

International colloquium

“Music, gestures and emotions”

Colloquium organized by the Swiss Center for Affective Sciences (CISA) and
the Geneva University of Music (HEM)

Monday June 3 2013 – Wednesday June 4 2013

Timetable:

	Monday, June 3	Tuesday, June 4	Wednesday, June 5
9h00 - 9h30	Registration and Welcome		
9h30 - 10h30	Rémy Campos – Aurélien Poidevin*	Marc Leman	Steven Brown
10h30 - 11h30	Antonio Camurri – Donald Glowinski	Luciano Fadiga	Laurent Aubert*
11h30 - 11h45	Coffee break	Coffee break	Coffee break
11h45 - 12h45	Rolf Inge Godøy	Constance Frei*	Wiebke Trost
12h45 - 14h00	Lunch break	Lunch break	Farewell lunch
14h00 - 15h00	Beatrice de Gelder	Marcelo Wanderley	
15h00 - 16h00	Xavier Bouvier	Sofia Dahl	
16h00 - 16h30	Coffee break	Coffee break	
16h30 - 17h30	Visit of the Virtual Reality Lab at the BBL	Didier Grandjean – Marc-André Rappaz	
19h30	Social Dinner	Concert	

Location:

- Conservatoire de Musique, Place de Neuve 5, room 20 (white)
- Université de Genève (Tuesday afternoon), Rue du Général-Dufour 24, U 159 (green)
- Brain and Behavior Laboratory (Monday afternoon), Avenue de Champel 9 (blue)

Please note that the talks marked with * will be held in French.

Abstracts:

Monday, June 3:

Le geste oratoire à l'opéra autour de 1900 : un essai d'histoire appliquée

Rémy Campos et Aurélien Poidevin (Haute École de Musique de Genève)

Au sein de la Haute École de Musique de Genève, nous avons récemment procédé à deux expériences originales de recherche appliquée. La première a consisté à remettre à la scène au printemps 2012 un tableau d'un opéra de Wagner (les Maîtres chanteurs de Nuremberg dans la version de la création parisienne de 1897). La deuxième tournait autour de la mise en scène et en gestes de deux cantates de Prix de Rome de Claude Debussy et Paul Vidal (1883) en décembre 2012.

Lors de la mise en œuvre de ces deux projets, une attention toute particulière a été portée à la restitution du geste des chanteurs dans ses dimensions à la fois élocutoire, expressive et musicale. Ce travail a nécessité de retrouver la grammaire gestuelle en usage à l'opéra autour de 1900 et de développer en parallèle une méthode de transmission innovante du geste lyrique. Non sans difficulté d'ailleurs car il fallait à chaque instant retrouver la justesse technique mais aussi émotive des mouvements.

Ce processus de réflexion sur des gestes anciens a suscité un double travail : avec les interprètes bien sûr mais aussi avec le public qu'il a fallu former à la compréhension de conventions spectaculaires oubliées. Pendant trois années, ce programme de recherche aura soulevé les enjeux d'une mise à l'épreuve d'hypothèses historiques afin de mettre à jour la structure d'un système expressif révolu.

Automated measure of non-verbal expressive gesture and social signals in joint music action

Antonio Camurri (University of Genoa, Italy) and Donald Glowinski (University of Genoa and University of Geneva)

This seminar briefly presents our recent research on computational models for the analysis and modeling of non-verbal expressive, emotional, and social communication in joint music action. The research is in the framework of the SIEMPRE EU ICT FET Project (www.siempre.infomus.org). Experimental scenarios considered in SIEMPRE face the subtle and complex social interactions taking place between expert quartet musicians during live musical performance, in orchestra strings sections, and in listening to this music by non-expert audiences.

This seminar will present techniques to the automated measure of expressive gesture, entrainment and leadership in orchestra and string quartet scenarios.

The EyesWeb XMI software platform (freely available) supporting the development of experiments and applications is also briefly presented, and short video excerpts are shown and discussed.

Coarticulation in the production and perception of music

Rolf Inge Godøy (University of Oslo, Norway)

In the past couple of decades, we have seen much research documenting close links between music and body motion. However, we need to have a better understanding of how meaningful units of sound and body motion are generated and perceived in music. The phenomenon of coarticulation, meaning the fusion of micro-level actions and sonic events into larger and somehow meaningful chunks of sound and motion, could help us not only to better understand sound and body motion links in music, but also contribute to our understanding of expressive and affective features of music. Coarticulation has been extensively studied in linguistics, to a certain extent in human movement science, but not so much in music. In my presentation, I shall give an overview of our own and other research on coarticulation in music.

Bodies in motion and emotion

Beatrice de Gelder (Tilburg University, the Netherlands)

Bodily expressions reliably convey emotions. Important information is carried by movement, whether movement is physically present or imagined as in still images. Accompanying auditory information, like vocalisations, merges with the movement information in the course of perceptual processing. This talk presents some new findings on body movement perception and discusses different ways of envisaging the merging of movement information, auditory signals and possibly music.

Musical performance and the principle of “effortless action”

Xavier Bouvier (Geneva University of Music)

Performing music engages a wide-ranging set of competences: perceptual attentiveness, psycho-motor synchronization, emotional presence, and cognitive awareness at many levels, up to stylistic understanding and artistic taste.

One of the most important concepts ruling the activity of a performer is the principle of “effortless action”, where the performer's complex actions are integrated to a point where they

appear natural and easy. For the musician, effortless action requires specific approaches during the learning process, and specific inner attitudes during the performance.

The Asian tradition of what can be called a “philosophy of gesture” offers a very suitable framework to reflect on the notion of effortless action. Around this principle, our presentation will try to enunciate as clearly as possible some crucial issues for music performers. At the end, we will suggest some topics that could be effectively addressed through multidisciplinary research involving musicians and scientists.

Tuesday, June 4:

A embodied viewpoint on music, gesture and emotions

Marc Leman (Ghent University, Belgium)

During the past 5 years, our work at IPEM (UGent) has been focused on the idea that interaction with music is embodied (Leman, 2008; Lesaffre & Leman, 2013). Several studies have been conducted in which we try to find empirical evidence for the theory of embodied music cognition. In addition, new ways of modeling gestures have been developed, because gestures form a core ingredient of the theory (Godøy & Leman, 2010). In this talk I will give an overview of our recent work. First, I will present our studies that provide evidence for the idea that human perception, emotion and movement forms an interconnected “embodied” system. For example, I will show evidence for the idea that (i) movement can influence the perception of emotional attributions to music (Maes & Leman, 2013), (ii) emotion-induction can influence spontaneous movement in response to music (Van Dyck et al., 2013), (iii) that perception of music may entrain the vigor of the movement top of time-entrainment (Leman et al., submitted). These and other studies support the viewpoint that the embodied paradigm is promising in understanding the power of music (Leman & Maes, in prep.). In the second part I will present our work on modeling gestures. I will focus on our new findings concerning the spatiotemporal representation of gestures (Naveda & Leman, 2010, Maes et al., 2012) and on a powerful new way of studying spontaneous and music-induced emotional-gestural responses of a group of subjects (Amelynck et al., submitted). The latter illustrates that it is possible to expand the concept of embodied music cognition to social embodied music cognition. Our theoretical work aims at providing a dynamic model of cognition in which the above empirical and modeling studies fit (Leman, 2013).

Is there a common cortical background for action, language and music?

Luciano Fadiga (University of Ferrara, Italy)

The traditional view about brain localization of higher cognitive functions localizes praxic abilities and language in the left, dominant hemisphere and musical ones in the right. This assumption has been more and more weakened by neuroimaging evidence showing that musical structures significantly activate left frontal areas, during both production and listening. Conversely, ERPs data show left and right anterior negativities elicited by syntactic violations in linguistic and musical domains, respectively. Starting from this ambiguous evidence, I will discuss the hypothesis that both, language and music may share a common syntactical background, motor in origin. Moreover, I will present some very recent results of experiments aiming at investigating the conductor/orchestra interaction during music playing and how leaderships expression could be related to the quality of musical execution.

Les *Affetti* dans le répertoire violonistique italien du 17^e siècle

Constance Frei (Université de Genève)

Dans le domaine violonistique, le contenu « affectif » de la musique trouve son expression actuelle notamment grâce aux nombreuses inflexions de l'archet, « l'âme du violoniste ». La réalisation des *affetti* implique souvent l'ajout d'ornements, de diminution, de coups d'archet variés et de jeu de dynamique. Ces artifices sont accompagnés d'une gestique conforme au sens musical que la notation musicale ne peut que difficilement représenter. Ainsi, trois niveaux de lecture se dégagent des *affetti*. Tout d'abord, les *affetti* s'expriment par un état d'âme, une sorte d'enveloppe émotionnelle qui colore l'ensemble de l'interprétation. Puis, les *affetti* exigent la connaissance d'une « sémantique » des ornements. Enfin, les *affetti* se traduisent directement dans le langage technique idiomatique de chaque instrument.

« Per non parere essere di pietra » précise Silvestro Ganassi en 1542. Il s'agit là de la première allusion, dans le domaine de la musique instrumentale pure, ayant recours à la valeur poétique d'un texte pour rendre une réalité sonore expressive. En effet, les partitions comme seuls témoins des intentions du compositeur ne sont que le reflet d'une réalité plus complexe basée sur la récitation et l'accentuation du texte musical, auxquelles s'ajoute l'art éphémère de l'improvisation. Malgré le statut d'« œuvre finie » reconnu à la partition, celle-ci n'est qu'un écho d'une pratique vivante. En d'autres termes, cette distance qui sépare l'écriture de l'exécution est comparable à celle qui relie l'esquisse à la réalisation d'un tableau. Dans ce sens, la partition et l'esquisse jouent toutes deux le rôle d'étude préalable au cours de laquelle naissent les contours et la structure de la composition, laissant le détail, la vivacité et le geste à la réalisation et à l'accomplissement de l'œuvre.

Expression and control in music performance: The role of musicians' movements

Sofia Dahl (Aalborg University, Copenhagen, Denmark)

When playing an instrument, musicians primarily use their hand and arm movements to produce or modify sounds intended for musical communication. Typically, there is a strict time constraint on these movements and during practice focus is on sound (rather than movement per se). It is now well established that expressive intent in music performances can be successfully conveyed using audio cues such as variations in timing, dynamic level etc (see e.g. Juslin & Sloboda, 2001). Expressive intents can also be identified by observers just from looking at the player performing (Davidson, 1993, 1994). This visual communication is possible despite the constraint associated with musicians' playing movements, suggesting that the visual information coincides with the movements used for sound control. However, musicians also move their bodies in a way that is not directly related to the production of tones. Body sway and head shakes are examples of movements frequently occurring in music performance and other types of non verbal communication. What role do these types of movement gestures play in the music performance, and could the use of expressive gestures facilitate the control of sound production?

In this talk, I will report work on musicians' movement gestures, discussing how these movements may be used for instrument control and expression.

Motion Capture/Gesture Sensing for Performance Analysis and Interactive Applications

Marcelo M. Wanderley (McGill University, Canada)

Movements and gestures are an integral part of music performance. Musicians playing acoustic instruments or digital musical instruments make a variety of movements that are either essential or ancillary to the production of sound, contributing to the experience of the performer as well as to the way and audience perceives the music.

In this talk I will discuss various research projects at the Input Devices and Music Interaction Laboratory (IDMIL) at McGill University dealing with the measurement of movement in music performances.

A first direction will focus on motion capture of a variety of instruments (e.g. clarinet, viola, cello, guitar, timpani) as a means to a) quantify the movements present in performance with acoustic and digital musical instruments, b) evaluate the repeatability of ancillary performer movements, c) create pedagogical tools to improve the learning of musical instruments, and d) provide control data for the synthesis of a virtual musician (timpanist).

In a parallel direction, sensors attached to performers and instruments or as part of interfaces with which performers interact were used to capture individual gestures of musicians. This has

been carried out in live production contexts, where sensor data was used to generate control signals for a) augmenting acoustic musical instruments (trumpet), b) realtime interactive performance using digital musical instruments, and c) interactive dance-music performances. Examples will be provided to illustrate both directions.

References:

- Alexandre Bouënard, Sylvie Gibet and Marcelo M. Wanderley. "Hybrid Inverse Motion Control for Virtual Characters Interacting with Sound Synthesis - Application to Percussion Motion." *The Visual Computer Journal*, 28(4):357-370, 2012.
- Alexandre Bouënard, Marcelo M. Wanderley, Sylvie Gibet and Fabrice Marandola. "Virtual Gesture Control and Synthesis of Music Performances: Qualitative Evaluation of Synthesized Timpani Exercises". *Computer Music Journal*, 35(3):57-72, 2011.
- Alexandre Bouënard, Marcelo M. Wanderley and Sylvie Gibet. "Gesture Control of Sound Synthesis: Analysis and Classification of Percussion Gestures." *Acta Acustica united with Acustica*, 96(4):668-677, 2010
- Baptiste Caramiaux, Marcelo M. Wanderley and Frédéric Bevilacqua. "Segmenting and Parsing Instrumentalist's Gestures". *Journal of New Music Research*, 41(1):13-29, 2012.
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- Manfred Nusseck and Marcelo M. Wanderley. "Music and Motion – How Music-related Ancillary Body Movements Contribute to the Experience of Music." *Music Perception*, 26(4):335–353, 2009.
- Joseph Thibodeau and Marcelo M. Wanderley. "Trumpet Augmentation and Technological Symbiosis". *Computer Music Journal*, in press.
- Bradley W. Vines, Carol L. Krumhansl, Marcelo M. Wanderley, Ioana M. Dalca and Daniel J. Levitin. "Music to My Eyes: Cross-modal interactions in the perception of emotions in musical performance." *Cognition*, 118:157–170, 2011.
- Bradley W. Vines, Carol L. Krumhansl, Marcelo M. Wanderley, and Daniel J. Levitin. "Cross-modal Interactions in the Perception of Musical Performance." *Cognition*, 101:80-113, 2006.
- Marcelo M. Wanderley, Bradley Vines, Neil Middleton, Cory McKay, and Wesley Hatch. "The Musical Significance of Clarinetists' Ancillary Gestures: An Exploration of the Field." *Journal of New Music Research*, 34(1):97-113, 2005.
- Marcelo M. Wanderley. "Quantitative Analysis of Non-Obvious Performer Gestures." In I. Wachsmuth and T. Sowa (eds.): *Gesture and Sign Language in Human-Computer Interaction*. Springer Verlag, 2002, pp. 241-253.
- Marcelo M. Wanderley. "Non-obvious Performer Gestures in Instrumental Music." In A. Braffort et al. (eds): *Gesture-Based Communication in Human-Computer Interaction*. Springer Verlag, 1999, pp. 37-48.

From metaphors to gestures: "...the way she moves"

Marc-André Rappaz (Geneva University of Music)

After having studied the significant relationships between music and metaphors, firstly as simple figure of speech, secondly within the framework of the conceptual metaphors theory, the Study and Research Group on Musical Metaphors now focuses on the concept of musical gestures. At a basic level, the relationships and analogies linking music, space, and motion are

rooted in conceptual metaphors. For example we speak about high or low sounds for pitch, about tensions producing movements, etc. In fact, most of the source domains of conceptual metaphors that allow to conceptualize, theorize or simply talk about music, refer to spatial dimension, and by extension involves physical and corporeal aspects: body movements, touch, gesture, skin, and so on.

We will investigate the links between metaphorical language, conceptual metaphors and aspects of physical and sensory experiences. In relation to this issue, the *Gestème* project, which brings together composers, dancers and choreographers, will be presented.

From sounds to music: gestures and emotions

Didier Grandjean (University of Geneva)

How are emotions inferred from music? How is the human central nervous system able to decode and build up acoustical objects based on air waves produced by musicians' gestures? These questions will be discussed in the context of brain imaging results. Both musical structure parameters and acoustical features contribute to perceived and felt emotions in music. One critical characteristic is the perceived tempo and metrics in music, inducing entrainment phenomena that can be studied at several levels including brain waves and peripheral physiological rhythms such as respiration, action tendencies, and actual motor behaviors. From primary auditory regions, the information flow related to rhythms can be spread out to other brain regions such as basal ganglia, insula, and supplementary motor areas, contributing to the emotional impact of music. The dynamics of the production of a specific musical gesture impact on acoustical information and those are decoded and interpreted as emotional expressiveness by listeners. Moreover, as music is often produced in social contexts, I will discuss how the relationships between musicians and the social environment of listening might have an influence on emotional processing related to music. Put together, all these phenomena are the probable roots of humans' fascination with music and might explain why we can feel such strong emotions during music listening.

Wednesday, June 5:

Musical Narration: Emotion, Empathy, and Gesture

Steven Brown (Department of Psychology, Neuroscience & Behaviour, McMaster University, Hamilton, Canada)

Music is said to have both intrinsic and extrinsic meanings. I will start by presenting a cognitive model in which music's intrinsic meaning is derived from two independent factors: 1) music's tonal structure, as related to features like intervals, scale types, chord types, and harmonic progressions; and 2) "expressive factors" related to the modulation of tempo, loudness, register, articulation, and timbre. In terms of the basic dimensions of emotion, tonal structure encodes valence, while expressive factors encode intensity. These two factors, in combination, account for the intrinsic meaning of music. In contrast to this, extrinsic meanings emerge from music's association with things outside of itself, such as linguistic texts, dramatic scenarios, ceremonial contexts, commercial products, and autobiographical episodes. Music is an important narrative device in all of the arts, and a ubiquitous context for musical narration is cinema. Most discussions of music and film deal with music's influence on emotions, but I would like to extend this discussion to the realm of perspective-taking and talk about music's influence on *empathy* for characters in dramatic narratives. I will present the results of an ongoing neuro-cinematics study that is examining music's ability to stimulate activity in empathy-related brain areas. Ultimately, musical narration for characters in dramas is about mapping music's intrinsic features onto the expressive features of human gesturing. This music/gesture mapping, therefore, creates a link between the intrinsic and extrinsic meanings of music.

La voie des rebelles - Poésie, musique et mystique chez les Bauls du Bengale

Laurent Aubert (Ateliers d'Ethnomusicologie, Geneva)

De tout temps, les mystiques ont été des rebelles. Dans une société comme celle du Bengale, marquée, d'une part, par le rigorisme du système brahmanique des castes et, de l'autre, par les nouveaux fondamentalismes islamiques, la voie des Bauls s'affirme comme une alternative radicale, basée sur la tolérance et le rejet des conventions. À la fois ascètes et bardes errants, vivant en marge des communautés villageoises, les Bauls s'inscrivent dans une tradition qui remonte aux grands poètes mystiques médiévaux comme Jayadeva, l'auteur du *Gîta-Govinda*, Caitanya, l'initiateur du courant mystique de la *bhakti*, ou Kabir, le grand poète et philosophe soufi. Pour les Bauls, la valeur attribuée à la poésie chantée est de nature proprement alchimique : elle aurait le pouvoir de transformer les âmes en inscrivant la résonances de ses significations dans la conscience de ceux qui la chantent et l'écoutent. Basé sur une série

d'entretiens avec Parvathy Baul, cette contribution visera à mettre en lumière la dimension synesthésique d'une démarche à la fois spirituelle et artistique faisant appel à la poésie, à la musique, à la danse et, occasionnellement, à la peinture dans la diffusion de ses idéaux.

From rhythmic entrainment to musical gestures

Wiebke Trost (University of Geneva)

Music and movements seem closely linked, because listening to music can induce the urge to move, which includes a motivational and an emotional component. It has been suggested that rhythmic entrainment is the basis of this phenomenon. In this presentation I will talk about different types of rhythmic entrainment and the role of this process in the induction of musical emotions. Rhythmic entrainment can be observed on the perceptual, the peripheral physiological, the motor, and up to the social level of the human organism. We have recently shown that motor circuits in the brain are involved for specific kinds of musical emotions. Moreover, motor activations during music listening have been shown to be more important when listening to pieces that the listener has been trained to perform. In a current project we have studied how these brain processes are modified when the musicians not only know how to perform the musical piece, but actually listen to their own musical recordings of these pieces. The results suggest that listening to short musical gestures evaluated as self-performed involve brain structures that play also a role in rhythmic entrainment.

Practical information:

Conference locations: see maps below

- Conservatoire de Musique, Place de Neuve 5, room 20
- Université de Genève (Tuesday afternoon), Rue du Général-Dufour 24, U 159
- Brain and Behavior Laboratory (BBL) (Monday afternoon), Avenue de Champel 9, <http://bbl.unige.ch/index.html>

Social dinner: (Monday) Le Dorian, Place René-Payot 1

Concert: (Tuesday) Institut Jaques-Dalcroze, Rue de la Terrassière 44, <http://www.dalcroze.ch/>

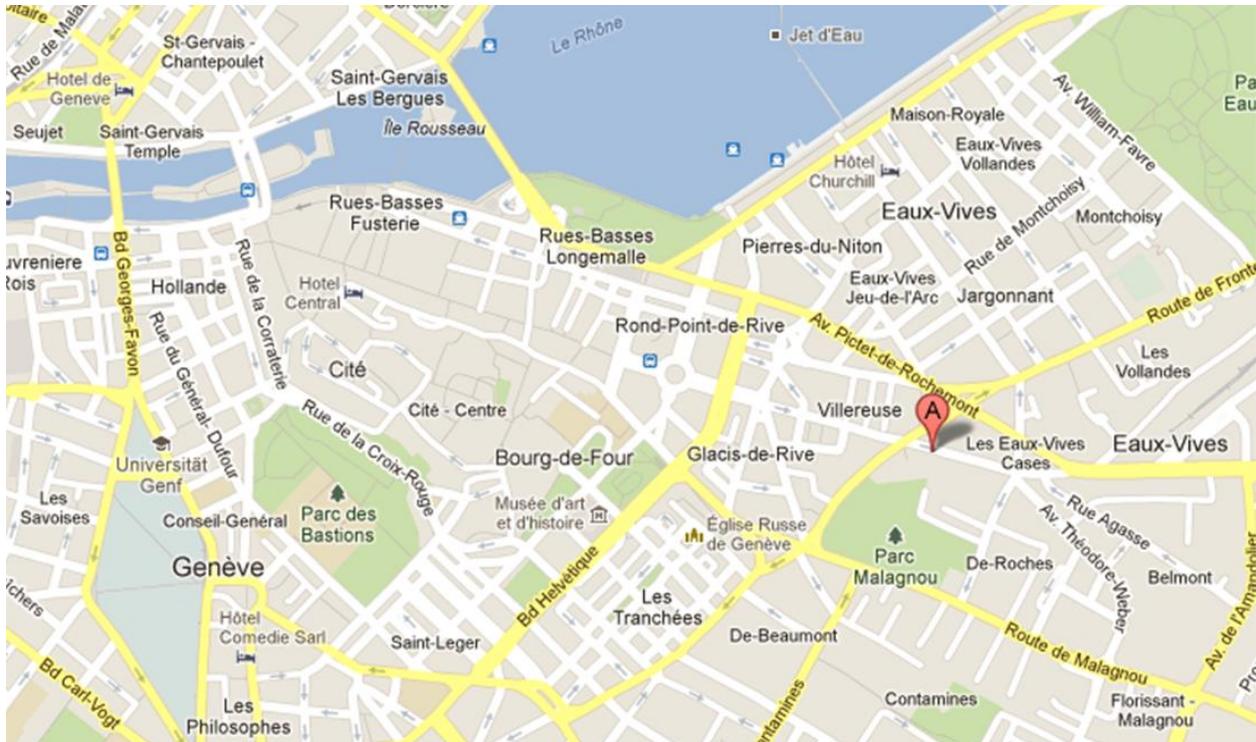
Hotel: Hôtel Bel'Espérance, Rue de la Vallée 1 – Geneva, Tel: 0041 (0) 22 818 37 37, contact@hotel-bel-espérance.ch, www.hotel-bel-espérance.ch

Concert: Tuesday evening, 19h30

Institut Jaques-Dalcroze – Concert Hall, Rue de la Terrassière 44, 1st floor

How to get there:

Take tram 12 (direction Moillesulaz) from stop Place neuve (Conservatoire de Musique) or stop Rive (Hotel Bel'Espérance) and get off at stop Villereuse.



Visit of the Brain and Behavior Laboratory (BBL): Monday afternoon

How to get there:

It is a 15 minutes' walk from the Conservatory (Place de Neuve). Or you can take bus No. 3 from stop 'Place de Neuve' and get off at bus stop 'Claparède'.

How to get back to the Hotel:

It is a 20 minutes' walk. Or you can take bus No. 7 from stop Hôpital and get off at bus stop Rive.

