Second Symposium of the
ICTM Study Group on Sound, Movement, and the Sciences
October 26-28, 2022
Barcelona, Spain

Time			
10:00		TIMBRE AND MEMORY Presentation 3: Cattaneo Presentation 4: Helmlinger	IMPROVISATION Presentation 8: Schatz Presentation 9: Abramovay
10:30			
11:00		Coffe break	Coffe break
11:30		Keynote: Bernd Brabec de Mori	DANCE Pres. 10: Edwards-Fitzsimons Pres. 11: Misgeld *et al.* Presentation 12: Stepputat
12:00			
12:30			
13:00		Lunch break	Lunch break
13:30			
14:00			
14:30		Open Session	VOICE Pres. 13: Sultan von Bruseldorff Pres. 14: Velichkina *et al.*
15:00			
15:30			
16:00	Welcome	Coffe break	Coffe break
16:30	RHYTHM AND TEMPO Presentation 1: Polak Presentation 2: Jure & Rocamora	VARIA Pres. 5: Swarbrick *et al.* Pres. 6: Pearson & Manickavasakan Pres. 7: Bonini Baraldi and Viana	Closing comments Open discussion
17:00			
17:30			
18:00	Reception	Business meeting	
18:30			
19:00			
19:30			
20:00	Lecture/Concert: Marc Chemillier and Justin Vali		Dinner (Optional)
20:30			
21:00			

"Music, Health, and Wellbeing: Methods for Bridging Science and Ethnography"

Bernd Brabec de Mori

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Abstract

The study of music in the field of health and wellbeing is commonly either studied by anthropologists and ethnomusicologists when the field extends to non-modern societies, or by psychologists and social or medical scientists when it comes to modern biomedicine or music therapy. Although the latter may sometimes show interest in the field of the former, and vice versa, it is still unusual to find serious scientific studies of non-modern musical health practices or ethnographic studies of music therapy. Even less research is conducted with mixed quantitative-qualitative methods in the whole field. Based on a couple of examples in the contemporary study of musical health practices, I argue that this is due to communicative difficulties in interdisciplinary studies, especially regarding music. Both humanities and sciences have strong traditions in music studies, and traditionally often rather stand against than with each other. In order to bridge this divide, it is mainly necessary to empower – or even protect – humanities based ethnographic research as a valid complement and explanatory extension of scientific studies. Protection is needed because contemporary media coverage, public policy, and also project funding seems to favor science over humanities. On the other hand, many practitioners of music therapy or related health practices do not find access to or do not understand the methods and results of scientific studies and long for more personal, biographical, qualitative explanations about the power of music in health and wellbeing. I will end with some open suggestions for future research design in order to promote mutual acknowledgement and cooperation among humanities and science scholars.

Bio

Bernd Brabec de Mori received his M.A. (Mag. phil., 2003) and Ph.D. (Dr. phil., 2012) in musicology from the University of Vienna. He has been working for five years in the field among Indigenous People in the Peruvian lowland rainforests. After returning to Europe in 2006, he has been teaching and researching, among other institutions, at the Phonogrammarchiv of the Austrian Academy of Sciences, at the department for social and cultural anthropology at Philipps-University Marburg, at the centre for systematic musicology of Karl-Franzens-University Graz, at the institute of musicology at the University of Vienna. Currently he holds a tenure track position at the University of Innsbruck, Austria. He published a couple of books, among them *Die Lieder der Richtigen Menschen* [Songs of the Real People] (2015), *Sudamérica y sus mundos audibles* [South America and its auditory worlds] (2015), and *Auditive Wissenskulturen* [Auditory knowledge cultures] (2018), as well as research articles in the areas of Indigenous vocal music, medical ethnomusicology, sound perception, and auditory knowledge.

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## "Bi-musicality at the age of artificial intelligence"

Marc Chemillier
École des Hautes Études en Sciences Sociales

Musician, computer scientist and anthropologist, Marc Chemillier studied jazz piano as a teenager, then mathematics at ENS Fontenay-aux-roses and made a PhD thesis in computer music. As an ethnomusicologist, he worked in Central African Republic (CD *Music of the former Bandia courts* in 1995), then on the zither of Madagascar. In 2000, he created the improvisation software OMax with colleagues at IRCAM. Director of studies at EHESS in Paris, he published *Les Mathématiques naturelles* in 2008 (Odile Jacob) and continues his research on computer-assisted improvisation and its anthropological and social issues. In 2021, he published the book-CD *Artisticiel. Cyber-improvisations* with Bernard Lubat and Gérard Assayag.

Justin Vali

Justin Vali ranks among the greatest living players of traditional Malagasy music on the *valiha*, a bamboo tube zither considered the national instrument of Madagascar. He also performs on the *marovany* box zither of central and southern Madagascar. Vali contributed to several compilations in the late 1980s before beginning to release his own albums in 1990. In 1994 he recorded *Ny Marina (The Truth)* at Real World Studios under Peter Gabriel's Real World Records. In 1999 he released *The Sunshine Within*, a collaboration with Paddy Bush (brother of Kate Bush). In 2008 he collaborated with Eric Manana and other prominent Malagasy artists to record an album as the Malagasy All Stars.
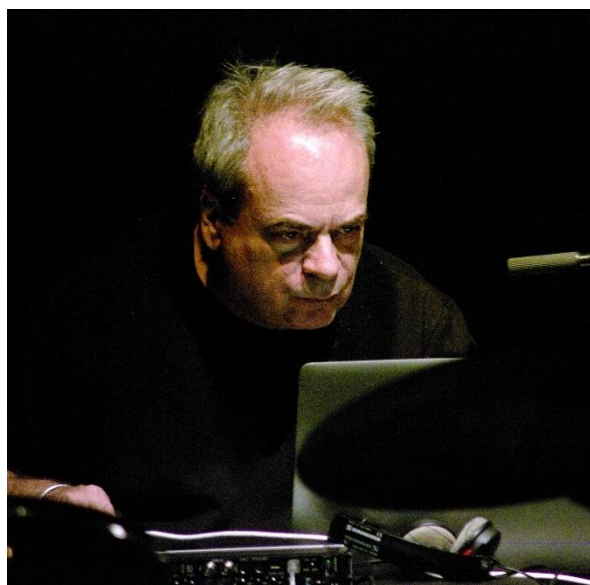
PROGRAM

RHYTHM AND TEMPO
Chair: Kendra Stepputat

Presentation 1   Oct. 26, 16:30 (online)

Rainer Polak

"Measuring tempo as a methodological approach: Case studies of West African drum ensemble music"

> The measurement of musical tempo is an approach rich in tradition in empirical musicology. A strong focus is on style-specific patterns of local variations in tempo and note durations (e.g., rubato, swing timing). Another more recent and much smaller focus is on automated data extraction and advanced computational analysis of large data sets, such as lists of tempo indications or audio recordings. Such corpus analyses deal, among other things, with statistical trends on the frequent occurrence of certain preferred tempo ranges in entire genres.

> In this talk, I describe a methodological middle ground: manual annotation by tapping along with the main pulse and simple computer-assisted analyses of beat and subdivision rates in medium-sized corpora of audio recordings, focusing on global tempo curves across whole pieces. This approach assumes a good knowledge of the annotated repertoire, as is common in ethnomusicological research. It is technically very robust, as any measurement errors are automatically corrected by creating a reverse error in the following cycle and then compensated for by using running averages. The analysis requires only the simplest calculation methods, which can be easily mastered even by humanities scholars not trained in statistics.

> The presentation describes published studies (Polak, 2017; Polak and London, 2022) of the performance practice of tempo in three different collections of field recordings of dance drumming from Mali and Ghana. This approach allows important insights into the psychological mechanisms of tempo perception, e.g. the important role played by the fastest pulse in addition to the often exclusively prioritized main pulse (tactus rate), as well as into the genre-specific generation and meanings of musical form. The presentation pleads for greater attention to the dimension of tempo in music research and illustrates that, contrary to widespread reservations, the integration of ethnographic and quantitative perspectives can sometimes—depending on research interest and choice of methods—be achieved quite easily.

Keywords: tempo, meter, form, Mali, Ghana, dance drumming

References:

Polak, R. (2017). The lower limit for meter in dance drumming from West Africa. Empirical Musicology Review.

Polak, R., & London, J. (2022). Tempo, meter, and form: An analysis of "Dansa" from Mali. In L. Shuster, S. Mukherji, & N. Dinnerstein (Eds.), *Trends in World Music Analysis*. Routledge.

Presentation 2   Oct. 26, 17:00

Luis Jure and Martín Rocamora
"Documentation and analysis of Uruguayan candombe drumming"

The purpose of this research is to document and analyze different aspects of candombe drumming, one of the most defining features of Uruguayan traditional culture and symbol of the identity of communities of African descent in Montevideo. While its cyclic, timeline–based rhythm shares many characteristics with other musics of the Afro–Atlantic world, candombe also exhibits several unique and distinctive traits. Internationally less known than other Latin American musics of African origin (such as Afro–Cuban or Afro–Brazilian), candombe drumming possesses a considerable rhythmic wealth and deserves wider recognition. In acknowledgement of its rich history and cultural value, in 2009 it was inscribed on the Representative List of the Intangible Cultural Heritage of Humanity by UNESCO.

Within the framework of the project, a valuable collection of audio and video recordings has been assembled, spanning more than 30 years of both field and studio recordings. The collection comprises audio—stereo and multitrack—as well as video recordings, documenting many of the most distinguished players in the community. Part of the collection is available for researchers working in this field.

Computational tools using techniques of Digital Signal Processing, Music Information Retrieval and Machine Learning have been applied to audio—and in some cases, also video—recordings, both for automatic analysis and for data extraction and visualization in computer aided analysis. A Python toolbox for rhythm analysis has been released and is under continued development, providing a set of ready–to–use tools for computer assisted rhythm analysis from audio recordings. The toolbox has also been applied to other corpora of percussion music of the Afro–Atlantic tradition, such as Afro–Brazilian samba.

The main lines of research pursued so far include the analysis of the most characteristic rhythmic patterns of the three drums, analysis of microtiming, and aspects of musical entrainment and the leader–follower relationship within the ensemble.

Keywords: Candombe; Rhythm analysis; Computational musicology; Afro-Atlantic music; Microtiming

TIMBRE AND ERGONOMY
Chair: Dana Swarbrick

Presentation 3   Oct. 27, 10:00 (online)

Massimo Cattaneo
"Mimicking timbre. Identifying gestural patterns and sonic similarities in flamenco flautists and singers"

This paper explores the multi-modality of timbre in flamenco flute performance. Although timbre is a fundamental element in the flamenco experience, it is still under researched both from within flamenco studies and from the discipline of ethnomusicology. Natively, in flamenco timbre is often understood to be a repository of meaning, affect, and a sonic expression of ethnicity and identity. This paper expands on my doctoral research on flamenco flute (2020) and analyses a set of gestures employed by flamenco flautists in the production of certain characteristic flamenco timbres. I will compare videos from flamenco singers and flamenco flute players identifying how the gestures employed in singing performances are mimicked by flamenco flautists in the process of timbral emulation. Such comparison will enable me to assert whether native flamenco timbres and the culture-specific metaphors and meanings associated with them are the result of a holistic embodied experience that transcends the mere acoustic dimension. This paper will also draw from my recent fieldwork experience as an online student of flamenco flute. As such, it will also explore the hybrid pedagogies that have been developed in recent years. In particular, I will analyse how the consolidation of remote online lessons, brought about by the COVID-19 pandemic, has contributed to integrate a cross-modal methodology of transmission of flamenco flute playing. I will explore how the new virtual classroom environment has facilitated the transmission of native gestures for the production of 'authentic' flamenco sounds. This will allow me to evaluate on the one hand, to what degree gesture is utilised as an integral element of sound production and timbral emulation in flamenco and, on the other, how movement is a fundamental part of the musician's 'competence' and interaction (Brinner 1995) and of the ongoing process of indigenisation of the instrument in the tradition (Tucker 2016).

Keywords: Timbre; Gesture; Flamenco; Flute; Embodiment

Presentation 4   Oct. 27, 10:30

Aurélie Helmlinger
"Memorisation of repertoire in Trinidad & Tobago steelbands: a cognitive approach"

This presentation will focus on the quick memorisation abilities shown by the players of steelpan, Trinidad and Tobago's famous melodic idiophone made of one to twelve second hand oil drums. This instrument, invented at carnival

festivities of the late 30's to 40s and later consecrated "National Instrument of Trinidad & Tobago", has been institutionalized through the creation of various national competitions. In the "Panorama" indeed −the largest musical event for steelbands where orchestras of up to a hundred players compete through a challenging music contest− seasonal players, playing about one month a year, and sometime even beginners, are able to memorize and perform by rote a symphonic-like tune, with a lot of technical constraints, at an extremely fast tempo. Without the help of score sheets or the use of variation, they hold at the same time constraints from written and oral traditions.

Crossing classical anthropological approach and background (participant observation) with the input of a cognitive sciences - oriented bibliography and methodology, I'll propose a comprehensive analysis of the way these non professional musicians retain the music in a challenging context. Several hypotheses will be presented, supported both by fieldwork observations and cognitive psychology bibliography. The memory of songs, the visuo-spatial memory and mental images, and an implicit understanding of the intervals on the instruments. Another hypothesis, the help of the feeling of other players' simultaneous performance, has been tested by an experiment inspired by cognitive psychology, and has been able to show a positive influence of the group on individual memory.

Keywords: cognition; memory; mental images; experiment; collective performance

References:

Dudley, S. (2008). *Music from Behind the Bridge: Steelband Spirit and Politics in Trinidad and Tobago* (illustrated edition). New York: Oxford University Press Inc.

Helmlinger, A. (2012). *Pan Jumbie. Mémoire sociale et musicale dans les steelbands (Trinidad et Tobago)*. Nanterre: Société d'Ethnologie.

Stuempfle, S. (1995). *The Steelband Movement: The Forging of a National Art in Trinidad and Tobago*. Philadelphia: University of Pennsylvania Press

VARIA
Chair: Aurélie Helmlinger

Presentation 5   Oct. 27, 16:30

Dana Swarbrick, Fernando Rosas and Jonna Vuoskoski
"Collectively Classical: Social Connection at a Classical Concert"

Concerts are fundamentally social experiences in which an audience and musicians gather to witness and create an aesthetic experience. Live concerts are important sociocultural events that normally involve gathering at the same

time and in the same space. In livestreamed virtual concerts, participants may gather in time, but not in space, providing a manipulation for studying concert experiences. Our previous research indicated that livestreamed concerts can promote more social connectedness and reduce loneliness more than pre-recorded concerts. Additionally, live, in-person concerts promote more movement than listening to recorded music in a group. However, to the best of our knowledge, a comparison between live and virtual concerts and their effects on motion and emotion has not yet been conducted.

The Danish String Quartet is an acclaimed classical music group who performed a concert to both live and livestreaming audiences. Audience members were invited to participate by downloading a smartphone application that records motion with their smartphones' inertial measurement unit sensors. Surveys collected information on participants' experience of the music, social connectedness, and the sociorelational emotion of feeling moved before the concert and after each piece.

Survey responses were collected from 91 participants in the live audience and 67 participants in the livestreaming audience. Motion data was collected from 79 participants in the live audience and 34 from the livestreaming audience. While analyses are ongoing, preliminary results of the questionnaire data revealed that although the live audience felt more connected to other audience members than the virtual audience, both live and virtual audience members felt equally connected to the performers.

This research contributes to ethnomusicology by reinforcing the importance of the social nature of musical experiences. Greater understanding of the ways in which concerts influence social connection could help illuminate interventions for reducing loneliness and improving well-being.

Keywords: concerts; live; livestreamed; virtual; classical music; motion; movement social connection; feeling moved

Presentation 6   Oct. 27, 17:00

Lara Pearson and Brindha Manickavasakan
"Melodic concepts in Karṇāṭaka Saṅgīta: their application in a computational musicology project"

In Karṇāṭak music (Karṇāṭaka Saṅgīta), rāgas (melodic frameworks) are defined in part by their characteristic phrases, known as piḍis. However, there exists no definitive list of such phrases in music theory texts. Instead musicians assimilate them gradually with the guidance of their teacher, through experience of the repertoire and of listening to other musicians. As a result there can be a degree of subjectivity regarding whether any given phrase is indeed a piḍi. In this paper, we explore the concept of characteristic phrase/piḍi, alongside associated melodic ideas such as sañcāra and meṭṭu, with reference to their application in a

computational musicology project. The project relates to the Saraga open dataset (Srinivasamurthy et al. 2021), which includes a collection of Karṇāṭak music concert recordings and accompanying annotations. Current work on this dataset includes refining the annotation system and developing automated motif-finding tools. By exploring the subtleties of Karṇāṭak melodic concepts, we aim to consider how the motif search and dataset annotation can be made optimally useful to musicologists. Furthermore, in light of the Karṇāṭak concepts discussed, we reflect on issues of segmentation (what are the borders of a particular phrase/sañcāra?) and similarity (is this the same phrase/sañcāra?) that commonly arise in annotating music (Volk & Van Kranenburg 2012).

The emic perspective in this paper is based on the expertise and lived experience of one of the authors who is a Karṇāṭak vocalist and musicologist, based in Chennai. In addition, we draw on Indian music theory texts in which the melodic concepts are presented (e.g., Viswanathan 1977).

Keywords: South Indian music; Music analysis; Computational musicology; Rāga

References:

Srinivasamurthy, A., Gulati, S., Caro Repetto, R., & Serra, X. (2021). Saraga: Open Datasets for Research on Indian Art Music. Empirical Musicology Review, 16(1), 85-98.

Viswanathan, T. (1977). The analysis of rāga ālāpana in South Indian music. Asian Music, 9(1), 13-71.

Volk, A., & Van Kranenburg, P. (2012). Melodic similarity among folk songs: An annotation study on similarity-based categorization in music. Musicae Scientiae, 16(3), 317-339.

Presentation 7   Oct. 27, 17:30

Filippo Bonini Baraldi and Paula Viana
"An interactive animation for the study of Maracatu-de-baque-solto (Brazil) collective choreographies"

Maracatu *rural* or *de baque solto* (rural-style or free-beat) is a Carnival performance-ritual occurring in the Zona da Mata Norte region of Pernambuco state (Brazil). Maracatu sounds and movements, when executed "in consonance" (*consonância*) - i.e., in a highly coordinated way - are supposed to "close" (*fechar*) the performers' bodies, protecting them from illness. Conversely, a non-coordinated musical or kinetic action produces "holes" (*furos*) that may "fracture" (*desmantelar*) the group, exposing its members to any kind of health problems.

Beside exploring the concepts of "closure" and "consonance" from an anthropological perspective, my aim is to "translate" them on the formal level of music and dance analysis. When are the dancers' collective movements actually

"in consonance"? The video recordings obtained during field research, on their own, do not fully allow to address these issues. Indeed, a Maracatu performance is a complex musical and choreographic scene to analyze: it involves up to 200 dancers, may last many hours, and comprises various types of superposed actions.

In the framework of the collective project "The Healing and Emotional Power of Music and Dance" (HELP-MD), we developed a prototype computer simulation which helps to illustrate how different members of a Maracatu group move in space and produce various types of complex collective choreographies. Presenting this new, "artificial" audio-visual material to the performers themselves should help to translate the concepts of "closure" and "consonance" in the domain of sound and movement analysis.

Keywords: computer interface, aesthetic values, dance, collective choreographies

IMPROVISATION
Chair: Lara Pearson

Presentation 8   Oct. 28, 10:00

Kurt Rudolf Schatz
"Grammatical Synthesis of Kendang Tunggal: Computer-Aided Ethnography of Improvisatory Balinese Solo Drumming"

Balinese drummers often compare the improvised rhythmic patterns of Balinese kendang tunggal solo drumming to sentences in spoken language (Sudirana 2018, Suweca 2021). Stock rhythmic "words" and phrases are combined and permuted in myriad ways to form the individual sentences and larger grammatical constructs of a language of improvised Balinese drumming.

This paper introduces an empirical method for analyzing how kendang tunggal patterns are constructed as sentences through improvisatory solo drumming. I propose a computational approach comprising the development of a program capable of automatically recording, transcribing, analyzing, and generating such drumming patterns, as performed by master Balinese drummers, with the algorithm based on my experiences studying with these drummers. Through its creation of algorithmically generated patterns from actual drummed patterns, the program becomes a research tool for analytical discourse with my interlocutors. Here, I will outline a method for discursively engaging with these musicians around their feedback on the computer-generated patterns. Their assessments of the quality and appropriateness of these patterns will initiate a continuing research process of transforming the algorithm toward a "generative grammar" of the kendang tunggal art. The ultimate goal is to unravel the fundamental rules of this pattern-based mode of improvisation, gaining insights into what may be

called an alphabet (smallest meaningful units) of kendang tunggal and the grammatical framework that is applied when creating such patterns. The possibilities and limits of such an ethnographically informed, recursive computational analysis through synthesis will be discussed. Results, findings, and experiences gained from conducting computer-aided ethnography with several master Balinese drummers over a period of nine months serve as the basis for the discussion.

Keywords: Balinese Performing Arts; Kendang tunggal; Improvisation; Computer-Aided Ethnography

Presentation 9   Oct. 28, 10:30 (online)
Juliano Abramovay
"Exploring taksim improvisation: the challenges of analysing 'free-rhythm' music"

Taksim improvisations are an essential part of musical practices within different traditions connected with Makam music. Although the importance of taksim has been observed in the literature, musical analyses of the phenomenon were hindered due to its 'free-rhythm' features ('free-rhythm' is used here in the sense that no metric framework seem to be present in its performance). Existing literature suggests that its 'free rhythm' character is intentional and responsible for the expressive features of these practices, urging for an effort to reveal its rhythmical practices.

This paper will discuss a new methodological proposition for analysing rhythmical aspects of taksim improvisations. This methodology is based on the combination of the following features: (a) Qualitative analysis; using Chrystopher Hasty's (1996) and John Rodher's (2019) terminology, rhythmical procedures observed in taksims are catalogued into different types of 'projectional durations'. (b) Computational analysis; recording of taksim are segmented into small phrases, which are then analysed according to its periodicity measures obtained through FFT, Wavelet analyses and a manual rating of a "periodicity score". And finally, (c) collaborative analysis, in which musicians and scholars are included in the analytical process, seeking to understand stylistic changes between different generations of musicians. This paper will focus on discussions conducted during the fieldwork with musicians and scholars from Greece and Turkey. The propositions presented in the paper leads to the production of a typology of rhythmical procedures that characterise 'free rhythm' within taksim improvisations, providing a methodology with the potential to be used in other genres of music with this characteristic.

Keywords: Rhythm Analysis, Taksim, Classical Ottoman Music, Improvisation

DANCE
Chair: Kurt Rudolf Schatz

Presentation 10   Oct. 28, 11:30 (online)

Niall Edwards-Fitzsimons
"Kekompakan: synchronization and solidarity in Acehnese sitting dances"

From traditional origins in coastal Aceh and the Gayo highlands, Acehnese sitting dances have exploded in popularity and acclaim, spreading to schools, universities, embassies, and festival stages across Indonesia and the world. They require intense rhythmic co-ordination between participants, who synchronize singing, body percussion, and dance movements to create a powerful impression of 'moving with one body.' Kekompakan, translated as compactness, solidarity, or harmony, is described as an important value expressed by these dances, and achieving kekompakan—keeping movements precisely in time and with the same affect and level of energy—is said to contribute to feelings of togetherness in participants.

This paper will share findings from my doctoral research which centers the embodied experiential and traditional knowledge of these "dancer-musicians," using ethnography to explore issues which have mainly been examined using cognitive sciences methodologies. Scholars working in disciplines such as psychology, neuroscience, and behavioral biology have identified a pro-social effect of mutually synchronized, i.e., entrained, rhythmic movement, which may underpin the benefits to group cohesion many argue are conferred by shared musical activity. Others have urged that the entrainment concept be investigated ethnographically. The resonance between the concept of kekompakan and the aforementioned theories suggests that this facet of the discourse around Acehnese sitting dances holds valuable insights.

While pursuing this research I conducted participant-observation with an Indonesian dance group in Sydney, Australia, and interviews with over 90 dancers, teachers, and students across Aceh, in Jakarta, and in Sydney and Melbourne. This 'multi-site' ethnographic project gathered testimony describing personal experiences of rehearsing, teaching, and performing these dances, generating insights into the psychological moment of group mutual entrainment. This paper will present emic understandings of synchronized rhythmic movement and describe links with empirical research that help to illuminate how such practices relate to cohesion on inter-personal, regional, and national scales.

Keywords: entrainment; ethnography; Aceh; Indonesia; rhythmic synchronization; body percussion; dance; social cohesion

Presentation 11   Oct. 28, 12:00 (online)

Olof Misgeld, Hans Lindetorp, Sven Ahlbäck and Andre Holzapfel
"Exploring sonification as a tool for folk music-dance interactions"

In this paper we present ongoing work on the sonification of movements by dancers and players in Swedish folk music, with the aim to develop oral music theory tools for artistic and pedagogical purposes.

An advantage of using sonification in the exploration of dance and music interaction is that it places dance movements within the same sensory domain as music - sound. In general, human beings are more accurate in perceiving time differences with auditory than visual stimuli, and the ability to listen to the dance movements can facilitate a more precise understanding of the complex temporal relations between movements and music. Sonifying dance movements extend traditional music and dance practices into an artificially created sonic world. With sounding dance movements, the roles in the interaction of dancers and musicians become entangled, which can allow new ways of artistic expression.

This work aims at sonifying movement patterns in the dance in ways that 1) correspond to the embodied experience of the performers, 2) make the experience of how rhythms and meter interact in dancing and playing more tangible and, 3) allow for artistic explorations of performing with sonifications of dance.

As a first step we explore sonifying motion capture data of dancers and musicians performing together and sonify movements that are relevant to the rhythmic and metrical patterns of the music and dance forms. This initial focus on recorded data facilitates a sound design that involves first-person perspectives. To this end, we invite expert dancers and musicians to contribute to the design process. We sonify using WebaudioXML to facilitate accessible interactions in this process, through a web interface, and we will present the insights from our ongoing design process. In future extensions we aim to explore using real-time sensors to allow live interactions between sonified dancers and musicians.

Keywords: folk music; folk dance; sonification; motion capture; music theory

Presentation 12   Oct. 28, 12:30

Kendra Stepputat
"Why they don't step on each other's toes: Motion capture analysis of tango argentino backsteps"

Tango argentino is an improvised couple dance, where one person in the couple takes on the role of a leader, the other that of a follower. Both move together making use of a common, learned movement repertoire. This allows them to dance with any other person similarly trained, creating new dance experiences every time.

One of the basic tango argentino movement rules is that the couple progresses counter-clockwise on the dancefloor, the leader walking mostly forwards, the follower backwards. Because both dancers walk in close proximity, their steps overlap in space; where seconds ago the follower's foot was situated, now the leader's foot is headed. For beginner dancers, this is a great challenge to tackle. Hence, stepping on each other's toes is part of the tango argentino learning process.

In this presentation, I will demonstrate the mechanics of the tango backstep in detail, with a focus on how experienced dancers actively avoid collisions of their moving legs. I base my insights on my own dance experiences as both leader and follower in tango argentino, supported by a motion capture analysis of professional tango dancers' backsteps.

Keywords: tango argentine; motion capture; dance training; step analysis; backstep

VOICE
Chair: Luis Jure

Presentation 13   Oct. 28, 14:30 (online)

Alexandria Sultan von Bruseldorff
"Mugham Singers Vocal Sound and Voice Health and Wellbeing"

Built upon the various schooling traditions of the ancient cities of Azerbaijan, and performed as an improvisatory process vocal-instrumental mugham is an important branch of modally-based Azerbaijani musical tradition. The important component of the performing process is the vocal sound itself. The vocal craftsmanship is revealed when the singer demonstrates the ability to tailor specific improvisatory elements, rhythmic ornamentations, musical fragments, poetic variations, and compositional elements into a musically connected improvisatory presentation that is transmitted through the extraordinary range of the singer's voice. As a result of hard voice training and frequent concert schedules, mugham singers' voices have no rest and are subjected to wear and tear. This overview discusses science-based approaches that are being applied in studies of the first time ever, pilot doctoral research entitled "Research on acoustic and physiological properties of the vocal apparatus of mugham performers (khanende)" that is currently being conducted at the Azerbaijan National Conservatory under the advisory supervision of several medical and acoustic consultants including Dr. Jürgen Hennig (Germany), Dr. Johan Sundberg (Sweden), and specialists from Azerbaijan. The research takes its roots from the master's degree dissertation carried out for the first time in the field of vocal pedagogy and voice science worldwide in 2009. The task is to determine the mode of phonation and objectively establish in which vocal mode mugham is

performed. This topic also presents the overview on the research of the first time ever real-time magnetic resonance imaging (MRI) of the vocal tract of Azerbaijani mugham singers while singing mugham of the aforementioned topic and the discussion exploring vocal acoustic properties of mugham singers, the vocal sound production that was observed with the use of the endoscopy and fibrostroboscopy under the supervision of the ENT doctors, including the issues on the vocal hygienes and vocal health of mugham singers.

Keywords: Azerbaijani khanende; mugham; real-time magnetic resonance imaging (MRI); physiological and acoustical research; voice larynx; breath techniques; vocal tract; vocal hygiene; vocal health

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Presentation 14   Oct. 28, 15:00 (online)

Olga Velichkina, Yulia Nikolaenko, Elizabeth Phillips, Gabriel Zuckerberg, Miranda Crowdus, Zhaoxin Yu, Yukun Li, Yuto Ozaki, Chiba Gakuto, Patrick Savage, Ieva Tihovska, Zane Šmite, Yannick Wey, Lawrence Shuster, David Shugalishvili, Nana Mzhavanadze, Teona Rukhadze, Anastasiia Mazurenko, Frank Scherbaum, Andrew Killick, John McBride and Polina Proutskova

"The VocalNotes project – Investigating (dis)agreement among expert transcribers in different cultures"

What is a note in vocal music? In a score notation, a note is defined by its onset, pitch and duration. Whereas a temporal f0 visualisation of an instrumental performance usually consists of well-defined segments corresponding to notes in the score, for vocals no segmentation can be derived from the f0 trace (Fig. 1). Vocal pitch is usually continuous and unstable, due to voice characteristics such as vibrato, glides, embellishments [1]. It seems our vocal instrument is less precise than other musical instruments [2, 3, 4].

How then do we make sense of vocal performances? How do we perceptually segment a vocal audio stream into more-or-less discrete bits we call notes? How do we assign them to categories like pitch classes?

Our approach is to qualitatively and quantitatively examine disagreements between expert transcribers: rather than being errors, disagreements between experts are most likely a consequence of perceptual differences resulting from the above processes.

We developed the methodology in a pilot study of Russian traditional vocal music [5, 6, 7]: experts in a given vocal tradition independently transcribe real-life performances using the Tony software [8] which does not constrain the note pitches to equal temperament and does not force the note onsets into a metrical structure (Fig. 2).

In the VocalNotes project, this methodology is extended to eight teams lead by ethnomusicologists: Chinese, Japanese, Jewish, Latvian, Alpine yodel, Georgian, Ukrainian, Russian.

The first phase of the VocalNotes project will be dedicated to independent expert transcriptions within the teams and to a cross-cultural synthesis of the musical contexts in which disagreements among transcribers occur. The second phase will investigate how expertise in a given culture affects transcription. In the third phase we will study the relationship between human and machine transcription and provide insights for automated methods [9, 10]. Phase VI will see us annotating descriptive scales in vocal performances [11]. The dataset including the audio fragments and annotations created in the project will be published for replication and for follow-up and new research.

This is ongoing research, with Phase I planned to conclude in June 2022. Our panel will present the current state of the project.

Keywords: vocal; music; transcription; cross-cultural; perception; dataset

OPEN SESSION   Oct 27, 14:30

ONLY IN PRESENCE, NOT STREAMED ON-LINE.

This session is intended as a moment to share and discuss, in a more informal environment, ongoing and future research projects (of course related to the SoMoS themes). Like in a poster session, participants will be free to move in the room and meet the participants who want to share their ideas, data, doubts, etc.

Aurélie Helmlinger
"The spread of steelpan layouts: a comprehensive study of ergonomic choices"

Séraphin Costa, Dominique Costa, Mikhail Malt, Marc Chemillier and Gérard Assayag
"Machine-man Co-improvisation: Incursion of DJazz in Flamenco"

Lara Pearson
"Some recently developed open source tools for 3d motion tracking from video"

Sonja Graf
"In-group expansion: Prosocial effects of intergroup dancing and the mediating role of oxytocin"