IRCAM
Centre Pompidou

IMPROTECH @ PARIS 2025

CONFERENCES, WORKSHOPS, CONCERTS, INSTALLATIONS

IRCAM & LA DYNAMO

TUESDAY, 2 - SUNDAY, 7 DECEMBER

IMPROTECH
Improtech@Paris 2025

turnerwilliamsjr.com

With the support of AXA,
IRCAM's exclusive sponsor

IMPROTECH @ PARIS 2025

GENERAL PRESENTATION

Organized as part of the European *REACH* project, the international workshop-festival *Improtech* is dedicated to the explosive alliance between the age-old art of improvisation and the emerging cultures of digital intelligence, in an assumed approach of human-machine co-creativity. Through conferences, interdisciplinary workshops, and concerts, Improtech has traveled across three continents, gathering major figures in the field. It now returns to IRCAM, one of its founding institutions, for an edition focused on space, composition, and a tribute to American composer George Lewis, a key reference in musical AI.

Over six days, world class artists and researchers will decipher the astounding encounter between human expertise and machine musicianship in fields such as electronic lutherie, interaction and immersive spatialization systems, gesture control, hacking, social networks, haptic interfaces, digital ritualization of tradition, audio-musical generativity, and creative AI more broadly.

This year, IRCAM will host Improtech concerts in its unique concert hall, the Espace de projection, encouraging a triple synthesis: that of acoustic instrumental culture with the original interactive artificial intelligence developed by the *REACH* project, that of solo improvisation with writing for mixed ensembles, and finally that of spatialization and sound immersion, also renewed by creative AI. This groundbreaking combination, supported by leading artistic figures in composition, improvisation, performance, and technology, will undoubtedly create a dazzling version of this sixth *Improtech*.

ORGANISING COMMITEE

Gérard Assayag, Marc Chemillier, Marco Fiorini, Vasiliki Zachari

Avec le soutien du projet ERC REACH dans le cadre du programme de recherche et d'innovation Horizon 2020 de l'Union européenne, de l'Ircam-Centre Pompidou, de l'Art Music Denmark et de la région Nouvelle-Aquitaine.

Toutes les informations sur : reach.ircam.fr/

PROGRAM OVERVIEW

Tuesday, 2 December

8 pm IRCAM, Espace de projection	**Improtech Concert #1**

Wednesday, 3 December

10 am - 1 pm IRCAM, Studio 2	**Workshop-performance**
2 - 7 pm IRCAM, Studio 5	**Workshops**

Thursday, 4 December

9.30 am - 1 pm IRCAM, Stravinsky room	**Lectures**
2 - 7 pm IRCAM, Studio 5 & Stravinsky room	**Workshops**

Friday, 5 December

11 am - 1 pm IRCAM, Studio 5	**Workshops**
2 - 7 pm IRCAM, Stravinsky room	**Lectures**
8 pm IRCAM, Espace de projection	**Improtech Concert #2**

Saturday, 6 December

2 - 7 pm IRCAM, Studio 5	**Installations-concerts**

Sunday, 7 December

2 - 5 pm La Dynamo, Pantin	**Masterclass**
6 pm La Dynamo, Pantin	**Improtech Concert #3**

DETAILED PROGRAM

Tuesday, 2 December

IRCAM, Espace de projection, 8 pm
Improtech Concert #1

Psappho, After Iannis Xenakis
Lorenzo Colombo, percussions
Marco Fiorini, AI-Agents Somax2, live electronics

Décembre - premier livre du cycle Arc'
Marco Suárez-Cifuentes, composition, AI-Agents Somax2
Johanna Vargas, voice
Nicolas Crosse, bass
Aurélien Gignoux, drums
Nieto, texts

Traversée III
Nicolas Brochec, composition, AI-Agents Somax2
Kanami Koga, flute

Entracte

REACHin' Marseille
Turner Williams Jr, shahi baaja
György Kurtág Jr, synthetisers
Jean-Marc Montera, guitars, electronics
The Who/Men (Gerard Assayag, Mikhail Malt, Marco Fiorini), AI Agents Somax2
Mari Kimura, violin
Pierre Couprie, live electronics

Deleph
Jaap Blonk, voice, sound poetry
Benny Sluchin, trombone
Georges Bloch, composition, AI-Agents Omax5, Somax2, immersive electronics

In albireo luogo...
Lara Morciano, composition
Joëlle Léandre, Nicolas Crosse, bass
José-Miguel Fernandez, AI-Agents Somax2Collider, immersive electronics

IMPROTECH CONCERT #1

PSAPPHO, AFTER IANNIS XENAKIS

Lorenzo Colombo percussions
Marco Fiorini AI-Agents Somax2, live electronics

Psappho is the third instance of the project *Xenakis Reloaded*, after *Evryiali* (2022) and *AI-Komboï* (2023), paying homage to Xenakis through the choice of a well known piece and an improvised extension using AI. As the continuation of a broader research and performance project developed by Lorenzo Colombo and Marco Fiorini, two artists and researchers dedicated to exploring the creative potentials at the intersection of human and artificial intelligence in music, this new chapter will use *Psappha* (1975) as its central material. The project will investigate new modes of cyber-human co-creativity by integrating Somax2 and gestural control into an immersive spatialized performance environment. *Psappha* will serve as the compositional and performative ground, with a focus on gestural and temporal density, rhythmic articulation, and structural complexity, core features of Xenakis's language, and fertile terrain for this novel interaction.

DÉCEMBRE - PREMIER LIVRE DU CYCLE ARC'

Marco Suárez-Cifuentes composition, AI-Agents Somax2
Johanna Vargas voice
Nicolas Crosse bass
Aurélien Gignoux drums
Nieto texts

Décembre - Premier livre du cycle Arc' is a project that involves both written music and improvisation, inspired by Daichi Mori's art, and especially one of his "emakimono" sketches, mysteriously titled *The Birth of the Centaur*. *Décembre* makes up the first chapter, introducing the cycle. Imagined for and featuring three musicians interacting with an electroacoustic set that spatializes multiple AI-improvised voices, this work constitutes the first step of a research project focusing on voice and speech in generative improvisation systems, as well as the spatialization of musical structures generated through improvisation processes with the Somax2 software.

TRAVERSÉE III

Nicolas Brochec composition, AI-Agents Somax2
Kanami Koga flute

Traversée III is part of a series of compositions for flute and real-time electronic system, in which the real-time generation of electronic material relies on the automatic recognition of flute playing techniques thanks to ipt~, a new and groundbreaking tool developed by Nicolas Brochec, Joakim Borg, and Marco Fiorini. Whereas in the previous *Traversée* pieces, the generation of electronic material was directly controlled by ipt~, *Traversée III* differs in that it integrates Somax2 artificial improvisation agents, which now share this role. The Somax2 agents interact with the instrumental part, producing sonic responses that range from counterpoint to accompaniment, depending on the playing techniques performed. This sometimes results in the insertion of unexpected events, which may or may not influence the flute part and alter its course.

REACHIN'MARSEILLE

Turner Williams Jr shahi baaja
György Kurtág Jr synthetisers
Jean-Marc Montera guitars, electronics
The Who/Men (Gerard Assayag, Mikhail Malt, Marco Fiorini) AI-Agents Somax2
Mari Kimura violon
Pierre Couprie live electronics

REACHin'Marseille continues the series of performances *REACHing OUT* which celebrates all around the world the most jubilant improvisation, featuring renowned musical guests with the Who/Men, an IRCAM-based group of musicians-researchers playing on their strange machines doped with generative AI. The *REACH* project behind this new form of performance, formulates the hypothesis of co-creativity between players as a kind of mixed reality where ever-renewed musical forms and co-constructed sound spaces are both unpredictable and controlled, from the rustle of a wing to a volcanic explosion. What if human and machine were to dream of each other, hybridizing human and artificial creative energy in multiple feeback loops for a purely pleasurable experience?

DELEPH

Jaap Blonk voice, sound poetry
Benny Sluchin trombone
Georges Bloch composition, AI-Agents Omax5, Somax2, immersive electronics

Deleph ventures in the territory between sound and language. But, mostly in these areas where language is fundamentally absurd. We took as a point of departure a short poem in French which combines words using the sounds D, L and F in this order. Taking inspiration from this text, and imagining what Offenbach, Schwitters of the Ursonate, Robert Erickson of General Speech, or Jaap Blonk might have done with it.

Deleph
Delphine la dauphine ainsi médit d'Olaf :
Il veut être Calife en place de Deleph !
Dieu quel défi ! Et même si Deleph se trompe
Car se passer d'Aleph, c'est bête…
Il se trompe, Deleph, embouchant l'olifant,
Delphes ? Pourquoi partir ? Delphes n'est que pythie,
Mesquins oracles dans le fond déiquescents.
Et se passer d'Aleph, c'est bête…

IN ALBIREO LUOGO...

Lara Morciano composition
Joëlle Léandre, Nicolas Crosse bass
José-Miguel Fernandez AI-Agents Somax2Collider, immersive electronics

With this new work, I intend to explore the relation between composition, improvisation and the electronics, in keeping with my research on dynamic combinations between intrumental performance, real-time processing, listening and interactive spaces involving co-creative agents. The encounter between two talented soloists playing the same powerful instrument, the double bass, each with their own style and energy, and the Somax2 software, opens up a whole fascinating world of sound and opportunities for improvised interactions allowing the creation of spatial textures and unique forms. This co-evolution of the formal structure relies on a "shared musicality" based on listening, responsiveness and collective intelligence, both human and machine. This project is part of an experimental process that constitutes both a musical and aesthetic challenge: it mobilizes a cross-process approach and cooperative behaviours that generate unpredicted actions and interactions. The sound material becomes an anchor point, a tool to draw trajectories and transformations that articulate several sound layers. Between careful score composition and interpretative freedom, finding a balance is both instable, subtil and sharp. The electronics intensifies this tension and ambiguity, by instauring a cyclic, organic and impredictable interaction system. In a tridimensional sound space achieved with ambisonics spatialization, adding spatialized agents (Somax2) generates a lively interconnection between the written and improvised parts that inscribes them in a constantly evolving spatial interaction dynamic.

Lara Morciano

Un poème de Chat-GPT
(Albireo est une étoile double dans la constellation du cygne)
In albireo luogo
Dans un lieu albireo, rien n'est fixe.
Deux lumières cohabitent, l'une froide, l'autre brûlante
— elles tournent l'une autour de l'autre, sans jamais se fondre.
C'est un point d'équilibre instable,
une tension suspendue entre contraste et fusion.
Ici, les frontières entre le composé et l'improvisé se dissolvent.
Le geste écrit rejoint le souffle libre,
le traitement électronique devient partenaire de jeu.
C'est un terrain mouvant,
où la forme n'est jamais donnée mais toujours en devenir.
Le lieu albireo est un espace d'écoute active,
de co-présence sensible entre humains et machines,
où chaque son porte la trace d'une décision partagée,
et chaque silence, celle d'un dialogue en suspens.
C'est là, dans ce lieu imaginaire mais audible,
que cette œuvre prend naissance :
entre précision et dérive,
entre structure et surprise,
entre étoile bleue et étoile dorée

Wednesday, 3 December

IRCAM, Studio 2, 10 am - 1 pm
Workshop-performance

Resounding Bodies in Space
Alberto Maria Gatti, composer, sound designer, computer music designer
Anaïs del Sordo, voice, body harness
Marco Fiorini, PhD researcher (IRCAM; Collegium Musicae), guitar, Spatial Agents Somax2

IRCAM, Studio 5, 2-7 pm
Workshops

Breathing Media Projects (ft 1000+ Years Old Traditional Gagaku Music Reimagined with Cutting-edge Sensors Technology)
Tamami Tono, composer, shō
Atsushi Todokoro, creative coder, visual artist (Maebashi Institute of Technology)

Mugic Magic
Mari Kimura, Mugic Sensors inventor (UC Irvine), violin
Tamami Tono, composer, shō
Minako Ito, Bugaku dancer

The Sophtar: An Electroacoustic Feedback Instrument with Embedded Algorithms for Human-Machine Improvisation
Federico Visi, composer, performer, Sophtar Instrument inventor (Universität der Künste Berlin)

First Meeting
Alain Blesing, composer, electric guitar, Somax2
Claudie Boucau, flutes

WORKSHOP-PERFORMANCE

RESOUNDING BODIES IN SPACE

Alberto Maria Gatti composer, sound designer, computer music designer
Anaïs del Sordo voice, body harness
Marco Fiorini PhD researcher (IRCAM; Collegium Musicae), guitar, Spatial Agents Somax2

This workshop-performance on audio-tactile listening & 3D spatialization invites participants to explore a gentle convergence of touch and sound in space. A multimodal harness, combining vibrating transducers and bone conduction, works alongside Somax2 and Spatial Agents to shape responsive, real-time interactions. The system processes audio on the fly, adapts material for the transducers, and coordinates diffusion between the harness and an ambisonics system. Through microphone input and motion capture, participants can subtly guide the flow and trajectories of sound. The session opens a space to reflect, through practice, on the relationship between audio-tactile perception and spatial composition, touching on assisted improvisation and multimodal diffusion.

Artists, musicians, sound designers, researchers, and curious listeners interested in embodied listening, interactive spatial audio, and performance-driven research are all welcome to attend. Each hour features three active stations with guided spatial listening within the 3D field and interactive control with microphone and motion capture (harness + ambisonics). The three stations are designed for three individual participants (one per station) per slot; auditors are welcome to attend and listen. The session includes short improvisations by the performers, with opportunities for participant interaction. It closes with a Q&A on spatial improvisation, multimodal diffusion, and artistic/technical insights.

WORKSHOPS

BREATHING MEDIA PROJECTS

Tamami Tono composer, shō
Atsushi Todokoro creative coder, visual artist
(Maebashi Institute of Technology)

This workshop features performances involving traditional Gagaku music that is more than 1 000 years old, reimagined with cutting-edge sensors technology.

Hyojyo no Choushi (平調　調子), traditional Gagaku performance

Shō and ibuki, breath controller demo

dinergy 4, for interactive audio/video

Etenraku (越天楽), traditional Gagaku performance with live cording

Audiovisual solo

MUGIC MAGIC

Mari Kimura violin, Mugic Sensors inventor (UC Irvine)
Tamami Tono composer, shō
Minako Ito Bugaku dancer

Mugic is a 9-axis motion sensor similar to other generic 9-axis sensors available on the market. However, what sets Mugic apart is its comprehensive, user-friendly design. Created by violinist and composer Mari Kimura, Mugic is a turnkey product that allows musicians to create their art immediately without requiring extensive programming or electrical engineering skills. The first version of Mugic sold out following a significant bulk order from the Lincoln Center in NYC this spring. As Mugic v.2 is under development, Kimura will demonstrate the importance of fostering a community around new technology and how Mugic users are expanding its application not only in music but also in other forms of art and beyond.

Demonstration and workshop

SOMAXMOBILE, for violin, Somax, Mugic

Genjyoraku (還城楽), traditional Gagaku music with Mugic

THE SOPHTAR: AN ELECTROACOUSTIC FEEDBACK INSTRUMENT WITH EMBEDDED ALGORITHMS FOR HUMAN-MACHINE IMPROVISATION

Federico Visi composer, performer, Sophtar Instrument inventor (Universität der Künste Berlin)

The Sophtar is a tabletop string instrument with an embedded system for digital signal processing, networking, and machine learning. It features an array of actuators and controlled electroacoustic feedback capabilities that can be activated algorithmically by the models running on the embedded computer. These respond to the actions of the player, making the instrument a platform for electroacoustic human-machine improvisation. Other features of the Sophtar include a pressure-sensitive fretted neck, two sound boxes, and bespoke interface elements. It combines conventional tactile musical affordances with recent machine learning models and digital signal processing algorithms, which are deeply integrated in the design of the instrument and have a strong influence on how it is played and the way it sounds. During this workshop I will presents the instrument and its distinctive techniques, and improvise with different algorithms and models.

FIRST MEETING

Alain Blesing composer, electric guitar, Somax2
Claudie Boucau flutes

This workshop will attempt to determine under what conditions the discourse of two improvising musicians (Alain Blesing: electric guitar, and Claudie Boucau: flute) can be brought closer to, or even inspired by, a body of work considered and claimed to be the complete opposite of improvisation, namely the music of Pierre Boulez. It will propose a work based on excerpts from the *Douze notations* for piano, a cycle of short pieces composed in 1945.

Short performances and audio excerpts will comment on and illustrate the subject. A second part will feature a longer performance, both solo and duet. This performance will involve Somax 2 in addition to the two musicians, in various playing modes. The final part of the workshop will be devoted to a discussion and possible questions.

Thursday, 4 December

IRCAM, Stravinsky room, 9.30 am - 1 pm
Lectures

Mixed Initiative Co-creative Design for Long-Term Human-AI Musical Partnership
Ken Deguernel, (CNRS; Laboratoire CRISTAL; Université de Lille)

Generative Spatial Synthesis of Sound and Music (ERC G3S)
Alain Bonardi, (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Emma Frid, (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Paul Goutmann, (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Axel Chemla-Romeu-Santos, (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)

Somax2 for Live Visual Music: Co-improvisation with Creative Agents
Sabina Covarrubias, digital artist, founder of Synesthesic Devices

The meaning of « co » in « co-creative »
Pierre Saint-Germier, (CNRS; IRCAM)

Gestures in Electronic Improvised Music
Pierre Couprie, (Université Évry Paris-Saclay)

Real-time Recognition of Instrumental Playing Techniques for Composition and Co-creative interaction
Nicolas Brochec, PhD researcher (Tokyo University of the Arts)
Marco Fiorini, PhD researcher (IRCAM; Collegium Musicae)

IRCAM, Studio 5, 2-7 pm
Workshops

AI at Carnegie Hall and Electronic Instrument Design
Levy Lorenzo, percussions, electronics

Activate Cities: Urban Inspiration and Live-coding
NSDOS (Kirikoo Des), composer, electro-hacker, dancer
Noam Assayag, writer, visual artist, performer

IRCAM, Stravinsky room, 4.30 pm
Workshops

PURE MALT: Augmented Improvisations, from Instrumental Gesture to Telematics
Mikhaïl Malt, composer, Somax2 AI Agents, live electronics, telematics
Cássia Carrascoza, flute, telematics (Universidade de São Paulo)
Li Chin Li, sheng

TikTok Djam
Yohann Rabearivelo, PhD researcher (EHESS)
Ulysse Roussel, PhD researcher (Sorbonne Université)
Martin Mahieu, musician
Heny Zouari, PhD researcher (EHESS), violin

LECTURES

MIXED INITIATIVE CO-CREATIVE DESIGN FOR LONG-TERM HUMAN-AI MUSICAL PARTNERSHIP

Ken Deguernel (CNRS; Laboratoire CRISTAL; Université de Lille)

Current mixed initiative co-creative systems (MICC) have opened new avenues in music generation. These systems facilitate novel creative processes and modes of interactions. However, these systems lack the ability for long-term adaptation between user and machine. Current ways of adapting are either unilateral, where the user adaptively learns to operate the AI system, or self-engineered, where musician-engineers modify their own systems over time. The recently started ANR research project *MICCDroP: Mixed Initiative Co-Creative Design for Long-Term Human-AI Musical Partnership* aims to address this limitation by developing AI systems for music performance based on lifelong learning, with a focus on adaptation and personalisation. These systems will allow us to explore the evolution of human-AI partnerships using ethnographic studies and creativity theory, as well as conduct artistic experimentations and live performances to inform future research directions. In this presentation, Ken Deguernel will introduce the theoretical and practical underpinnings of the project, as well as its future prospects.

GENERATIVE SPATIAL SYNTHESIS OF SOUND AND MUSIC (ERC G3S)

Alain Bonardi (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Emma Frid (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Paul Goutmann (Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)
Axel Chemla-Romeu-Santos Université Paris 8; CICM / MUSIDANSE; Projet ERC G3S)

While the industrial markets for 3D audio and artificial intelligence in music are expanding rapidly worldwide, the spatial qualities of sound are still an unthought-of aspect of AI. In practice, spatial audio is generally carried out in post-production and is usually confined to the spatialization of sound and the acoustic modelling of rooms. The aim of the *G3S* project is to propose new ways of creating, modelling and analyzing sound by natively integrating its spatial dimension. Its goal is to extend the theoretical and practical approach to spatial diffusion, whether with loudspeakers or headphones, by using the generative capabilities of artificial learning.

SOMAX2 FOR LIVE VISUAL MUSIC: CO-IMPROVISATION WITH CREATIVE AGENTS

Sabina Covarrubias digital artist, founder of Synesthesic Devices

Visual music has a rich history, yet live audio-visual (A/V) practice is often limited by fixed control schemes. Within the framework of co-improvised interaction and distributed creativity, Somax2 offers new perspectives on visual music by organizing audiovisual forms through agents, players, and influences that operate in real time. Instead of treating the image as a passive display, Somax2's multi-agent capabilities and corpus-level tools – Regions, Filter, and Atom – are used to structure performance and support emergent and cohesive behaviors across media. This lecture outlines practice-ready configurations in which: internal and external influences, peaks/matches, and reactive/continuous modes shape local and global form, continuity, quality/sparse, probability, and beat alignment provide macro-temporal control suitable for large-scale audiovisual structures, and musical information dynamics, including information rate, function as analysis and design principles during performance. In this context, the strategies of dialogue, enrichment, convergence, and divergence employed by the agents become visible and audible as co-creative phenomena rather than predetermined mappings. It also proposes lightweight documentation via state indices, matches, and region activity to evaluate perceived agency and formal clarity ex post facto. Overall, this contribution redefines Somax2's role in visual music, positioning it not as a unidirectional driver but as an operational framework for co-creativity in live, improvised audiovisual performances. This approach aligns with *REACH*'s objectives for creative agents and multi-timescale adaptation.

THE MEANING OF "CO" IN "CO-CREATIVE"

Pierre Saint-Germier (CNRS; IRCAM)

It is increasingly common for researchers in the field of computational creativity to substitute the question of co-creativity for the question of creativity. The common pattern of reasoning seems to be that creativity requires agency, computational machines lack agency, and therefore cannot be creative on their own. So we should look instead for ways to be creative *with* computational machines, rather than trying to design creative ones. But if computational machines lack agency, and a fortiori creativity, how can you be *co*-creative with them? If co-creativity is to be a viable substitute for creativity, some explanation is in order regarding the meaning of "co". One way to approach this question is to look for a theory of distributed creativity, taking traction from similar efforts in the theory of distributed agency and the theory of distributed cognition, as developed in the fields of philosophy, anthropology, and cognitive science. The presentation will propose some preliminary results in this research, taking the case of Somax as a running example.

GESTURES IN ELECTRONIC IMPROVISED MUSIC

Pierre Couprie (Université Évry Paris-Saclay)

This presentation revisits Philippe Descola's concept of "worlding," emphasizing the creative process through which improvising musicians construct their own sonic environments. In electronic improvisation, the musician actively develops and refines their instrument, adapting its interfaces and performance techniques, thereby continuously shaping their unique musical world. This lecture first examines the role of the instrument in electronic improvisation, highlighting its hybrid nature, which integrates electro-mechanical, analog, and digital elements. The second key concept, the trace, explores how performance documentation transforms into an artifact. In performance analysis, musicologists work with traces — recordings that capture an event and are subsequently shaped through selection, editing, and mastering. The final section addresses the complexities of musical gestures in electronic improvisation. Given the inherent challenges in defining and analyzing gestures, this presentation introduces the concept of a "gestural chain" or "catena," drawing from geological metaphors to illustrate how gestures influence and build upon one another in a non-hierarchical structure. This interconnected network of gestures shapes the act of performance, encompassing movements made by the musician, interactions with the instrument, and the perception of these actions by the audience. The presentation is accompanied by audiovisual examples, including an improvisation, as well as a performance where gestures of diffusion are explored within a spatialized orchestration setup. Ultimately, the study of music, particularly in improvisation, is not merely an analysis of sound objects but of the complex web of gestures that bring music into being.

REAL-TIME RECOGNITION OF INSTRUMENTAL PLAYING TECHNIQUES FOR COMPOSITION AND CO-CREATIVE INTERACTION

Nicolas Brochec PhD researcher
(Tokyo University of the Arts)
Marco Fiorini PhD researcher
(IRCAM; Collegium Musicae)

Throughout the history of music, playing techniques have greatly evolved. With the advent of contemporary music in the West in the second half of the 20th century, playing techniques became one of the central parameters of musical expression, if not the only one in specific genres. Despite the growing use of computers in music practices and the emergence of computer music in the 1970s, playing techniques have been largely disregarded by music algorithms due to their complex nature. In recent years, the emergence of artificial intelligence, which allows a more accurate real-time music analysis, made it possible to design computer music tools based on playing techniques. It is in this context, that composer Nicolas Brochec decided to focus on imagining playing technique-based human-machine music interactions for mixed music composition, a project that led him to work with improviser and engineer Marco Fiorini, who shared the same vision for improvisation and co-creative interaction. This lecture intends to present the compositional and improvisational motivations behind ipt~, a Max/MSP external object for real-time recognition of instrumental playing techniques, as well as methods and techniques that led to a reliable and robust system, spanning from sound bank recording to algorithm design and training.

WORKSHOPS

AI AT CARNEGIE HALL AND ELECTRONIC INSTRUMENT DESIGN

Levy Lorenzo percussions, electronics

This workshop describes the musical and technical process for presenting a new work: *Pliages* at Carnegie Hall, that uses Boulez's *Pli Selon pli: No. 3* as musical training material for corpuses for Somax2. The work is an improvisation for Somax2 and members of the International Contemporary Ensemble (voice, harp, piano, percussions, electronics). Levy Lorenzo, will present his work to offer consideration between manual vs automatic music, as well as embodied and disembodied performance.

ACTIVATE CITIES: URBAN INSPIRATION AND LIVE-CODING

NSDOS (Kirikoo Des) composer, electro-hacker, dancer
Noam Assayag writer, visual artist, performer

In this workshop, the two artists perform a fragment of their joint project, *Activate Cities*, where ambient music is woven around the pages of a manual of techniques for urban attention and inspiration. Attendees will explore the artistic dimension of "a cellular automaton" and the ability to live-code music with the open-source software Orca.
Just as the machine evolves from an initial set of parameters, we can inject prompts and constraints — even in a simple walk, for example with an altered deck of cards — to step outside of our automatisms and notice things that may have otherwise escaped us. Between attention and intention, this gleaning of sensations, snapshots, and words from the street inspires the musical session that transforms these gleanings into something rich and strange.

PURE MALT: AUGMENTED IMPROVISATIONS, FROM INSTRUMENTAL GESTURES TO TELEMATICS

Mikhaïl Malt composer, Somax2 AI Agents, live electronics, telematics
Cássia Carrascoza flute, telematics (Universidade de São Paulo)
Li Chin Li sheng

This workshop explores the future of improvisational practice by comparing two research-creation projects: one focused on extending instrumental gesture and the other on delocalizing interaction. It examines how modern technologies are transforming relationships between performers, altering human-machine interactions, and redefining spaces for collective musical creation.
The first project focuses on improvisation with traditional instruments and artificial intelligence: Li-Chin Li plays the sheng in interaction with Somax2. This system, capable of learning and responding in real time, becomes a full-fledged improvisation partner. The goal is to show how combining the ancestral gesture of the sheng with the generative responses of the machine can open up a field of hybrid sound exploration, between tradition and innovation.
The second project explores improvisation in a telematic performance. Mikhaïl Malt, using the Somax2 environment and generative electronics while in Paris, interacts live with flutist Cássia Carrascoza Bomfim, located in São Paulo. This configuration serves as a laboratory for examining the creative challenges and opportunities related to network latency, synchronization, and establishing a shared listening experience despite the distance. The workshop will highlight strategies developed to transform technical constraints, such as delays and audio artifacts, into compositional and expressive elements.

TIKTOK DJAM

Yohann Rabearivelo PhD researcher (EHESS)
Ulysse Roussel PhD researcher (Sorbonne Université)
Martin Mahieu musician
Heny Zouari PhD researcher (EHESS), violin

This device explores online and offline co-creativity by creating a dialog between musicians and the Djazz software around TikTok's algorithmic content recommendation. By using published or live-streamed content from the plarform and the sound produced by the musicians, the Djazz software acts both as an intermediary and a moderator between improvised music and music recommended by the algorithms in real-time. This way, it generates in turn new improvised combinations in order to create new sonic patterns from diverse sound sources. TikTok's algorithm has been previously calibrated to offer mostly musical content to the users. The smartphone's screen is shown on a big screen. Videos scroll and their sound is being recorded in Djazz, creating new combinations with the recorded content, its memory and the guest musicians playing on stage. The whole performance is live-streamed on TikTok.

Friday, 5 December

IRCAM, Studio 5, 11 am - 1 pm
Workshops

Hypercept - Improvisation Quatuor
György Kurtág Jr, synthesizers
Donatien Garnier, Metaphorminx instrument, poetry
Emmanuelle Pépin, dancer

Live Coding Practices
Raphaël Forment, musicologist, music software designer
Rémi Georges, sound artist, composer, computer music designer
Guillaume Piccarreta, programmer, digital artist

IRCAM, Stravinsky room, 2-7 pm
Lectures

The Odd Couple - Human & AI Making Music in the Moment
Oded Ben Tal, (Kingston University, London)
David Dolan, (Guildhall School of Music & Drama, London)

Unity Interfaces for Djazz and Somax: Ludic and Narrative Perspectives on Musical Machine Co-creativity
Daniel Brown, (University de Picardie)
Steve Horowitz, composer

Sharing your style with AI: the tale of an unexpected collaboration
Jean-Rémy Guédon, composer, performer

Composition and Improvisation in Contemporary Opera
Sivan Eldar, composer
Jean-Louis Giavitto, (CNRS; IRCAM)
Augustin Muller, computer music designer (IRCAM; Le Balcon)

Evaluation of AI-Based Improvisation Systems
Gilbert Nouno, (Haute école de musique de Genève (HEM))
Christophe Fellay, (École de design et Haute école d'art du Valais (EDHEA))
Nathalie Hérold, (IReMus; Sorbonne Université)
Pierre Alexandre Tremblay, (Conservatorio della Svizzera italiana)

Extensymbiosis - The Audio-Visually Augmented Trumpet and Multi-modal Corpus-based Synthesis as a Shared Instrument
Nicolas Souchal, PhD researcher (IRCAM)
Diemo Schwartz, (IRCAM)

IRCAM, Espace de projection, 8 pm
Improtech Concert #2

Boulez Roloaded
Elaine Chew, piano
Thierry Miroglio, percussions
Gérard Assayag, AI-Agents Somax2

Solo for Sliding Trombone
John Cage, composition
Benny Sluchin, trombone
Mikhail Malt, AI-Agents Somax2, immersive electronics

Taideji
Lara Morciano, composition, piano
Thierry Miroglio, percussions
José-Miguel Fernandez, AI-Agents Somax2Collider, immersive electronics

Entracte

Transe III
Justin Vali, Malagasy zither, voice
Marc Chemillier, AI-Agents Djazz
NSDOS, electronic hack, live coding, dance

NaN - Not a Number
Alberto Maria Gatti, composition, immersive electronics, AI-Agents Somax2
Anaïs del Sordo, voice

in memoriam Susan Alcorn
Miya Masaoka, composition, koto

Nomadologies
George Lewis, composition, SoVo AI system
Joëlle Léandre, bass, voice
Miya Masaoka, koto
Marco Fiorini, SoVo AI system
Damon Holzborn, SoVo AI system
Gérard Assayag, SoVo AI system

WORKSHOPS

HYPERCEPT - IMPROVISATION QUATUOR

György Kurtág Jr synthesizers
Donatien Garnier Metaphorminx instrument, poetry
Emmanuelle Pépin dancer

This performance-presentation revolves around a hybrid instrument, the MÉTAPHORMINX, which was made from a Syrah vine trunk grown in Mas Foulaquier (in the Pic Saint-Loup region in France). The electronics structure includes a three-axis accelerometer, a potentiometer, a breathing sensor, five switches, and a transceiver box, which works remotely, through Wi-fi and MIDI messages.
The program developed especially for this device by Joseph Larrald, called Hypercept, was created in order to explore the versatility of the instrument by deviating it from its initial performative function, and to dig into the different choreographic, musical and verbal registers it can produce in an improvisation practice.

LIVE CODING PRACTICES

Raphaël Forment musicologist, music software designer
Rémi Georges sound artist, composer, computer music designer
Guillaume Piccarreta programmer, digital artist

This workshop constitutes an introduction to live-coding techniques and practices through intersecting perspectives and narratives. Over the course of one hour, Rémi Georges, Guillaume Piccarreta and Raphaël Forment will present the technological, musical, ethical and activist issues that encourage them to practice live coding. They will introduce the tools, websites and works they design. This presentation is followed by uring a 20-25 minute demonstration, they will improvise together over a network, using computers, modular synthesizers and other machines. Live-coding is not merely a production technique; it is rather a way of thinking about musical action and positioning oneself as an artist in relation to technology, creative tools, knowledge sharing and collective creation.

LECTURES

THE ODD COUPLE - HUMAN & AI MAKING MUSIC IN THE MOMENT

Oded Ben Tal (Kingston University, London)
David Dolan (Guildhall School of Music & Drama, London)

This performance-talk will present an ongoing collaboration between composer Oded Ben-Tal and pianist David Dolan. Ben-Tal has been developing an AI-inspired system (JHAIMI – Joint human AI music improvisation) that 'listens' to the pianist (extracting musical data from microphone input) and generates responses in real-time during the performance. The responses combine generative compositional processes on the one hand and real-time musical inferences about the pianist's improvisation on the other. The aim is to create a strong, sophisticated and nuanced musical dialogue between human and machine. Dolan's improvisations are based on an expanded tonal-modal idiom but do not conform to a specific musical style nor adhere to a preplanned scheme such as a chord progression, agreed tempo, key, or meter. The result is a new form of musical dialogue, created by the possibilities of new technology and drawing on the wealth of 300 years of music making. While Ben-Tal is adjusting parameters in the system during the performance to shape larger-scale aspects, the moment-to-moment generation of musical material is done automatically by JHAIMI.

UNITY INTERFACES FOR DJAZZ AND SOMAX: LUDIC AND NARRATIVE PERSPECTIVES ON MUSICAL MACHINE CO-CREATIVITY

Daniel Brown (University de Picardie)
Steve Horowitz composer

This lecture introduces Unity, an interface for Djazz and Somax. Unity is a video game engine: an environment for creating games, a process that involves the design of many aspects such as visuals, physics, characters, rules, as well as music. While game engines traditionally only allow a linear control of a looped playback of prerecorded audio tracks to generate the music design, Unity can also be used as a control interface for generative music systems such as Djazz and Somax. The combination of the systems is appealing: unscripted, dynamically changing musical accompaniments could offer a richer gaming experience. A friction however arises between the game engine and the music system, raising the issue of control and interaction. Are the experiental aspects of gaming that are considered 'meaningful' similar to those of musical improvisation? If so, do the same musical parameters affect these experiential aspects? Should a co-improvisation system be used as the musical accompaniment to an extra-musical experience such as a video game? Or is gameplay another form of interaction that invites as much co-creativity as a direct musical interaction? When discussing video games and music, the dimensions of entertainment and narration need to be considered. During this lecture, examples of Unity in combination with Djazz and Somax will be showcased to illustrate these perspectives and suggest methods of further development and exploration into this combination.

SHARING YOUR STYLE WITH AI: THE TALE OF AN UNEXPECTED COLLABORATION

(TRANSMETTRE SON STYLE À L'IA : RÉCIT D'UNE COLLABORATION IMPROBABLE)

Jean-Rémy Guédon composer, performer

This research project examines the encounter between artificial intelligence and musical intuition from an experimental compositional approach. By mobilizing no-code tools and the latest generation of conversational models (such as GPT-5, Codex, Claude 4.5), Jean-Rémy Guédon set out to train the AI on a corpus of his own pieces collected over the 25 years he spent writing for his ensemble Archimusic. His intent was to convey his unique musical language – neither tonal or atonal and marked by a complex polyphony – to the AI, in order to produce variations that respect that stylistic identity. At the end of several months of research that led to the creation of fourteen musical apps prototypes, the conclusion is clear: there is a discrepancy between the potential promoted by AI and the compositional reality. The machine reproduces without learning, repeats without any real intuition. This conference presents the conclusion of this co-creative experience between composer and algorithm both from an critical and artistic standpoint. It questions the notions of iteration, intuition and agorithmic style and features the recording of a short piece for clarinet born from this collaborative work and performed by Eric Lamberger. Apart from the technical aspect, the goal is to open a reflection on the possibility of creating an "open compostional box": a space where all composers could start a dialog with their own musical memory through the machine.

COMPOSITION AND IMPROVISATION IN CONTEMPORARY OPERA

Sivan Eldar composer
Jean-Louis Giavitto (CNRS; IRCAM)
Augustin Muller computer music designer (IRCAM; Le Balcon)

This presentation addresses the issue of synchronization between electronics and instrumentalists in contemporary opera, focusing in particular on the technical and aesthetic challenges of integrating real time, distributed control, and sound spatialization. Two works, *Like Flesh* (Fedora Prize for Digital Innovation, 2022) and *Nine Jewelled Dear* (Aix-en-Provence Festival, 2025), will provide a concrete opportunity to address the tensions between fixed writing and improvisation, strategies for coordination between instrumental scores and electronic devices, as well as the perspectives opened up by the reactive music programming tools developed at IRCAM to make electronics expressive and lively by integrating human musical time into the heart of the concert.

EVALUATIONS OF AI-BASED IMPROVISATION SYSTEMS

Gilbert Nouno (Haute école de musique de Genève (HEM))
Christophe Fellay (École de design et Haute école d'art du Valais (EDHEA))
Nathalie Hérold (IReMus; Sorbonne Université)
Pierre Alexandre Tremblay (Conservatorio della Svizzera italiana)

This lecture draws on an exploratory studio sessions and a workshop conducted at HEM Geneva, offering a practice-based evaluation of AI devices for free improvisation. It articulates conditions of stage operativity with poetic/aesthetic effects or more precisely, how the agent transforms the act of playing and the act of listening, in order to probe their digital organology. The study yields development directions for agents conceived as co-acting partners within a shared capacity for action between human and device, aiming at the conjunction of surprise and formal coherence.

EXTENSYMBIOSIS - THE AUDIO-VISUALLY AUGMENTED TRUMPET AND MULTI-MODAL CORPUS-BASED SYNTHESIS AS SHARED

Nicolas Souchal PhD researcher (IRCAM)
Diemo Schwartz (IRCAM)

This lecture presents three technologies for free non-idiomatic audio–visual improvisation, the fruit of long-term research and musical application in performance and compositional contexts. First, corpus-based concatenative synthesis leverages machine listening and allows to play music by selecting grains from pre- or live-recorded sound via gesture-controlled navigation in a timbre space defined by perceptual audio descriptors. Second, the extension of corpus-based synthesis to the domain of images enables audio–visual improvisation via cross-modal mappings between the audio and visual perceptive dimensions. Third, the audio-visually augmented trumpet uses the sound of the instrument itself to control sound processing, unlike typical sensor-based augmented instruments. The audio-augmentation is based on real-time sound analysis driving sound processes such as additive synthesis, resonators, and auto-convolution. The main aim of this trumpet is to explore human/augmented-instrument interactions that trigger unpredictability, navigating between moments of control and moments of adaptation to situations of non-control, which is particularly relevant to the practice of improvisation. The lecture will be followed by a short piece that combines these three technologies by live-recording the augmented trumpet to feed the corpus-based embodied instrument CataRT, and to control image generation from a corpus of drawings by Elizabeth Saint-Jalmes, creating a symbiotic shared multi-modal instrument.

IMPROTECH CONCERT #2

BOULEZ RELOADED

Elaine Chew piano
Thierry Miroglio percussions
Gérard Assayag AI-Agents Somax2

Conceived in homage to Pierre Boulez on his centennial, *Boulez Reloaded* is a musical trio that brings to the live stage human-AI cocreativity and skilled human improvisers. An open, semi-improvised dialog between multiple confronting music streams which draws material from the rich musical history that shaped Boulez's work . Elaine Chew will perform, adapt, and improvise on musical excerpts, from works such as Boulez's *Fragment d'une ébauche* (1987) or his 1st piano sonata (1946). Gérard Assayag will guide Somax2 AI agents' improvisations towards different interaction strategies and sonic material drawn both from Chew's live piano playing and corpuses of Boulez's works including *Pli selon pli*, sometimes switching to totally different sonic universes. Thierry Miroglio will blend in with various percussions in a "*tintinnabulant*" (tinkling) spirit that Boulez would have much appreciated. The musician's and the machine's reciprocal listening and adaptation produce rich and previously unheard combinations. New possible readings of Boulez' complexity emerge, giving his works a new life beyond their finitude, and a resolutely new aesthetical and ethical approach to AI. The music that Boulez loved, analyzed and conducted, notably Ravel whose 150th birthday is also celebrated this year, also finds its way in this musician-AI dialog, which extends the idea of re-creation to that of a meta-level dialogue of musics and influences fueled by AI.

SOLO FOR SLIDING TROMBONE

John Cage composition
Benny Sluchin trombone
Mikhail Malt AI-Agents Somax2, immersive electronics

This performance presents an artistic research project exploring the performance of John Cage's *Solo for Sliding Trombone* using AI generative tools within the Somax2 environment. The performance investigates the interplay between human interpretation, AI-assisted performance, and Cage's core concepts of silence, indeterminacy, and unintentionality. By integrating AI agents as virtual performers and employing techniques like "coloring the silence" and "expansions," the research aims to push the boundaries of Cage's indeterminacy. This artistic research resulted in a unique set of improvised performances, captured and presented in a box set with 7 distinct tracks, showcasing the dynamic interplay between human and AI creativity within the framework of Cage's innovative musical philosophy.

TAIDEJI

Lara Morciano composition, piano
Thierry Miroglio percussions
José-Miguel Fernandez AI-Agents Somax2 Collider, immersive electronics

In this piece, the collaboration between the performers is rooted in an exploration of the dynamic relationship between acoustic instruments and electronics, incorporating the interactive possibilities offered by Somax2. The sonic palette of the piano at times low, distorted, and percussive, at others bright and resonant, interacts with the rich colors of the percussion, shaping a musical journey marked by strong contrasts and an ever-shifting energy, oscillating between density and rarefaction. On the electronic side, the two acoustic instruments are processed in real time through various techniques, while Somax2 establishes a sensitive and reactive connection between instrumental performance and generated sound material, enriching the dialogue between human and machine.

TRANSE III

Justin Vali Malagasy zither, voice
Marc Chemillier AI-Agents Djazz
NSDOS electronic hack, live coding, dance

World music star zitherist Justin Vali will propel this collective into the realms of musical trance as practiced in Madagascar. The crystalline swirls of Justin Vali's zither are relayed by the obsessive improvisations generated by Marc Chemillier using the artificial intelligence system Djazz, trained through machine learning with zither playing data. This captivating dialogue is underpinned by hypnotic grooves, notably the diabolical ternary rhythms of the Indian Ocean. Electronic musician NSDOS adds enveloping and sophisticated textures, drawing on the audio features of these improvisations, while sounds of Malagasy nature are projected into the room space, as in a traditional context they are inseparable from the music. In this confrontation between AI and the world of trance and spirits, the focus is on the delicate balance between the treasures of tradition and technological innovation.

NAN - NOT A NUMBER

Alberto Maria Gatti composition, immersive electronics, AI-Agents Somax2
Anaïs del Sordo voice

NaN - Not a Number is an immersive sonic experience, a real-time dialog between the human voice and artificial intelligence, where the concept of feedback becomes a dynamic and creative principle. This performance-concert explores the co-creation between the organic and the synthetic, an unpredictable fusion of the living presence of the voice and the responsiveness of an AI agent system that transforms, reacts to, and reshapes sound into a continuum of sonic metamorphosis. The performer, as the primary acoustic source, interacts with a latent AI environment that analyzes, processes, and reinterprets her vocality, generating an ever-evolving sound ecosystem. Every breath, timbral inflection, and harmonic extension propagates through space, giving rise to mutable and dynamic sonic configurations. The performance unfolds in an expanded and immersive environment, enriched by a resonant proscenium made of diverse materials (metal, glass, paper), which serve as surfaces for sound diffusion and vibration. These elements become active parts of the concert, amplifying and transforming the sound into a material choreography that engages the audience in a multi-sensory experience. The result is a seamless sonic flow, where the boundary between human and machine dissolves, giving way to a new, ever-transforming sonic organism. *NaN* goes beyond the musical performance: it's an experiment in symbiosis between voice and artificial intelligence, a journey into the unexpected, the indeterminate, and the beauty of emergent interaction.

IN MEMORIAM SUSAN ALCORN

Miya Masaoka composition, koto

in memoriam Susan Alcorn by kotoist Miya Masaoka will celebrate the great musician Susan Alcorn who left this world in January 2025. Miya, Susan and viola player LaDonna Smith performed as a trio at Improtech 2017 in Philadelphia.

NOMADOLOGIES

George Lewis composition, SoVo AI system
Joëlle Léandre bass, voice
Miya Masaoka koto
Marco Fiorini SoVo AI system
Damon Holzborn SoVo AI system
Gérard Assayag SoVo AI system

Nomadologies is a musical work realized as a real-time dialogic collaboration among contrabassist Joëlle Léandre, kotoist Miya Masaoka, and SoVo, a new cocreative improvisation system conceived to expand the communicative terrain of human-machine collaboration in ways discussed for quite some time by George Lewis and Gerard Assayag during their encounters at preceding Improtechs. Designed and implemented in 2024-25 by Marco Fiorini, Damon Holzborn, George Lewis and Gérard Assayag, the SoVo system represents the convergence of decades of innovation in artificial intelligence and improvisation. SoVo is not a fixed composition, but a dynamic environment where creative agency is distributed among human virtuoso performers Léandre and Masaoka, and improvising software agents operating in an integrated architecture combining Lewis' Voyager system with the program Somax2 from the REACH project. The system merges symbolic and audio-based interaction, combining in real time rule based algorithmic generation with machine learning and cognitive modeling, and uses machine listening and adaptive strategies both between the program and the musicians and between the So and Vo components. This performance will also feature ipt~, a new, groundbreaking tool for real-time instrumental playing techniques recognition by Nicolas Brochec, Joakim Borg and Marco Fiorini, that will enhance "machine listening" to better "understand" musical gestures. The system engages in the improvisational process with creative autonomy, where intention, memory, and form emerge through co-authored musical discourse.

Saturday, 6 December

IRCAM, Studio 5, 2-7 pm
Installations-concerts

WWW, for Spat'Sonore: Tentacular Physical Spatialisation
José-Miguel Fernandez, composition, AI-Agents Somax2Collider, immersive electronics
Amaryllis Billet, violin
Philippe Bord, French horn
Nicolas Chedmail, French horn
Roméo Monteiro, percussions
Maxime Morel, brass instruments
Joris Rühl, clarinet

Batterie Fragile (Fragile Drums)
Yves Chaudouët, creator of the Fragile Drums
Jean-Brice Godet, clarinets
Thierry Miroglio, percussions
Aurélien Gignoux, percussions
NOSFELL, composition, voice, texts
Mikhail Malt, composition, Somax2 AI Agents

INSTALLATIONS / PERFORMANCES

WWW

FOR SPAT'SONORE: TENTACULAR PHYSICAL SPATIALISATION

José-Miguel Fernandez composition, AI-Agents Somax2 Collider, immersive electronics
Amaryllis Billet violin
Philippe Bord French horn
Nicolas Chedmail French horn
Roméo Monteiro percussions
Maxime Morel brass instruments
Joris Rühl clarinet

The concept of *WWW* (« *Wood Wide Web* ») stems from the discovery that trees and plants are not isolated entities, but entertain complex and symbiotic interconnections within their group and with other organisms. This term is used to describe the intricate communication and nutrients-trading network between trees, plants, mushrooms and other living organisms inhabiting the forest ecosystem. This underground communication plays a major role in resource sharing, disease resistance and the survival of plants in nature. This system allows the different components of the forest to self-regulate, thus creating a whole universe defined by its interactions and diversity. This idea constitutes the basis and source of inspiration for this composition/improvisation with Spat'Sonore, which can be described as a large, sprawling instrument with branches like "climbing plants made out of copper tubes topped with corollas-like horns that form a cocoon of sound within which listeners are seated. Each machinists is stationed at a different mouthpiece with valves to play their spat'." The combination of the spatialized instruments from the Spat'sonore structure and real-time immersive electronics create a complex communication network between the different components of the system. Self-regulation is insured by spatial agents such as Somax2Collider, in a system with distributed speakers that is playing throughout the whole performance, taking into account the audio descriptors but also where the sounds emitted by the different instruments of the ensemble come from.

BATTERIE FRAGILE

Yves Chaudouët creator of the Fragile Drums
Jean-Brice Godet clarinets
Thierry Miroglio percussions
Aurélien Gignoux percussions
NOSFELL composition, voice, texts
Mikhail Malt composition, Somax2 AI Agents

Made of biscuit porcelain by visual artist, writer and stage director Yves Chaudouët, the *Fragile Drums* (la *Batterie Fragile*) is a sculpture that requires special care. A kind of "musical oxymoron" from the words of philosopher Pierre Sauvanet, the battery was initially only designed to be an invitation to dream. But it was without counting on the musicians who longed to try it. Since then, it has been often use by percussionists, such as Bernard Lubat, Valentina Magaletti, Sylvain Darrifourcq, Julian Sartorius, Aurélien Gignoux, Iker Idoate, Amélie Gould... who all play with the limits of its fragility in solo pieces performed on current music scenes. The *Fragile Drums* prototype, conceived at the ÉSAD-Pyrénées in 2016, is part of the FRAC Nouvelle-Aquitaine MÉCA's collection. The second version, which was developed at the ENSAD-Limoges, is the one that will be used at Improtech. The *Fragile drums* will be played by Thierry Miroglio and Aurélien Gignoux, along with different musicians like Jean-Brice Godet (clarinet), Nosfell (voice, text), and the co-creative generative AI system Somax2.

Sunday, 7 December

La Dynamo, Pantin, 2-5 pm
Masterclass

Masterclass REACHin' Paris
Steve Lehman, saxophones
Miles Okazaki, guitar, Dogstar generative system
The Somax Brothers (Gérard Assayag, Marco Fiorini), AI-Agents Somax2

La Dynamo, Pantin, 6 pm
Improtech Concert #3

REACHin' Paris
Steve Lehman, saxophones
Miles Okazaki, guitar
The Somax Brothers (Gérard Assayag, Marco Fiorini), AI-Agents Somax2

MASTERCLASS

MASTERCLASS REACHIN' PARIS

Steve Lehman saxophones
Miles Okazaki guitar, Dogstar generative system
The Somax Brothers (Gérard Assayag, Marco Fiorini)
AI-Agents Somax2

Steve Lehman and Miles Okazaki give an exceptional masterclass open to the public before the concert, in which they will discuss their musical trajectory as composers and instrumentalists and shed valuable light on their creative relationship with technology. They will be accompanied by the Somax Brothers (Gérard Assayag and Marco Fiorini) to share demonstrations of the generative software (Dogstar and Somax2) used in the concert and thoughts on interaction strategies and the type of listening and responsiveness that such an experience with the machine brings into play. The masterclass will end with a session of Q&A and a discussion with the audience.

IMPROTECH CONCERT #3

REACHIN' PARIS

Steve Lehman saxophones
Miles Okazaki guitar
The Somax Brothers (Gérard Assayag, Marco Fiorini)
AI-Agents Somax2

Internationally recognized as leaders in the field of modern improvisation and compositional thought, Miles Okazaki (electric guitar, live electronics) and Steve Lehman (alto saxophone) will join the Ircam Somax Brothers (Gérard Assayag and Marco Fiorini) with their Somax2 AI Agents, in a collection of short compositions and improvisations showcasing a variety of approaches to musician-machine interaction. In this cocreative experiment of a new kind, the musicians may enjoy their full freedom of expression while the algorithmic systems in presence (Dogstar by Miles Okazaki and Ircam's Somax2) navigate their way to follow their steps and expand their flows in an electroacoustic and generative space. This concert will also feature ipt~ an innovative tool for real-time instrumental playing techniques recognition by Nicolas Brochec, Joakim Borg and Marco Fiorini that will enhance the "machine listening" process to better "understand" musical gestures.

IRCAM
Institute for Research and Coordination in Acoustics/Music

IRCAM, the Institute for Research and Coordination in Acoustics/Music directed by Frank Madlener, is one of the world's largest public research centers dedicated to both musical expression and scientific research. This unique location where artistic sensibilities collide with scientific and technological innovation brings together over 160 collaborators.
IRCAM's three principal activities — creation, research, transmission — are visible in IRCAM's Parisian concert season, in productions throughout France and abroad, and in an annual rendezvous, ManiFeste, that combines an international festival with a multidisciplinary academy.
Founded by Pierre Boulez, IRCAM is associated with the Centre Pompidou, under the tutelage of the French Ministry of Culture.
The mixed STMS research lab (Sciences and Technologies for Music and Sound), housed by IRCAM, also benefits from the support of the CNRS and Sorbonne University.
In 2020, IRCAM created Ircam Amplify, a spin-off for the commercialization of the institute's audio innovations. A true interface between state of the art of audio research and the industrial world on a global scale, Ircam Amplify is a major actor in the sound revolution of the 21st century.

ircam.fr

REACH
Raising Co-creativity in Cyber-Human Musicianship

Digital cultures are increasingly pushing forward a deep interweaving between human creativity and autonomous computation capabilities of surrounding environments, modeling joint human-machine action into new forms of shared reality involving ""symbiotic interactions" found in the arts and, more generally, in almost any human endeavor. Co-creativity between humans and machines will bring about the emergence of distributed information structures, creating new performative situations with mixed artificial and human agents. This will disrupt known cultural orders and significantly impact human development. Generative learning of symbolic representations based on physical and human signals, as well as the understanding of artistic and social strategies of improvisation, will help us to better comprehend the dynamics of cooperation (or conflicts) inherent to cyber-human bundles.

To this end the *REACH* project aims at understanding, modeling, and developing musical co-creativity between humans and machines through improvised interactions, allowing musicians of any level of training to develop their skills and expand their individual and social creative potential. Indeed, improvisation is at the very heart of all human interactions, and music is a fertile ground for developing models and tools of creativity that can be generalized to other activities, as in music the constraints are among the strongest to conduct cooperative behaviors that come together into highly integrated courses of actions. *REACH* will study shared musicianship occurring at the intersection of the physical, human and digital spheres as an archetype of distributed (natural / artificial) intelligence, and will produce models and tools as vehicles to better understand and foster human creativity in a context where it becomes more and more intertwined with computation.

REACH is based on the hypothesis that co-creativity in cyber-human systems results from a an emergence of coherent behaviors and non-linear regimes of event and structure formation, leading to a rich co-evolution of musical forms. These phenomena result from cross-learning processes between agents involving feedback loops and complex reinforcement mechanisms. *REACH* will study these mechanisms in vivo and in vitro, and will produce creative tools through the convergence of methods from research in interactive computational creativity, artificial intelligence and machine learning, social sciences with the anthropology of improvised practices (collaboration with CAMS at EHESS), and instrumental mixed reality systems (collaboration with the company HyVibe).

ircam.fr