how the bodily engagement is determinant in musical performance. Accordingly, musical gestures consists in the articulation of the performer's subjectivity showing aspects of the explicit and tacit dimension of the signification process that constitutes musical interpretation. However, can the bodily gestures express the musical meanings embedded in the score? Can gestures be considered as the interface of the performers' cultural identity?

With the aim of studying gestures as an interface of intentions expressing musical and cultural meanings, I set up a "Performative Experiment" as case study to empirically investigate the music gestures involved in my performance practice of a Western piano work based on *Karnatic* music from South India - *72 Etudes Karnatiques* by the French composer J. Charpentier (1933). I explored the hypothesis that musical gestures interface the performer's expressive musical

intentions and embodied musical skills acquired through his creative and deliberate practice linked to his own cultural background (enculturation) and other cultural environmental context (acculturation). By combining my subjective experience as a performer (= the top-down analysis) with the objective measurement and computational analysis of my bodily expressions (= the bottom-up analysis) acquired through the motion capture system, I objectified my bodily expressions into a “body image” in order to look at my performance from an outsider’s perspective through the lens of empirical data. This approach provided to study how musical gestures are vehicles of musical meanings also in terms of subjective intentions and expressions determined by different cultural and practical experiences.

KEYWORDS: musical gestures; embodied music cognition; musical performance; musical intentions and expressivity; Indian music

Born in Italy and living in Brussels, **Giusy Caruso** is a professional concert pianist and artist researcher graduated *cum laude* in Piano and in Philosophy. Rewarded by important institutions, she carries on her concert activity throughout Europe, Asia and America though working as a PhD researcher at IPEM - Department of Musicology, Art, Music Performance and Theatre Studies at the University of Ghent in affiliation with the KASK - School of Arts of Ghent, Royal Conservatory. Her artistic research project involves an investigation on her piano performance practice of the *72 Etudes Karnatiques pour piano* by Jacques Charpentier (1933) while embracing the sphere of embodied music cognition, specifically the correlation between intentionality and musical gestures. Since 2011, she has been holding conference-concerts on her artistic research in many Universities and Institutions. Her last article, *Le patrimoine musical indien dans le répertoire français contemporain pour piano de Olivier Messiaen et Jacques Charpentier*, was published on « Les Cahiers internationaux de symbolisme » (November 2015).

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*Embodying Musical Gesture in Performance: The Case of Prokofiev*

#### ABSTRACT

The body is inseparable from musical practice. Yet, because of the relation between the physical domain and human cognitive processes, the phenomenon of gestures is given special attention and it has been recently studied in various fields such as phenomenology, neuro-phenomenology, neo-cognitivism, critical theory,

linguistics, constructivism...including musicology. There are many possible ways how music theory explores gestures, but the fundamental idea in every perspective remains the same: gestures provide great opportunities for the development and deepening of playing, singing, composing, in other words creating music in general.

In this paper, some points that are made in a meta-analytical debate in music theory regarding this issue will be discussed, in particular embodying musical gestures in performance. For that purpose I will use Prokofiev's musical gestures which are highly transparent and suggestive for performers. But even so, performers may have a problem to embody them and to get closer to the meaning of music and intention of the composer. Here arises the idea that in certain stages of practising and preparing the piece, the performer should distance him or herself from their instrument, with the purpose of coming closer to the expressive meaning of music through bodily movements and practical exercises. Embodying musical gestures in a performance supports the performance oriented analysis and indicates that the analysis itself is not an exclusive and self-sufficient activity, that is knowledge *per se*.

KEYWORDS: musical gesture, Prokofiev, embodiment, A. Pierce; performance

**Natasa Crnjanski**, PhD music theorist, Academy of Arts, Novi Sad, Serbia. During her studies, she has won a *Special Award* for her studying results from the University of Novi Sad, as well as a scholarship from the Norwegian Government. She finished her postgraduate and doctoral studies in Music Theory with Music Semiotics as her main field of research. Besides her articles, which have been published in books and journals, she is an author of the two books *Music Semiotics through D-S-C-H* (2010) and *Prokofiev and Musical Gesture* (2014). She is the chief editor for *Collective papers of Academy of Arts* and Assistant Professor at the Department for Composition and Theoretical Subjects at the Academy of Arts, University of Novi Sad.

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*Musical Gesture as Reified Expression: Body Discipline, Interpretation,  
and Civilizing Processes*

#### ABSTRACT

Available empirical research suggest that expressive deviations, both in interpretation and reception, may be thought of as interiorisation of the cognitive

structure of music, insofar as timing and agogic profiles draws heavily on harmonic and melodic factors.

Physical gesture, consistently with the former, may be thought of, from the point of view of communication, in interpretation and reception, to be intimately related to music expression, insofar as it conveys structural information to listeners.

Considered in a diachronic historical perspective, instrument technique, on its part, reflects a progressively intensive use and optimization of the body, as well as its extension on innovative technique and devices, converging in the exploration of gesture as an integral part of composition in contemporary works.

Analyzed as metaphor for expression, and as a bodily and visual component of performance and composition, musical gesture is conceptualized as an instance of rational behavior and communication.

**Ângelo Martingo**, *Master of Music in performance* (MMus, University of Reading, 1999), *Doctor of Philosophy em Música* (Ph.D., University of Sheffield, 2004), *Diplome Supérieur D'Enseignement (École Normale de Musique de Paris, 1997)*, é Professor Auxiliar da Universidade do Minho e investigador do Centro de Estudos Humanísticos da Universidade do Minho (CEHUM). A sua investigação e publicações têm particular incidência na área da teoria e sociologia musical do século XX, bem como no âmbito dos estudos de performance, com destaque para a co-edição de *Interpretação musical - Teoria e prática* (Lisboa: Colibri, 2006) e *Contextos da Modernidade – Um inquérito a compositores portugueses* (Porto: Atelier de Composição, 2011).

## S15 GESTURE AND INTERFACES FOR MUSICAL EXPRESSION

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*Conceiving Involuntary Movements as Musical Performance Tools*

### ABSTRACT

Gestures can have a role in musical communication and creation, as the listener processes their musical meaning and performers are often characterized and distinguished by their use. In this paper we describe the conceptualization and development of tools for controlling the musical discourse and sound effects of a saxophone via the involuntary gestures of its performer in real time. The

performance framework is based on MYO armband used as MIDI/OSC controller. As a wearable device, this kind of devices allows to catalog and distinguish between voluntary and involuntary movements in the performative environment. The performative analysis was focused on involuntary movements through the integration of spontaneous and biological motion mapping information as sound components in live performance. The scope of this work suggested that focus was to be made on a specific instrument so the saxophone was chosen. Gestures were categorized within an iterative process with the performer, although a strategy to figure out main gestures of an instrument performance was first defined. Gestures seem to act as metaphors, which can be associated with endless things and originate multiple meanings. As periods of research activity produce findings and artifacts that can then be mobilized in episodes of musical practice, we address several dimensions of the gestural performance activity in the music domain. It is suggested a framework of relations between types of gestures, which can both serve as a model for analysis, as well provide composers and performers with pathways and strategies under these conditions.

**KEYWORDS:** computer mediated interaction; electroacoustic music; performance aesthetics; gesture; motion tracking;

International D'Addario Woodwinds and Selmer Paris artist, **Henrique Portovedo** has found its' place in contemporary music by working with composers such as Phil Niblock, Michael Edwards, Chiel Meijering, Paulo Ferreira Lopes, Sara Carvalho, Hugo Correia, Rolf Gehlhaar, among others, having more than 30 works for saxophone dedicated to him. Co-founder of QuadQuartet and Artistic Director of Aveiro SaxFest, he is the creative director and producer of Sound of Shadows. He recorded for several labels including Naxos and RRoots Productions. Was awarded with several Trinity Music Awards in London, Prémio Jovens Criadores 2012 by the Portuguese Institute of Art and Ideas and received the Award by the Portuguese National Centre of Culture in 2014. He works at CITAR, Oporto.  
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**Paulo Ferreira Lopes.** See above.

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*An Anthology of Fifteen Years of Musical Interface Research and Practice*

ABSTRACT

To mark the fifteenth year of the New Interfaces for Musical Expression (NIME) conference, we initiated a project to compile an anthology of works representing the development and state of the art of musical interface research since 2001, when the first NIME was held as a two-day workshop of the ACM CHI conference (Poupyrev et al, 2001). To date, more than 1300 research articles have been published at the NIME conference, and similarly many live performances and demonstrations have been presented. In editing our anthology we selected about 30 representative articles from the NIME literature for their perceived impact and coverage of a wide range of interests. Prior works were augmented with commentaries from original authors and third-party experts. Authors and experts were given the opportunity to critique each others commentary before submitting final versions of their texts. The anthology covers the field of musical research broadly, if not exhaustively, including topics such as musical gesture recognition, augmented instruments, expressive performance with: bio-sensors, mobile devices, vision-based and haptic interfaces, various theoretical and social issues relating to musical interface research and other topics. The presentation, our first public announcement of this NIME anthology project, will outline our reasons for undertaking the work and report on the process by which we selected the range of topics and articles for the anthology. We will summarize observations and lessons learned from organizing and editing the peer commentaries, and propose future activities, which could benefit musical interface and related research communities.

- Jensenius, A. R. and M. J. Lyons. *A NIME Reader - Fifteen years of New Interfaces for Musical Expression*, in preparation, expected publication by Springer in 2016.
- Poupyrev, I., M.J. Lyons, S. Fels, and T. Blaine (Bean). "New interfaces for musical expression." In *CHI'01 Extended Abstracts on Human Factors in Computing Systems*, pp. 491-492. ACM, 2001.

KEYWORDS: NIME, Musical Interface, Gesture, Sensors, Expressive Performance

**Michael Lyons** is Professor of Image Arts and Sciences at Ritsumeikan University. He studied Physics at McGill University (B.Sc.) and the University of British Columbia (Ph.D.) and has worked in computational neuroscience, pattern recognition, human-computer interaction, and media arts, as a Research Fellow at the California Institute of Technology, Assistant Professor at the University of Southern California, and Senior Research Scientist at the ATR Research Labs. Michael proposed and co-organized the CHI 2001 workshop on New Interfaces for the Musical Expression, and has served as a member of the NIME steering committee and advisory board.

**Alexander Refsum Jensenius** (BA, MA, MSc, PhD) is a music researcher and research musician working at the Department of Musicology, University of Oslo. He holds degrees from the University of Oslo and Chalmers University of Technology and have been a visiting researcher at CNMAT, UC Berkeley and CIRMMT, McGill University. His research focuses on music-related body motion, from both analytical and creative perspectives. Results from theoretical and empirical studies of how people move to music is used as the basis for creating and performing with new interactive music technologies. Alexander organized the NIME 2011 conference and is currently chair of the NIME steering committee.

**S16 GESTURE ELECTRONICS AND METAPRAXIS IN MUSIC**

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*Gesture as a Musical Parameter: Conducting with Live Electronics in  
Sculpting the Air (2015) by Jesper Nordin*

ABSTRACT

*Exformation Trilogy* is a mixed music triptych, which Swedish composer Jesper Nordin plans to complete by 2017 using Gestrument, an iOS gestural-based application developed by Nordin himself. *Sculpting the Air* is the first piece of this cycle and was premiered on June 22<sup>nd</sup> 2015 by the TM+ Ensemble conducted by Marc Desmons. The piece is conceived as a conductor concerto: the conductor gesturally controls electronic parts by means of the Kinect cameras and the Gestrument application. In practice, the user of this application sweeps the touchpad to “play” sonic events, which can be pitch-, length- or density-modulated. The technological apparatus aims at enhancing orchestral conducting. It consists of two Kinect cameras connected to tablets hosting the Gestrument application. Kinect cameras are placed so that the conductor can reach the tracking area with his hands while conducting. We attended to almost every working session during the production of the piece at IRCAM where we collected a substantial amount of ethnographic data, on which this research is based. Our paper will delineate the different types of gestures the conductor has to make in order to direct the ensemble, setting bells in motion or interacting with the electronics by entering into the field of the Kinects. In close collaboration with the

conductor and the computer music designer, Nordin developed original notation strategies, which we aim to analyse. We will focus on the compromises he had to make between technological and human constraints and on the way he indicated conductor's gestures in the score.

KEYWORDS: Jesper Nordin; conducting; gesture tracking; mixed music; Gesturment

**François-Xavier Féron** is CNRS research associate at the LaBRI (Laboratoire Bordelais de Recherche en Informatique, France) and collaborator with CIRMMT (Centre for Interdisciplinary Research in Music Media and Technology, Canada). His research focuses on contemporary music and interaction between art, science and technology.

**Baptiste Bacot** is a Ph.D. candidate at the School for Advanced Studies in the Social Sciences, currently assigned at IRCAM, Paris. His work focuses on gesture and new instruments in electronic music.

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*Gesture and metapraxi in Anaparastasis III: The Pianist (1968) by Jani Christou*

#### ABSTRACT

The Greek composer Jani Christou (Cairo 1926 - Athens 1970) abandoned the inherited notion of musical work, composed pieces synthesizing multiple forms of artistic expression and conceptualized his theoretical and experimental contributions to music. His manifesto *A credo for music* (1966) provided an intellectual framework for his oeuvre and testified to its avant-garde and multi-disciplinary identity.

In this paper we focus on *Anaparastasis III: The Pianist* (1968) for a soloist, a conductor, an instrumental ensemble and tapes. We first emphasize the particularly graphic and experimental dimension of the score that provides not only musical but also psychological, artistic, or various extra-musical information and material. We study the notation signs used by Christou to express the soloist's emotions, psychological attitudes and actions, and we focus on the introduction of new figures into the score, the use of the voice and the instrumental sound, the performance particularities, the abdication of the composer's role and the redefinition of the performer's identity.

We explore the theatrical dimension of the performer and his role in these compositions that stem from primitive rituals evocating extreme psychological situations. We analyze the composition according to the “praxis-metapraxis” concept and we study the composer’s text on it. We also intend to broaden the theoretical spectrum provided by the composer and see how the performance limits can be transcended through various interpretations in different time and under different sociopolitical conditions. We concentrate on the “system-antisystem concept” introduced by the composer and we analyze the composition under this particular scope.

**Varvara Gyra** was born in Ioannina, Greece, and has been living in Paris, France, since 1998. She studied the guitar in Paris with Roland Dyens and Francis Kleynjans, graduated from the Ecole Normale de Paris and has been awarded scholarships by the Academy of Athens and the Onassis Foundation. She holds a Ph. D. in Musicology (University of Paris VIII) and her thesis is on the work of the Greek 20<sup>th</sup> century composer Jani Christou. She has recorded three CDs, won four international prizes and performed in various countries all over the world.

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**R1 | Lunch-time RECITAL**

A. Ilídio Pinho

**Felipe Verdugo**, piano | Université de Montréal, CA  
*Kreisleriana op. 16, Robert Schumann*

**Marine Blassel**, piano | Université de Montréal, CA  
*Sonata in B minor S. 178, Franz Liszt*

Piano technique, a complex subject that integrates physical, psychomotor and psychoacoustical phenomena, can be regarded as a comprehensive set of tools allowing the pianist to communicate a musical idea. At present, different technical approaches coexist and are transmitted, most often orally, from teacher to student. Despite their undeniable artistic value, many of these approaches make recommendations that are at odds with the scientific community. However, Marc Durand, one of the most recognized piano pedagogues in Canada, has developed, over the course of his 35-year career, a research-informed holistic and healthy approach that integrates contemporary advances from fields such as physiology, psychology and pedagogy, making him a pioneer in his domain. Among others, M. Durand's approach relies on both a systematic use of gestures involving not only the upper limbs but also the pelvis region (such as the 'wheel', the arm stroke, the absorption movement, the rotation, etc.) and the control of specific keystroke parameters (particularly attack speed and weight). Through the performance of Schumann's *Kreisleriana op. 16* and Liszt's *Sonata in B minor S. 178*, we intend to demonstrate how to apply this innovative approach to piano technique in a practical context. The objective of our performances is not to reproduce a prefabricated set of gestures but to adapt the gestural recommendations of M. Durand's approach to the specific needs of both the musical context and the performer.

**R2 | Lunch-time RECITAL**

A. Ilídio Pinho

**Robert Wechsler** | Motion Composer, Weimar, DE  
*The Motion Composer: A Mini Performance and Installation*

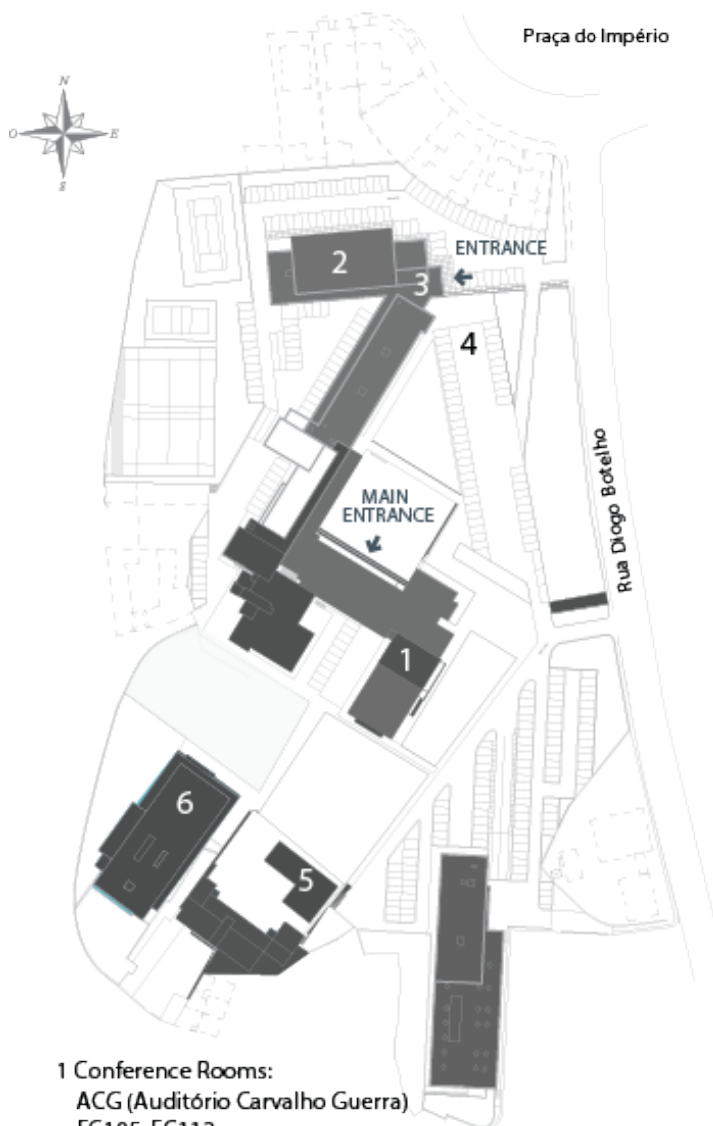
Robert Wechsler is a dancer and choreographer and one of the inventors of this device, which has been developed especially for persons with disabilities. The audience will be invited to be part of the performance. For further information please see [www.motioncomposer.com](http://www.motioncomposer.com).

**José António Oliveira Martins** holds a Ph.D. in Music History and Theory from the University of Chicago and is currently FCT- and Principal Investigator at Research Center for Science and Technology of the Arts (CITAR) at Catholic University of Portugal. Previous full-time faculty appointments include the Eastman School of Music/University of Rochester and the University of Iowa. He was also a visiting assistant professor at the Instituto Politécnico de Castelo Branco and a research fellow at Princeton University. His research interests include the modeling of musical systems, scale and transformational theory, and the music of Bartók, Milhaud, Lutoslawski, and Kurtág. His current and forthcoming publications appear in the *Journal of Music Theory*, *Perspectives of New Music*, *Theory and Practice*, *Bridges*, *Mathematics and Computation in Music*, and the *Portuguese Journal of Musicology*. José has been a recipient of the Arthur J. Komar award (Music Theory Midwest Society), the Patricia Carpenter Emerging Scholar award (Music Theory Society of New York State), and he has been a fellow at John Clough Memorial Symposia and the Mannes Institute for Advanced Studies in Music Theory. He has served as Reviews-editor for *Theory and Practice* (Music Theory Society of New York State) and is on the editorial board of *Music Theory Spectrum* (USA), *OPUS* and *TeMA* (Brazil). E-mail: [jomartins@porto.ucp.pt](mailto:jomartins@porto.ucp.pt)

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<http://vimeo.com/97307427>

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- 1 Conference Rooms:  
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EC105, EC112
- 2 MoCap Studio, AIP (Auditório Ilídio Pinho)
- 3 Bar das Artes/Reception
- 4 Parking Lot/Transportation to Casa da Música
- 5 Cantina/Lunch
- 6 Restaurante Américo Amorim/Dinner

