ICSC 2024
7th INTERNATIONAL CSOUND CONFERENCE

September 17th - September 20th 2024
Vienna, Austria

BOOK OF ABSTRACTS

Stadt Wien

DEPARTMENT OF
MUSIC ACOUSTICS
WIENER KLANGSTIL | IWK

mdw
university
of music and
performing
arts vienna

LOCATION

mdw – University of Music and Performing Arts Vienna
Anton-von-Webern-Platz 1, 1030 Vienna, Austria
Klangtheater (Sound Theater), Future Art Lab
Conference room AW K0101
Conference room AW M0107

COFFEE BREAKS

Coffee breaks will take place next to the conference rooms K0101/M0107.

LUNCH BREAKS

Please note that lunch breaks are not included, and each person will be responsible for their own meal expenses. There is a cafeteria on the university campus, but there are also several restaurants near the university.

WELCOME DINNER

The welcome dinner takes place on Tuesday evening (19:00 – 22:00) in the Winery *Heuriger 10er Marie* (Ottakringer Straße 222-224, 1160 Vienna), see page 1.

INTERNET ACCESS

Network: mdw-guest
Username: ICSC2024
Password: Mdw2024!!

CONFERENCE WEBSITE

https://www.mdw.ac.at/icsc2024/

Preface

The Rectorate of the mdw – University of Music and Performing Arts Vienna is glad to welcome the global Csound community to the 7th International Csound Conference at our university. The four-day conference on computer music brings together a diverse group of artists, academics, and Open-Source software developers. The goal of the conference is to foster a productive dialogue between Csound users, such as composers, performers and music students, and Csound developers, encouraging innovation and collaboration in the domains of electroacoustic music and computer music research.

The Department of Music Acoustics – Wiener Klangstil is an internationally recognized transdisciplinary research and education centre. It is renowned for its commitment to bridge the gap between scientific research and artistic practice, contributing to the advancement of both fields.

On behalf of the Rectorate, I warmly invite all attendees of the conference to the evening concerts, which will take place in the *Klangtheater* at mdw's *Future Art Lab*. These concerts promise to be one of the highlights of the conference, showcasing innovative performances and the latest advancements in computer music and live-electronics.

I'm convinced that the 7th International Csound Conference will provide you with valuable insights and inspiration for future research directions and I wish you stimulating discussions and a good time at the mdw.

Mag.ᵃ Ulrike Sych

Rector

PROGRAM:
7TH INTERNATIONAL CSOUND CONFERENCE

TUESDAY, September 17th

15:00-16:30 Session 1A: Registration + Installation Session (Ballerini, et al.)

LOCATION: Klangtheater – AW VU149

15:00 *Lorenzo Ballerini*, *Giuseppe Ernandez* and *Massimo Reina*
Web Box - Trans-interactive installation for physical and web environments

15:00-16:30 Session 1B: Registration + Installation Session (Grund)

LOCATION: Klangtheater – AW VU149

15:00 *Tim-Tarek Grund*
Polyomino Interface for Pitch Lattices

16:30-17:30 Session 2: Keynote Concert

LOCATION: Klangtheater – AW VU149
HOST: *Alex Hofmann*

16:30 Welcoming Words: Magª Ulrike Sych, Rector of the mdw
Univ.-Prof. Dr.phil. Werner Goebl, Head of the Department of Music
Acoustics – Wiener Klangstil

16:45 *Victor Lazzarini*
Frippertronics

19:00-22:00 Welcome dinner
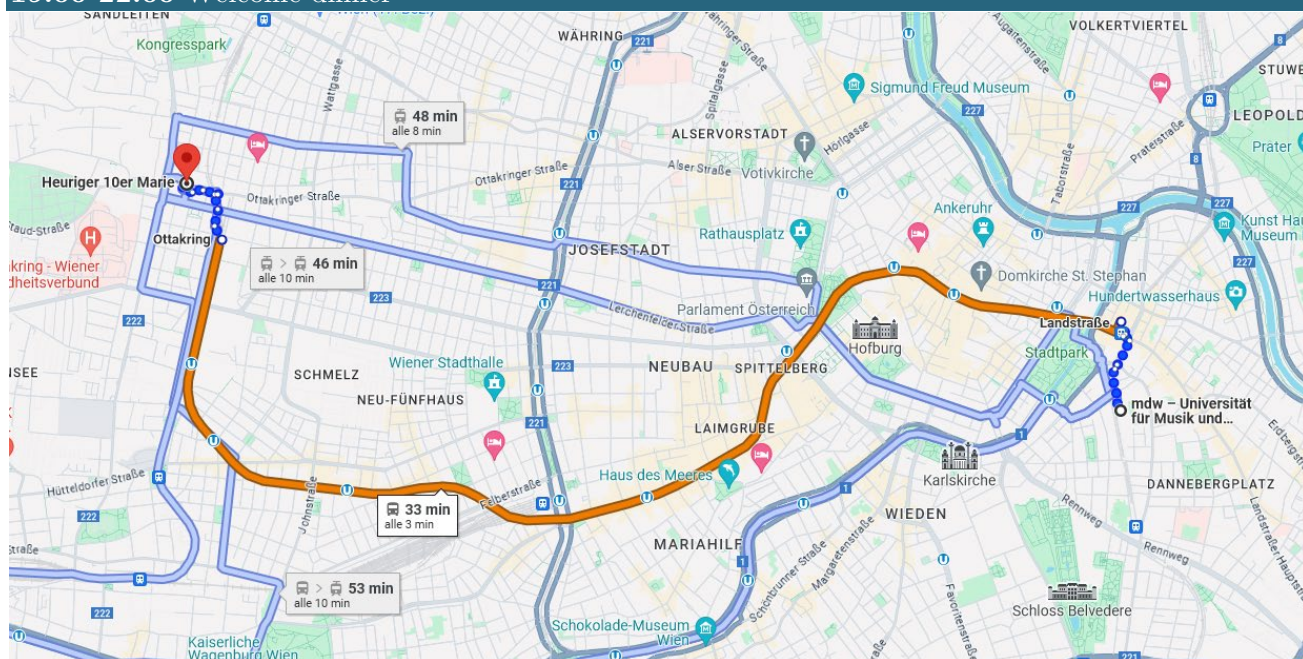
Walk to the metro station Landstraße (Wien Mitte) and take the metro U3 until the
metro station Ottakring. The Winery *Heuriger 10er Marie* is located in
Ottakringer Straße 222-224, 1160, Vienna.
Duration: about 35 minutes.

WEDNESDAY, September 18th

08:30 Registration opens

LOCATION: AW K0101

09:00-10:40 Session 3: Sound Synthesis and Web Apps

LOCATION: AW K0101
CHAIR: *Tarmo Johannes*

09:00 *Richard Boulanger* and *John Ffitch*
Playing Csound Duets on the Web: How Compositional & Performance Goals Lead to Coding and Design Solutions

09:20 *Øyvind Brandtsegg* and *Victor Lazzarini*
Frequency Modulation with Feedback in Granular Synthesis

09:40 *Joachim Heintz*
Creating Organic Generative Structures in Csound

10:00 *Lorenzo Ballerini* and *Giuseppe Ernandez*
The Internet of Sound

10:20 *Michael Gogins*
cloud-5: A System for Composing and Publishing Cloud Music

10:40-11:00 Coffee Break – AW K0101

10:40-11:00 Session 4: Installation Session (Jagwani and Lazzarini)

LOCATION: AW K0101

10:40 *Aman Jagwani* and *Victor Lazzarini*
Csound-FPGA Integration

11:00-12:00 Session 5: Keynote Talk

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

11:00 *Steven Yi*
Living Csound

12:00-13:30 Lunch Break

13:30-15:10 Session 6: GUIs and skills in Live-electronics

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

13:30 *Rory Walsh*
Cabbage is dead, long live Cabbage!

13:50 *Raul Vasile Drăgan*
A tracker based Csound frontend software for musicians

14:10 *Gianni Della Vittoria*
Envelope Shaper GUI for Complex Curves in Csound

14:30   *Jacopo Greco D'Alceo*

Cordelia, crafting a method while live coding in Csound

14:50   *Seokyeong Kim*

Csound Live Coding with Multiple Clients

15:10-15:30 Coffee Break – AW K0101

15:30-17:00 Session 7: Roundtable

LOCATION: AW K0101

15:30   *Joachim Heintz* and *Alex Hofmann*

Future developments in Csound and its community

17:00-17:30 Coffee Break/Fingerfood – AW M 0107

17:00-17:30 Session 8: Installation Session (Boulanger)

LOCATION: AW M0107

17:00   *Richard Boulanger*

Csound in the MetaVerse: CsoundUnity at Berklee

17:30-19:15 Session 9: Concert + Installation Session (Grund; Ballerini, et al.)

LOCATION: Klangtheater – AW VU149

HOST: *Dustin Zorn*

- *Joachim Heintz*
  ATT...   **1'49"**
- *Marijana Janevska*
  Silence(d)   **6'40"**
- *Leon Speicher*
  Solar   **5'00"**
- *Arsalan Abedian*
  Cstück Nr. 2 (2015)   **5'03"**
- *Oscar Pablo Di Liscia*
  Three words by Alejandra   **6'44"**
- *Jan Jacob Hofmann*
  Oscillation Of Life (world première)   **10'44"**   BREAK
- *Serkan Sevilgen*
  Gendy Cloud   **8'00"**
- *Bethanie Liu*
  Traverse: For Recorder and Electronics   **8'26"**
- *Shane Byrne*
  Caibleadh   **7'54"**
- *Clemens von Reusner*
  REEHD   **7'11"**
- *John Ffitch* and *Richard Boulanger*
  Eleven Questions (2024)   **8'00"**

THURSDAY, September 19th

09:20-10:20 Session 10: Csound Expansion

09:20 *Parham Izadyar*, *Amin Khoshsabk* and *Ghazale Moqanaki*
Csound Journey in Iran

09:40 *Brian Carty* and *Thom McDonnell*
Using SOFA HRTF Files with Csound Binaural Opcodes

10:00 *Aman Jagwani* and *Victor Lazzarini*
Bare-metal Csound

10:20-10:40 GROUP PHOTO 📷

10:40-11:00 Coffee Break – AW K0101

10:40-11:00 Session 11: Installation Session (Heintz)

10:40 *Joachim Heintz*
FERNNAH – Reading and Sound

11:00-12:00 Session 12: Keynote Talk

11:00 *Pierre-Alexandre Tremblay*
Why bother? The value(s) of an interface

12:00-13:30 Lunch Break

13:30-17:30 Session 13: Workshop

13:30 *Steven Yi*
Developing Csound

17:30-18:00 Coffee Break/Fingerfood + Installation Session (Boulanger) – AW M0107

18:00-19:45 Session 14: Concert + Installation Session (Grund; Ballerini, et al.)

- *Patrick Dunne*
  Decay   1'34''

- *Roberto Doati*
  Studio VII   7'00''

- *Mark Ferguson*
  Woodland Understorey 4'38"
- *Tarmo Johannes*
  "Franz Strauss – Five Etudes" (2021)
  for natural horn and electronics 7'30"
- *Jean-Basile Sosa*
  A fashionable nightclub 11'00" BREAK
- *Jinhao Han*
  Sievert 7'35"
- *Michael Gogins*
  2024-ICSC (4) 6'10"
- *Fernando Egido*
  Three Chants for Computer 11'15"

FRIDAY, September 20th

09:20-10:40 Session 15: Integrated Csound 1

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

09:20 *Ken Kobayashi*
Exploring the Expressive VR performance of Csound Instruments in Unity

09:40 *Xiaomeng Zhong*
Exploring Interactive Composition Techniques with CsoundUnity and Unit

10:00 *Strong Bear* and *Richard Boulanger*
Csound in the MetaVerse – From Cabbage to CsoundUnity and Beyond:
Developing a Working Environment for SoundScapes, SoundCollages, and
Collaborative SoundPlay
PRESENTER: *Richard Boulanger*

10:20 *Bethanie Liu*
Face Tracking with CsoundUnity: Converting Smiles into Sounds

10:40-11:00 Coffee Break + Installation Session (Heintz) – AW K0101

11:00-12:00 Session 16: Integrated Csound 2

LOCATION: AW K0101
CHAIR: *Giovanni Bedetti*

11:00 *Francesco Vitucci*, *Giuseppe Silvi*, *Daniele Giuseppe Annese*, *Francesco Scagliola* and
Anthony Di Furia
Opening mind by opening architecture: analysis strategies

11:20   *Albert Madrenys Planas*

Integrating Csound into Unreal Engine for Enhanced Game Audio

11:40   *Hans Pelleboer*

The advantages of multi-dimensional interfaces for the future of csound

12:00-14:00 Lunch Break

14:00-15:00 Session 17: Concert

LOCATION: Klangtheater – AW VU149
HOST: *Alex Hofmann*

- *Richard Boulanger*

  CsoundScapes in the MetaVerse (2024)

- *Anthony Di Furia*

  Female Child System – Imprisonment

- *Antonio Scarcia*

  Ordinary Rehearsals

- *Juan Escudero*

  WS Gluing Map

- *Jon Christopher Nelson*

  Ripples in the Fabric of Space-Time

15:00-15:45 Closing Ceremony

LOCATION: Klangtheater – AW VU149

ABSTRACTS AND PROGRAM NOTES: 7TH INTERNATIONAL CSOUND CONFERENCE

TUESDAY, SEPTEMBER 17TH

15:00-16:30 Session 1A:
Registration + Installation Session

LOCATION: Klangtheater – AW VU149

15:00

Lorenzo Ballerini, *Giuseppe Ernandez* and *Massimo Reina*

Web Box - Trans-interactive installation for physical and web environments

In our society, an illusory freedom conceals pervasive surveillance, with socioeconomic mechanisms monitoring our actions and subtly guiding our behavior. This control is exerted through advanced computer systems, especially the Web, which functions as a complex device integrating linguistic and nonlinguistic elements, regulations, and institutions to maintain capitalist power dynamics. This installation challenges the digital control system by interweaving the real and virtual worlds. At the center of the exhibition is a glowing, resonant black box, a monolithic symbol of mystery and hidden knowledge. This monolith, an archetype of the digital deity, emanates its own light and sound by absorbing and interpreting data from a dedicated web page, accessible via a QR code, allowing visitors to interact with its virtual counterpart. In turn, the monolith reacts by altering the screens of smartphones connected to the webpage, highlighting the often invisible processes of digital surveillance and social manipulation.

Through this interaction, the installation reveals how simple actions generate information streams, highlighting the pervasive and opaque nature of digital control in contemporary society.

By exploring Csound and its Web engine, we want to offer a trans-interactive experience that evokes awe and unease, prompting reflection on the influence of the digital world on our real relationships.

The monolith and its digital black box counterpart symbolize the hidden forces that shape our destinies, encouraging visitors to critically confront the pervasive surveillance of contemporary society.

15:00-16:30 Session 1B:
Registration + Installation Session

LOCATION: Klangtheater – AW VU149

15:00

Tim-Tarek Grund

Polyomino Interface for Pitch Lattices

This sound installation is using Csound to explore pitch lattices. There are several online applications that allow users to explore pitch lattices. However, few tangible interfaces for this purpose exist. The polyomino interface for pitch lattices aims to bridge this gap by providing a grid of fiducial markers representing pitches that can be played by covering them with geometric shapes (polyominoes). Moving, rotating and exchanging these pieces allows users to explore pitch relations in an intuitive way.

16:30-17:30 Session 2: Keynote Concert

LOCATION: Klangtheater – AW VU149
HOST: *Alex Hofmann*

16:30

Welcoming Words:
Magᵃ Ulrike Sych, Rector of the mdw – University of Music and Performing Arts Vienna
Univ.-Prof. Dr.phil. Werner Goebl, Head of the Department of Music Acoustics – Wiener Klangstil

16:45

Victor Lazzarini

Frippertronics

This is a performance of Frippertronics, a genre of improvised electronic music started by Robert Fripp and Brian Eno in their recording No Pussyfooting of 1973. Since then, it became one a standard mode of working for Fripp and it has influenced many musicians over the years. The essence of the genre is the use of some form of a long delay line with feedback, to accummulate in layers the live performance gestures. Fripp tends to favour the use of modal melodic fragments that can be easily recognised, building interlocking patterns, but of course this is only one of the many ways to approach it. Originally, the delay lines were established using two reel-to-reel recorders, where the tape would be fed from one to the other, the distance between the machines

defining the delays. This gave a workable maximum delay of about seven seconds. Later, digital delay lines replaced these.

In my setup, I am using Csound to provide all the processing, which allows me to define as many delay lines with any useful length in any arrangement I want. The computing resources afforded by a desktop environment pose no restrictions to this, we much sooner reach the musically useful limits of the setup than the ones imposed by the system. To me, long delay lines are a complete different beast to the ordinary delays. It is possible to push the limits of stability much further into what engineers would class as not practicable, which is an interesting form of subversion of the norms.

From a musical performance perspective, we are also in a very unstable situation, which, as Fripp reflected on, is humbling for the musician. A false step and we can come crumbling down into disarray.

Siting at the keyboard with no prior idea of what is going to ensue is also very perilous. We need to be in tune with the instrument and its interface, there is no hiding. This type of performance celebrates memory, new versus old, and, foremost, the concept of entropy - all things tend to decay after a while, and so do our musical gestures.

19:00-22:00 Welcome Dinner

Winery (Heuriger)
Heuriger 10er Marie
Ottakringer Straße 222-224, 1160 Wien

WEDNESDAY, SEPTEMBER 18TH

08:30-09:00 Registration

LOCATION: AW K0101

09:00-10:40 Session 3:
Sound Synthesis and Web Apps

LOCATION: AW K0101
CHAIR: *Tarmo Johannes*

09:00
Richard Boulanger and *John Ffitch*

Playing Csound Duets on the Web: How Compositional & Performance Goals Lead to Coding and Design Solutions
PRESENTER: *Richard Boulanger*

Whether your musical journey begins in the family recorder quartet or in a wedding band, a college choir, or a community orchestra, making and playing music with others is one of life's greatest and most memorable pleasures. For many years now, the authors have collaborated on compositions and enjoyed performing together on concert stages in the US, Asia, and Europe. For the past six years, they have been co-writing a new set of pieces in which, over the web, they are accompanied by and interacting with a generative algorithmic computer ensemble and both playing and controlling Csound instruments on each other's laptop and in each other's home studios. The code, design, research and advice presented in this paper is the result of the realization of the most recent of these 'long-distance' Web duets — the composition "Eleven Questions". In it, the authors share how compositional goals lead to design solutions and how those design solutions steer the work in new and different directions, often leading far beyond what they had originally imagined. What is shared here are ideas, instruments and algorithms that will hopefully be of use to other Csounders wishing to travel similar creative paths.

09:20
Øyvind Brandtsegg and *Victor Lazzarini*

Frequency Modulation with Feedback in Granular Synthesis

The paper investigates audio synthesis with frequency modulation feedback in granular synthesis, comparing it with regular FM feedback. The combinations of these two classic synthesis techniques show some promising areas of exploration. As a full exploration of this potential is beyond the scope of this paper, we will rather give insight into some initial experiments and share the tools used, encouraging the reader to dive deeper into parameter combinations not yet described.

09:40
Joachim Heintz

Creating Organic Generative Structures in Csound

This paper discusses the creation of organic generative structures in Csound exemplified by a concrete artistic example. After discussing the properties of an organic generative structure the example is described in its fundamental aspects sounds, interdependency and development. Implementation details are described and shown by code examples. Finally, the open possibilities of such an artistic approach are discussed in some aspects.

10:00
Lorenzo Ballerini and *Giuseppe Ernandez*

The Internet of Sound

Integrated into our daily lives, online systems such as the Web provide essential services and support a wide range of functions and tasks. Among these, Web Audio applications have revolutionized the production, streaming, and exploration of digital audio, offering advanced tools directly accessible from web browsers without the need for third-party software installations. This paper presents the implementation of realtime convolution reverb using Csound's engine within a web page container. The source code utilizes HTML, CSS for interface styling, and JavaScript for the Csound API implementation. Through this project, our aim is to illustrate how Csound can be employed in crafting audio and multimedia devices for the web, fostering the development of versatile environments for technical and artistic exploration, as well as and for educational inclusiveness and accessibility.

10:20
Michael Gogins

cloud-5: A System for Composing and Publishing Cloud Music

The advent of the World Wide Web, adequate support for computer graphics and audio in HTML, and the introduction of WebAssembly as a low-level language and browser- hosted runtime for any number of computer language compilers, have now created an environment well suited to the online production, publication, and presentation of music, visual music, and related media at a professional standard of technical quality. A piece of music on the World Wide Web no longer need be merely a link to a downloadable soundfile or video, or even to a stream. A piece can, indeed, be its own "app" that is live code running at near native speed in the listener's Web browser.

I call this kind of music cloud music because it exists only in the "cloud," the omnipresent computing infrastructure of the Web. I argue that this creates an entirely new environment for music that, in the future, should be developed with its own social context and to function as an alternative means of disseminating music in addition to live performances, discs, streams, and downloads. Here, I present and demonstrate cloud-5, a system of Web components for producing cloud music including, among other things, fixed medium music, music that plays indefinitely, visuals that generate music, music that generates visuals, interactive music, and live coding. cloud-5 includes a WebAssembly build of the sound programming language and software synthesis system Csound, a WebAssembly build of the CsoundAC library for algorithmic composition including chords, scales, and voice-leading, the live coding system Strudel, and supporting code for menus, event handlers, GLSL shaders, and more. A cloud-5 piece thus exists as an HTML page that embeds Csound code and/or score generation code and/or Strudel code and/or GLSL code, in the context of a static Web site that can be served either locally (for composing and performing) or remotely on the World Wide Web (for publication). cloud-5 differs from related online music systems not only by incorpo- rating Csound and CsoundAC, but even more by being designed primarily as a new medium of presentation, performance, and publication.

10:40-11:00 Coffee Break – AW K0101

10:40-11:00 Session 4:
Installation Session (Jagwani and Lazzarini)

LOCATION: AW K0101

10:40

Aman Jagwani and *Victor Lazzarini*

Csound-FPGA Integration

With the development of Bare-metal Csound, embedded systems with ARM-based CPUs can now be targeted to run Csound audio programs. This installation will demonstrate the potential of this development through an interactive, generative Csound piece running on a Digilent Zybo Z7020 board, which contains a Xilinx Zynq 7000 SoC. Csound's generative and synthesis capabilities will be interfaced with motion-sensing through LIDAR sensors to capture and convert motion in any of the common spaces of the conference into varied ambient sonic results. The purpose of this installation is to create an interactive ambience for a common space and to showcase the potential and portability of Bare-metal Csound.

11:00-12:00 Session 5: Keynote Talk

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

11:00

Steven Yi

Living Csound

A meditation on Csound as living software and reflections on living with this program exploring sound and music. In this talk, I will look at Csound 7, the newest generation of our software, and discuss what it offers us today as users and as a community. I will discuss where we are today, as well as short- and long-term plans, and offer some thoughts on what we can do to nurture this program to keep it vibrant and healthy for the days ahead.

12:00-13:30 Lunch Break

13:30-15:10 Session 6:
GUIs and skills in Live-electronics

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

13:30

Rory Walsh

Cabbage is dead, long live Cabbage!

In April of this year, JUCE announced a new end-user license agreement. While the updated license doesn't signify the immediate demise of Cabbage in its current form, it has presented a unique opportunity to reassess the project as a whole. Consequently, a new version of Cabbage is currently under development from the ground up. The end-user experience will remain largely unchanged: the familiar Cabbage syntax will persist, users will retain access to a wide array of widgets, and they will still be able to export to all popular plugin formats. However, the bulk of the new work will occur behind the scenes. This redesigned version will feature a significantly reduced codebase. Moreover, it will leverage the power of VS Code, providing developers with more options to create modern, responsive, and dynamic user interfaces.

13:50

Raul Vasile Drăgan

A tracker based Csound frontend software for musicians

Creating music for Csound can be done by creating code for orchestra and score sections, however frontends do

exist that offer simplicity for making musical projects such as Blue, CsoundQt and jo_Tracker. Csound offers a wide array of opcodes and language features that are useful for writing complex musical pieces and with the help of the frontends, the process of music composition is significantly improved, making it useful for musical projects of any kind of complexity, requiring only patience and work for achieving the desired artistic visions. While the features and the language that Csound offers are very useful for many kinds of musical projects, it would be much desired if another frontend offers the artists a flexible way of editing the musical events in a structured way such that they can easily change and replace specific musical features, such as musical segments with new ones when needed. This paper proposes a new frontend for enabling the artists to have a significantly improved workflow for their own musical projects, favoring the ease of editing the musical segments and instrument codes in an organized way, while also behaving as an environment for Csound projects, similar with IDEs for computer programmers, but instead it is for musical compositions made with Csound language, which features a diverse palette of opcodes helpful for applying a myriad of sound synthesis techniques and musical tricks.

14:10

Gianni Della Vittoria

Envelope Shaper GUI for Complex Curves in Csound

Creating envelopes is a valuable resource for giving movement to sound. Here we present a tool that facilitates the creation of complex envelopes thanks to a graphical interface in which the user can quickly draw the curves necessary for the most varied musical purposes. Four typical needs in the creation of the envelope are identified and discussed: the management of the general profile, the tremolo, the loop, the random component. The output product of this software will be Csound code. Designed particularly for beginners who start learning Csound, this tool makes it possible to facilitate the understanding of the envelope in the context of the parameter on which it is applied, and to provide ready-made code useful especially in conditions of very complex shapes.

14:30

Jacopo Greco D'Alceo

Cordelia, crafting a method while live coding in Csound

Cordelia emerges as a domain-specific language optimised for generating Csound and other code. Initially conceived as a live coding language, it evolved into a multifaceted tool, embodying the fluidity and the dynamic nature of contemporary composition practices.

Cordelia facilitates seamless integration of diverse musical elements, from envelopes tables to tunings files. As a composer's tool, Cordelia transcends conventional boundaries, offering pathways for live coding, extension scripting within DAW environments like Reaper, translation into Csound and graphical score. Its code structure, inherited from Csound, exemplifies meticulous attention to detail, with each parameter flawlessly organised within a coherent framework.

14:50

Seokyeong Kim

Csound Live Coding with Multiple Clients

This paper introduces a Python-based TCP socket server designed for collaborative live coding sessions utilizing the Csound engine, aimed at enhancing group music creation. The server facilitates real-time, multi-client connectivity, allowing users to dynamically create and manipulate custom Csound instruments. This system is equipped with an internal loop mechanism that manages quantized events and chord transitions, providing a rhythmic backbone for musical compositions.

Participants can engage concurrently, using a suite of commands that interact intelligently with ongoing chord changes to modify specific p-fields of the csound instruments produced. This feature ensures that musical expressions are both responsive and adaptive to the evolving sonic environment. Additionally, the system offers a variety of tools that support user interactions. Users have the capability to query and identify various components such as instruments, channels, and buses within the system. This transparency facilitates an intuitive understanding of the shared musical workspace. Moreover, the architecture allows for the manipulation of loop events tied to the server's clock. Users can easily subscribe, modify, or remove their events, enabling a fluid and dynamic compositional process. By supporting direct manipulation of musical elements in a live setting, the server not only fosters individual creativity but also enhances collaborative efforts among users.

Designed as a fun and innovative project, this server is an excellent platform for both novice and experienced musicians to experiment with collaborative composition and live performance in a digital setting. It provides a playful yet robust framework for musical exploration and interaction.

15:10-15:30 Coffee Break – AW K0101

15:30-17:00 Session 7: Roundtable

LOCATION: AW K0101

15:30

Joachim Heintz and *Alex Hofmann*

Future developments in Csound and its community

Csound has undergone a significant development over the last two decades [1, 3]. This applies to the extension of the coding language and a number of different usage cases such as on embedded platforms (e.g. Raspberry Pi, BELA [4]), but also applies to the structure of open source software development in general and the inherent community effort [2]. In this roundtable we motivate a discussion between Csound developers and Csound users on the following topics, and beyond:

Csound Development
● How do the developers see the current procedure of Csound development? What is good, what is missing?
● What could be desired contributions from the users?
● What tasks need to be addressed? Who can work on these tasks?

Csound Plugins
● What is the general status on this development?
● Why are there two plugin platforms? Can they be unified?
● What is the workflow for users?
● Which jobs need to be done, and who can do these jobs?

Csound Documentation
● State of Csound Manual, FLOSS Manual, and other parts of the documentation.

17:00-17:30 Coffee Break/Fingerfood – AW M 0107

17:00-17:30 Session 8: Installation Session (Boulanger)

LOCATION: AW M0107

17:00

Richard Boulanger, Strong Bear (Hung Vo), Xiaomeng Zhong, Ken Kobayashi and *Bethanie Liu*

Csound in the MetaVerse: CsoundUnity at Berklee

This installation will showcase four projects created and programmed in CsoundUnity by Professor Richard Boulanger's Electronic Production and Design students at the Berklee College of Music in Boston. Individual players and small groups will be able to choose from and enter immersive VR, AR, and XR worlds where they can: 1. Wander through Zhong's beautiful generative Sound Garden (La forét) and play some classic Chinese instruments; 2. Design and play expressive Csound instruments in Kobayashi's Sound Lab (Laser Synth); 3. Turn a smile into a sound with Liu's Face Tracing system; or 4. Colocate to see and collaborate with multiple local and remote players as you and they create, hit, stretch, squeeze, contort, reshape, grab, pass, catch and launch Vo's "SoundOrbs" and "SoundWanders," under the stars, on the beach, over the rooftops, and under the sea (Collaging in the MetaVerse with CsoundMeta). These CsoundUnity worlds will be installed on a number of Meta Quest 2+3 MR headsets and screencast onto multiple laptops. This will allow many to explore and play simultaneously while others can watch them play as they wait for an available headset to immerse themselves in these powerful, versatile, and fun VR soundworlds.

17:30-19:15 Session 9: Concert + Installation Session (Grund; Ballerini, et al.)

LOCATION: Klangtheater – AW VU149
HOST: *Dustin Zorn*

Joachim Heintz

ATT...

A minimalist study of the motion of an acceleration / desire / grasp -> deceleration / withdrawal / leaving -> staying / steadying / lasting, and an "accompaniment" through distant, intangible chords in quirky motion. A small salute to my teacher Younghi Pagh-Paan on the occasion of her retirement from teaching in 2011.

Marijana Janevska

Silence(d)

"Silence(d)" (2020) is a piece for female voice and electronics. The idea and inspiration about this piece came from a project, where I had a task to write a 30 second piece for solo voice concerning silence and immediately a question came to my mind: How does the silence of the silenced voice sound? This silence is not relaxing, but very loud.

Leon Speicher

Solar

"Space, the final frontier.." Since my youth I was fascinated with the imaginative influence the stars have on our culture and society. All the planets of our solar system have an influence on each other and as soon as a heavy enough object enters their gravitational field, they change their behavior and pathway. Similar things

happen between us humans. We enter each others life, have an influence and then we leave (or get kicked out).

Arsalan Abedian

Cstück Nr. 2 (2015)

The text material for the recorded voice in this piece is derived from the German Wikipedia entry on the definition of border. Here an example: "Ein Beispiel für Grenzen von eindimensionalen Räumen ist die „obere" und „untere Grenze" in der Mathematik [...]. Umgangssprachlich wird dafür auch Grenzwert, Schwellwert oder Schranke gebraucht." The dreamlike (or nightmarish) sound spaces of the spoken word "Grenze", which are created with the help of granular synthesis and time stretching, are presented as sound fields. In these sound spaces, forms emerge and recede, only to reappear in a different form and gestalt. This is similar to the boundaries between countries. In this context, the concept of identity is rendered meaningless. The character of the two border areas is subsumed within a spherical grey zone that simultaneously represents both the borderlands and an independent entity. The composition Cstück Nr. 2 was created using CsoundQt and features two principal sound sources: brass and voice (recorded voice: Kara Leva). It oscillates between sound and noise, creating a morphing between the sound colours and characters of voices and brass instruments. In this process, the "between", the foreign, can be seen not only as a transition, but also as a new field.

Oscar Pablo Di Liscia

Three words by Alejandra

This work is a sort of *electroacoustic poetry-landscape* based on ideas taken from three -very similar- poems by the Argentine poet Alejandra Pizarnik. In first place, there are three *portmanteaux* words (i.e., words blending the sounds and combining the meanings of others): *Errancia*, *Resolar* and *Grismente*. These three words constitute the basis of the three sections of the work, and are decomposed, time-warped and processed in several ways. In second place, the words are also combined with the sounds of three elements that were also found in the poems: wind, water and birds. The three sections become longer as the work develops, and present the material aforementioned combined in sequences more or less similar, as in a series of variations.

Jan Jacob Hofmann

Oscillation Of Life (world première)

This piece is about the generating forces of nature. To be more precise, it is about the idea of an underlying universal power that gives shape and energy to all living beings. What if there was a yet undiscovered oscillating energy beyond acoustic and electromagnetic oscillation, that gave shape, energy and interconnection to all living beings? That enabled/guided/facilitated the organisation of molecules and cells to higher organisms, beyond genetic chemical reactions and metabolism, opposed to the common increase of entropy? That creates shape like symmetry up to far more complex mathematical order, beauty out of chaos by transmitting harmonic information? What would that oscillation sound like, if we could perceive it? Would we listen? Would we be able to tune in?

Break

Serkan Sevilgen

Gendy Cloud

The "Gendy Cloud" (2022)1 is a networked, multichannel music piece that will be realized in real time by WORC, a telematic ensemble. The ensemble members could control their instruments remotely via a web interface. Any performer can control one or more instances of the software instrument based on Csound implementation of Xenakis's GENDYN algorithm. The control parameters are limited to reduce the learning curve and increase the adaptability to the existing interfaces. However, use of stochastic processes in the instrument allows performers to create varied timbre, patterns, and textures in a multichannel diffusion system. The project was inspired by an event during "Xenakis22: The Centenary Symposium" Orestis Karamanlis utilized GENDYN (a dynamic stochastic sound synthesis algorithm conceived by Iannis Xenakis) and prepared an audio stream that conference participants can use on their mobile phones to hear in the front of the building where Iannis Xenakis was wounded. It was a touching moment that we could be able to commemorate a great composer through his work. The idea arose from the event that if it is possible to build a software instrument based on the GENDYN algorithm that leads to collaborative music-making regardless of the physical locations.

Bethanie Liu

Traverse: For Recorder and Electronics

Inspired by the composer's own experience of battling against depression, Traverse: for Recorder and Electronics is an eight-minute electroacoustic composition depicting the journey of walking away from a place that once harbored deep shadows of sadness. In this piece, acoustic recorders and electronics echo and interact with each other to convey the intertwining memories of the past. Each step forward in the journey is met with swirling emotional disorientation, in which the state of lostness and confusion is depicted through dark atmospheric drones and brash ring modulation

sounds. All sounds are created through live improvisational melodies performed by the composer on soprano and alto recorders, then processed with a range of Csound and Cabbage plugins. Contemporary extended techniques for the recorder such as flutter tongue and sputato are also featured in the improvisational melodies. The piece eventually resolves back to the theme, depicting the composer's return to the same place after years, still agitated, but learning to be at peace with the past. The composer is the performer of the piece, and will attend the conference to perform it live if accepted.

Shane Byrne
Caibleadh

The Last Battle of Mag Tuired was fought between the Tuatha De Dannan, an ancient race of ancient Irish dieties, and their enemies, a supernatural people known as the Fomori. The leader of the Fomori, Balór na Súile Nimhe, was defeated in battle by the hero Lugh Lámhfada, resulting in the Fomorian army being cast into the depths of the sea off the coast of Ireland. Haunting voice-like calls heard in the distance across the water on still nights, known as cailbleadh, are said to be the songs of the lost Formorian spirits, exiled to beneath the waves. The idea of cailbleadh came to mind when listening to seals along the coast, their calls echoing across the cliffs and resonating in the caves, creating an almost preternatural soundscape.

Clemens von Reusner
REEHD

REEHD is not based on sounds of real instruments, but on sounds generated by physical modeling. Physical modeling allows to go beyond the limits imposed by real instruments as well as the limits imposed by human players. This can result in certain sounds no longer having any relation to known instrumental sounds. In REEHD sound objects interact as sound gestures as well as textures in a concept of composed spatial counterpoints in virtual spaces.

"But no one should be afraid that looking at signs leads us away from things; on the contrary, it leads us into the innermost of things." (Gottfried Wilhelm Leibniz, 1646-1716)

John Ffitch and Richard Boulanger
Eleven Questions (2024)

'Eleven Questions' (2024) is an 8-channel internet-duet with an 'ensemble' consisting of 4 'generative' computer players (the 'choir"), and 2 live ASCII players – one playing on stage in the concert hall and the other playing remotely over the WEB via OSC and ZeroTier. The remote player is projected into the concert hall via ZOOM. The live coding of the on-stage performer is projected onto another screen. Both are hearing the entire work as it is all being realized in real-time; both are sending and receiving 'text-print' messages as feedback informing each other about what motives (questions) they are selecting, what transpositions and tempi they are setting, what chords and timbres they are playing, and how they might be affecting the sounds of the computer players and each other. Over the course of the 7-minute piece, the 'tunings' of the computer harmonies and the melodic motives move from 59-tone to 12-tone. Each motivic 'question' and every note from the 'choir' comes from a discrete location and the live performers have complete control over the timing, the tempo, the register, the dynamics, and the overall mix of all the elements in the piece. As they listen to each other, and to the computer, they question and answer, accompany and lead, compliment and contradict; in some ways, "Eleven Questions" could be considered a structured internet Csound jam as it is never exactly the same, but the players are all always 'reading' from the same algorithmic 'lead-sheet'.

THURSDAY, SEPTEMBER 19ᵀᴴ

09:20-10:20 Session 10: Csound Expansion

CHAIR: *Joachim Heintz*
LOCATION: AW K0101

09:20

Parham Izadyar, *Amin Khoshsabk* and *Ghazale Moqanaki*

Csound Journey in Iran

Over the past decade, the growth of Csound users in Iran has had a profound impact on the music scene, not only in the realm of electronic music but also in the general music scene. This software has empowered young composers to articulate their creative visions more effectively and more easily to perform their pieces, thereby contributing to a vibrant and evolving music scene. The accessibility of Csound, its open-source nature, and the boundless creative opportunities it offers to composers have made it a favorite companion for their music. Additionally, there is a noticeable increase in composers that utilize Csound. This innovation not only benefits composers by providing them with new tools and possibilities but also introduces fresh perspectives for listeners. It is clear that many audiences are attending more and more to live electronic music performances each year, which has enriched the connection between composers and their audience. Given these observations, it is clear that Csound has had a unique and valuable influence on the contemporary Iranian music landscape. Consequently, the aim of this article is to highlight the significance of Csound in Iranian music. To better understand the widespread appeal of Csound in Iran, some questions were written for those who have experience with Csound. Their responses in following will shed light on the positive impact Csound has had on their artistic journey.

09:40

Brian Carty and *Thom McDonnell*

Using SOFA HRTF Files with Csound Binaural Opcodes

The Csound HRTF opcodes were initially written for use with a generic 'dummy head' dataset of location measurements. More recently, the field of binaural processing has enjoyed a renaissance through the proliferation of virtual loudspeaker processing. In parallel, the SOFA file format has been developed to store HRTF datasets in a defined manner. This paper discusses a method to allow the Csound HRTF opcodes to use any SOFA HRTF dataset. The outlined approach (available as a command-line tool) takes any given SOFA HRTF dataset and preprocesses it to work with the existing opcodes; it essentially stores HRTFs for each location defined in the original 'dummy head' dataset used. A rigorous interpolation algorithm is used to derive HRTFs for non-measured locations where necessary.

10:00

Aman Jagwani and *Victor Lazzarini*

Bare-metal Csound

Csound is able to target several platforms across desktop, mobile, web and embedded environments. This enables its vast audio processing capabilities to be leveraged in a wide range of sonic and musical contexts. Particularly, embedded platforms provide great portability and flexibility for users to design custom interfaces and signal processing chains for applications like installations and live performance. However, until now, embedded support for Csound was restricted to operating system-based platforms like Raspberry Pi and Bela. This paper presents our work on the development of Bare-metal Csound, extending the embedded support to ARM-based micro-controllers. We highlight the benefits and limitations of such systems and present two platforms on which we have conducted experiments - the Electrosmith Daisy and the Xilinx Zynq 7000 FPGA System-on-Chip. We also discuss potential use cases for Bare-metal Csound as well as future directions for this work.

10:20-11:00 Coffee Break – AW K0101

10:40-11:00 Session 11: Installation Session (Heintz)

LOCATION: AW K0101

10:40

Joachim Heintz

FERNNAH – Reading and Sound

The proposed event is more a performance than an installation. But with an installation it shares that visitors can come in and leave, can move closer or stay far, and take their own time. It can happen between other events in a corridor or corner, as we had it in Montevideo on the ICSC 2015. It should be noted that the text is in German; but the proposed event is not about "understanding" the text rather than experiencing the musical space.

11:00-12:00 Session 12: Keynote Talk

LOCATION: AW K0101
CHAIR: *Tim-Tarek Grund*

11:00

Pierre-Alexandre Tremblay

Why bother? The value(s) of an interface

As everyone attending this conference will know very well, creative coders have, today more than ever, a breadth of options to make music programmatically: from specialised software old and new, to toolset expanding general computer languages, many visions of what a good art-enabling coding environment cohabitate and cross-pollinate. While trends rise and fall, along the way communities wax and wane, the artworks survive as best as they could, and the artist-programmer tries to strike a balance between inspired mastery and catching up.

But is there a value to this multitude of opportunities? Are new proposals diluting energies and foci? Are there commonalities that would be better sorted once-and-for-all? What values each of these interfaces defend, consciously or not? And what about the underlying metaphors they employ to create bridges between practices and disciplines?

In this presentation, the author will muse on these questions around the design of software environments that are foundational to artistic research through creative coding. He will try to ascertain their value, the affordances and responsibilities of such enabling endeavour, through sharing his early-career personal experience of CSound, and the emergence of the FluCoMa ecosystem.

12:00-13:30 Lunch Break

13:30-17:30 Session 13: Workshop

LOCATION: AW K0101

13:30

Steven Yi

Developing Csound

This workshop introduces users to the tools, processes, and practices involved in building and developing Csound [1]. Attendees will go through a series of exercises using popular IDEs (Xcode [2], Visual Studio and editors (Visual Studio Code [4]) to build, explore, debug, and optimize the Csound codebase. The target audience is Csound users with intermediate programming experience who may be new to C/C++ development and are interested to customize Csound for

their own use as well as make contributions for the benefit of the community.

Planned activities include:

● Building Csound: Understanding the build system, setting up your tools, and diagnosing issues with builds
● Tour of Csound codebase: overview of layout of codebase; walkthrough of key data structures; a guided tour of the parser, engine, opcodes, library functions, and I/O
● Debugging Csound: work through exercises using tools (unit tests, debuggers, audio editors for waveform exploration) to diagnose and fix bugs
● Optimizing Csound: working through exercises to diagnose performance issues with internal Csound code as well as Csound CSD projects using a profiler
● Beyond the Desktop: A brief discussion and walkthrough of Android, iOS, WebAssembly, and other platforms and builds
● Questions and Answers

17:30-18:00 Coffee Break/Fingerfood + Installation Session (Boulanger) – AW M0107

18:00-19:45 Session 14: Concert + Installation Session (Grund; Ballerini, et al.)

LOCATION: Klangtheater – AW VU149
HOST: *Dustin Zorn*

Patrick Dunne

Decay – An AI-assisted Electroacoustic composition

Decay is inspired by the Works of Jonty Harrison, particularly Surface Tension and EQ. The goal of the piece was to create an entire composition using a single sound source – in this case, a box of matches. The visuals were generated using Runway's text-to-video and video-to-video AI tools. The visuals were further manipulated using the Runway motion brush to distort the generated images creating abstract shapes in the process.

Roberto Doati

Studio VII

My *Studi I-VIII* are inspired by Karlheinz Stockhausen's *Klavierstücke I-VIII*. These piano works revolve around the electronic experience of Elektronische Studie I and II. If *Klavierstücke I-IV* (1952-53) represent a sort of sketches of the electronic pieces to come, Klavierstücke V-VIII (1954-55) reveal a new attention to time which at the same time 'stretch' the form according to "statistical form criteria" and allows the author to build different timbres that emerge from the constant use of resonances produced by the silent pressure of the keys.

In my studies I wanted to recreate the colour of those years' electronic sounds, especially in its main morphology, very similar to that of piano sounds, and strongly correlated to the spectrum obtained with physical models applied to audio signals produced by a set of Julia. *Studio VII* is structured as if it were a sketch of *Klavierstücke VII*. It follows its dynamics and density using three morphological typologies: fast arpeggios, long single sounds, slow arpeggios. Each sound is conceived as a *momentform*.

Mark Ferguson

Woodland Understorey

Recollections from a Cotswold woodland. Tall ash and sycamore trees in fog, heavy with condensation; leaves bending, thick drops rolling off them as a kind of half-rain. Tawny owls and pheasants, louder than expected. An evening shower moves through. It is a scene of shelter and delicate interplay, infused with the smells of damp earth.

Tarmo Johannes

"Franz Strauss – Five Etudes" (2021) for natural horn and electronics

Tarmo Johannes on "Franz Strauss – Five Etudes" (2021): "I created this piece in the summer of 2021 when Erik Alalooga, an Estonian noise artist invited me to play at a open air summer experimental music event in Tallinn. At that time, I had relatively recently started learning the natural horn as a new hobby. Considering Erik Alalooga's preference for rather harsh sounds, I wanted to combine my especially novice attempts at playing Franz Strauss's horn etudes with electronic processing, which, according to a certain algorithm, mercilessly overrides the horn's triadic passages from time to time. Additionally, there is a contrast here between the perhaps somewhat tedious regularity typical of etudes and the unpredictability of the processing."

Jean-Basile Sosa

A fashionable nightclub

A fashionable nightclub is a live electronic music performance spatialized on variable loudspeaker arrays. With this immersive creation, Jean-Basile Sosa delivers an ethereal, phantasmatic version of some of electronic musics played in American nightclubs in the 80s and 90s... It's also a reminiscence of certain spaces of social, collective and individual freedom, where marginal cultures unfold, often foreshadowing the mores and habits of tomorrow... Without ever falling into a parody of house music or techno, the project nevertheless assimilates some of the most significant characteristics of these popular musical currents: the repetition and obstinacy of the pulse, the complete abstraction of the electronic sonorities used, the regular periodicity of squares, phrases and durations, the intuitive memorization of harmonic and rhythmic cycles and loops... The project is also motivated by the ongoing development of a digital environment dedicated to musical performance and sound spatialization. Transmissible and perennial, this environment should ideally adapt to all types of audio broadcast configuration, from projected stereo to the most modern three-dimensional sound spatialization techniques such as ambisonics.

Break

Jinhao Han

Sievert

This work is inspired by nuclear decay, using Csound and sound analysis-resynthesis measures to construct an audio-visual electronic music that displays the element decay within the theoretical framework of nuclear physics. In this piece, taking the decay process of Uranium-235 to Lead-207 as an example, radioactive nuclides release a large amount of energy through a series of α and β decays, reducing their own entropy to reach a relatively stable state. In this decay process, unstable elements lower their energy by emitting high-energy particles, gradually leaving the excited state to become a stable element. This reflects my perspective of viewing the development and change of the world from a microscopic viewpoint, extending the idea that "decay" is a process in which high-energy matter gradually stabilizes through a series of destructive changes to stabilize itself, shedding uncontrollable parts, and ultimately forming a new individual with a tight and regularly stable structure.

Michael Gogins

2024-ICSC (4)

This piece is implemented using the cloud-5 system for composing, performing, and publishing electroacoustic music: fixed medium, always-on or fixed duration, visual music, interactive music, and live coding. The cloud-5 system incorporates a WebAssembly build of Csound, supporting for displaying GLSL shaders, a WebAssembly build of the CsoundAC system of algorithmic composition with facilities for automating chords and scales, and the live coding system Strudel. This particular piece uses an adaption of a ShaderToy shader that is sampled to produce scales, chords, and notes rendered with Csound, and affords interactive control over aspects of both composition and rendering.

Fernando Egido

Three Chants for Computer

This piece experiments with the concept of intrasensory synesthesia but Instead of perceiving one sensory as another we perceive a sound feature as another one So instead of hearing colors we will perceive the time as timbre or the pitch as dynamics. To do so, I use how the perception of a musical feature affects the perception of the other musical features. The perception of one parameter is determined by the other ones, especially in the threshold of perception. We can achieve this using the thresholds of perception and the way that one parameter can determine the perception of another one to make parametric interdefinitions. For example, a pulse of gains of sound that is perceived as a temporal object can be converted into a timbrical object by accelerating the velocity of the pulses. beyond $16 - 20$ hertz it will be perceived as no longer as a pulse but as a pitched sound. I call this a parametric morphing in which a sound object is perceived in a way and then using changing only one feature of this sound object it is perceived around different parametric centrality.

FRIDAY, SEPTEMBER 20ᵀᴴ

09:20-10:40 Session 15: Integrated Csound 1

LOCATION: AW K0101
CHAIR: *Alex Hofmann*

09:20

Ken Kobayashi

Exploring the Expressive VR performance of Csound Instruments in Unity

Electronic music instruments have revolutionized musical performances. These gadgets allow musicians to perform using sound synthesis, unlocking infinite possiblities from countless algorithms, from those explored thoroughly to the cutting edge. However, as sound synthesis technologies evolve, such digital instruments must also be reimagined. An instrument that can fully utilize the capabilities of modern synthesizer technology should allow one to perform not just novel sounds, but be more expressive with their performance. This paper explores such expressiveness through an instrument created in VR, the Laser Synth.

09:40

Xiaomeng Zhong

Exploring Interactive Composition Techniques with CsoundUnity and Unity

This paper presents different techniques and systems that were used to create an interactive composition using Csound, Unity and CsoundUnity. The paper discuss the cre- ation of compositional and performative systems designed by combining the synthesis powers of Csound and the interactive game mechanisms in Unity. These systems includes: generative music with logic in C# played using Csound Instruments, trigger based control systems mimick- ing MIDI note on/off events using Unity's collision and rigidbody mechanics, transform object and controllers functioning as real-time controls like knobs and sliders. Taking advantage of both systems, it became possible to create a game-like composition la foret.

10:00

Strong Bear (Hung Vo) and *Richard Boulanger*

Csound in the MetaVerse – From Cabbage to CsoundUnity and Beyond: Developing a Working Environment for SoundScapes, SoundCollages, and Collaborative SoundPlay

PRESENTER: *Richard Boulanger*

Csound in the MetaVerse is an immersive multiplayer system built in Unity for Meta Quest XR headsets that supports new ways to interact with Csound instruments and effects. Players are collocated into shared physical or virtual spaces, either locally, playing together in the same physical space, or remotely, joining in with other players over the internet. In these VR and AR worlds, sounds appear as physical objects that players can hit, grab, stretch, squeeze or toss away while they continue sounding and wandering freely on their own. One can also 'connect' to the sounds via 'cords' and control individual or multiple parameters with buttons or physical gestures. This systems offers new ways to play with sound in time, to play with sounds in space, and to play with each other's sounds. And in this paper, we will highlight small excerpts from the code that provides the means for some of the more exciting, unique and important features that enhance the capabilities of CsoundUnity and make possible some of the uniquely powerful modes of interaction and collaboration that our Csound in the MetaVerse environment offers.

10:20

Bethanie Liu

Face Tracking with CsoundUnity: Converting Smiles into Sounds

Csound has been widely used for sound synthesis and live performance. While much exploration has been done in expanding the potential of music-making with Csound, few studies have looked into developing Csound-based music-making tools for people with physical conditions and/or disabilities. This paper presents a preliminary design and implementation of a face tracking-based musical expression system utilizing CsoundUnity's sound design capabilities for real-time

musical performance. The goal of this development is aimed towards providing alternative methods for people with limb motor impairment to express music through facial gestures. Users could control parameters of Csound instruments through facial movements such as but not limited to opening their mouths and winking. The paper will also discuss observations from user testing sessions with patients at a rehabilitation facility.

10:40-11:00 Coffee Break + Installation Session (Heintz) – AW K0101

11:00-12:00 Session 16: Integrated Csound 2

LOCATION: AW K0101
CHAIR: *Giovanni Bedetti*

11:00
Francesco Vitucci, *Giuseppe Silvi*, *Daniele Giuseppe Annese*, *Francesco Scagliola* and *Anthony Di Furia*

Opening mind by opening architecture: analysis strategies

In numerical signal processing for electroacoustic composition, the progressive loss of specific development and research environments caused by the increasing use of digital market tools has favoured the dominance of the closed-architecture audio processor model. This model, while powerful, envisions the possibility of describing output data about its perceived characteristics, but at the cost of ignoring its internal process and interacting systems, which become complex, powerful environments but closed in an inscrutable black box, a loss we must consider. Any digital signal processing technique tells a story. Just as the words of a language incorporate social, historical and technical polysemic layers, a signal processor has its own story of implementation, a gradual technological achievement with its inevitable aesthetic consequences. Through the looking-glass of literature, one can access those environments with renewed awareness by reestablishing a scientific method and an attitude to research. In this specific case, starting from the case study of Manfred Schroeder's historical reverbs, we illustrate the process of building analytical evaluation tools, as well as practical implementation, at the basis of a conscious study path.

11:20
Albert Madrenys Planas

Integrating Csound into Unreal Engine for Enhanced Game Audio

Unreal Engine is one of the most widely used game engines in the current market, thanks to its exceptional flexibility and strong graphical capabilities. Recently, the development team has introduced a new tool called MetaSounds, designed to facilitate sound synthesis, digital processing and sound design in a native way and within a node-based interface. Despite its user-friendly interface, MetaSounds still lacks certain functionalities present in older sound engines such as Csound or SuperCollider. Currently, integrating Csound into Unreal needs the use of a middleware like FMOD or Wwise, along with Cabbage to export Csound code into a VST. However, a MetaSounds node that inherently incorporates Csound, without the use of external dependencies, and with MetaSounds adaptable, intuitive, and potent graphical interface would be a significant advancement. Thanks to Unreal Engine's support for C++ implementations and enabling developers to craft their own MetaSounds nodes, it can be possible to integrate Csound within a MetaSounds node through the Csound C++ API.

11:40
Hans Pelleboer

The advantages of multi-dimensional interfaces for the future of csound

Present day micro-controllers allow many physical properties to be translated to and from the digital domain. As non-trivial sound synthesis encompasses a large number of controlling variables, the necessary properties of an effective interface are discussed. The dichotomy between the analytic approach of computer-mediated electro-acoustics and Gestalt-based integrated human perception is shown. Special emphasis is laid on the importance of simultaneous multi-modal presentation for sensory integration and the vital role played by haptic and proprioceptic feedback. Comparisons are made between the established conventions of analog electronic equipment and the relative pioneering status of computer synthesis. Three interface designs are presented, illustrating practical steps on the possible path forward and the implications these would have for csound's further development.

12:00-14:00 Lunch Break

LOCATION: Klangtheater – AW VU149
HOST: *Alex Hofmann*

Richard Boulanger

CsoundScapes in the MetaVerse (2024)

Featuring the Unity and CsoundUnity programming and system design of Hung Vo (aka Strong Bear), *CsoundScapes in the MetaVerse* (2024) by Richard Boulanger is an 10-minute structured SoundCollage. Under the eye of the 'watcher,' whose view of the action

from within a number of AI-generated VR worlds is screencast and broadcast for the audience to see and hear, as four local and one remote 'player' wearing Quest3 XR headsets, conjure *SoundOrbs* from thin air and then strike them, stretch them, twist them, toss them, catch them, share them, steal them, clone them, replace them, and eliminate them. The SoundOrbs produce a wide range of timbres and textures and serve in a number of ways to advance the narrative of the piece. Some SoundOrbs are generative; some are explosive; some brief and momentary; some are motivic, melodic, sequential, ostinatic; some are arhythmic and others groovy. Most are synthetic, but some are sample-based. At some points in the piece, it seems like the audience is caught in the middle of a sonic food fight, whereas, at other times, they might find themselves floating in a sound cloud, or trapped in an abandoned industrial complex listening to the chaos of gasping and groaning machines; or they might find themselves gazing around a sunken underwater city listening to the singing voices of mermaids, or lost in a cave, or on the desert moon of a distant planet, or just sitting on a beach, or on a mountaintop gazing at the stars overhead listening to the music of the spheres. All of these AI-generated visual worlds compliment and reinforce the timbre, tone, temper and drama of the palettes of Csounds that each player is presented with at that point in time – when they find themselves trasported by the system to this or that location. As such, the piece is a structured improvisation in which players are presented with specific collections of SoundOrbs along their journey, each of which contains a palette (or bank) of Csounds that they can choose from, sequentially or randomly, and that they can sonically and literally reshape and transform by the movements of their hands around and through them, or by attaching 'control cables' to them and then using a variety of mapped hand gestures and button presses to more dramatically and subtly transform and modulate them. As such, the work represents a new way to compose, play,

improvise, spatialize, and experience Csounds in time and shared virtual spaces.

Anthony Di Furia

Female Child System - Imprisonment

The composition attempts to tell an imaginary story through a "sound fable". A female child with beautiful eyes, she is incarcerated alone in a huge prison, completely dark and without windows. She is unable to speak, the only glimmer of communication is represented by the sound she hears by hitting one of the steel bars in her suspended room. Through this sound, transforming it into her mind, she embarks on a dreamlike journey; along the way, her imagination gains strength and, trying to limit it, builds a "sound mosaic" that slowly falls apart to gently lead her into a parallel reality, removing the emptiness of her perception, finally returning to her prison, keeping her life altered.
She doesn't fight, she just teaches who she is. And the "sound fable" continues... The composition is inspired by a recurring dream and is dedicated to my dear friend Ottavia.

Antonio Scarcia

Ordinary Rehearsals

"Ordinary Rehearsals" is an electroacoustic piece that utilizes digital techniques inspired by the traditional workflows of tape studio recording. The piece utilizes CSound for sound synthesis through sampling, articulating complex sound gestures from initially contrasting materials. These materials are designed to evolve into a dialogue, seeking moments of equilibrium. Scores are algorithmically generated within a computer algebra system, ensuring a sophisticated integration of computational precision with artistic expression. This piece intricately explores the tension and dialogue between disparate sound elements.

Juan Escudero

WS Gluing Map

From a formal point of view this work is based on a combinatorial description of the Seifert-Weber space, which is a multiconnected hyperbolic three-manifold where the faces of a dodecahedron are identified after some rotations. The construction of a random simplicial complex of the three-manifold originates from a starting triangulation or axiom. FM synthesis, plucked strings and other Csound instruments are used. The function tables are obtained from spectra of time quasicrystals and certain models of multiperiodic variable stars light curves based on analogous temporal structuring. Multiconnected manifolds are candidates for the spatial structure of the Universe. One of the consequences would be the

observation of the same part of the cosmos in different places of the sky and it appears due to the presence of a closed loop in the manifold. Some musical correspondences of this facts are explored.

Jon Christopher Nelson

Ripples in the Fabric of Space-Time

Ripples in the Fabric of Space-Time imagines a sound world filled with the "chirps" that result from two black holes colliding. As black holes collapse into one another they create a highly deformed new black hole that emits gravitational waves from its equator. These gravitational waves move up and down in frequency a few times before they die, creating "chirps." In this work aural chirps disrupt our temporal expectations, resulting in an animated soundscape filled with rapid and playful transformations between allusions to acoustic instruments, sonic environments, and percussive noises.

This composition represents the fourth movement of Nelson's six-movement acousmatic odyssey, *The Persistence of Time and Memory.*

15:00-15:45 Session 18: Closing Ceremony

LOCATION: Klangtheater – AW VU149
HOST: *Alex Hofmann*

LIST OF CONFERENCE CONTRIBUTORS:

Abedian, Arsalan	Hannover University of Music, Drama and Media (HMTMH), Germany
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Boulanger, Richard	Berklee College of Music, United States
Brandtsegg, Øyvind	Norwegian University of Science and Technology – NTNU, Norway
Byrne, Shane	Technological University of The Shannon (TUS), Ireland
Carty, Brian	Institute of Art, Design and Technology, Dún Laoghaire, Ireland
Della Vittoria, Gianni	Liceo Artistico e Musicale "A. Canova" di Forlì, Italy
Di Furia, Anthony	Conservatorio "Niccolò Piccinni" di Bari, Italy
Di Liscia, Oscar Pablo	Universidad Nacional de Quilmes, Argentina
Doati, Roberto	Independent, Italy
Drăgan, Raul Vasile	Technical University of Cluj-Napoca, Romania
Dunne, Patrick	Technological University of the Shannon, Ireland
Egido, Fernando	Independent, Spain
Ernandez, Giuseppe	Conservatory of Trapani, Italy
Escudero, Juan	Independent, Spain
Ferguson, Mark	Independent, United Kingdom
Ffitch, John	University of Bath, United Kingdom
Gogins, Michael	Irreducible Productions, United States
Greco D'Alceo, Jacopo	Independent, France
Grund, Tim-Tarek	mdw – University of Music and Performing Arts Vienna, Austria
Han, Jinhao	Sichuan Conservatory of Music, China
Heintz, Joachim	Hannover University of Music, Drama and Media (HMTMH), Germany
Hofmann, Alex	mdw – University of Music and Performing Arts Vienna, Austria
Hofmann, Jan Jacob	Independent, Germany
Izadyar, Parham	Independent, Iran
Jagwani, Aman	Maynooth University, Ireland
Janevska, Marijana	Hannover University of Music, Drama and Media (HMTMH), Germany
Johannes, Tarmo	Independent, Estonia
Khoshsabk, Amin	Independent, Iran
Kim, Seokyeong	Maynooth University, Ireland
Kobayashi, Ken	Berklee College of Music, United States
Lazzarini, Victor	Maynooth University, Ireland
Liu, Bethanie	Berklee College of Music, United States
Madrenys Planas, Albert	Maynooth University, Ireland
McDonnell, Thom	Sound Training College, Temple Bar, Ireland
Moqanaki, Ghazale	Independent, Iran
Nelson, Jon Christopher	University of North Texas College of Music, United States
Pelleboer, Hans	Perceptual Engineering, Netherlands
Reina, Massimo	Conservatory of Trapani, Italy
Scagliola, Francesco	Conservatorio "Niccolò Piccinni" di Bari, Italy
Scarcia, Antonio	Liceo De Ruggieri Massafra, Italy
Sevilgen, Serkan	Istanbul Technical University (MIAM), Turkey
Silvi, Giuseppe	Conservatorio "Niccolò Piccinni" di Bari, Italy
Sosa, Jean-Basile	Independent, France
Speicher, Leon	Hannover University of Music, Drama and Media (HMTMH), Germany
Tremblay, Pierre-Alexandre	Independent, England
Vitucci, Francesco	Conservatorio "Niccolò Piccinni" di Bari, Italy
Von Reusner, Clemens	Independent, Germany
Walsh, Rory	Dundalk Institute of Technology, Ireland
Yi, Steven	Independent, United States
Zhong, Xiaomeng	Berklee College of Music and UC Santa Barbara, United States

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Main Entrance
Anton-von-Webern-Platz 1
1030 Vienna

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