

# Inter-Centre Research Exchange 2025 - Report

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**Exchange Institute:** Institut de recherche et coordination acoustique/musique (IRCAM)

**Dates of Exchange:** May 15th to August 3rd 2025

## Main Research Activities

During my stay at IRCAM, I focused on the development of software tools that support improvisation practices with semi-autonomous musical agents. A first line of work involved prototyping Max for Live devices designed to bridge Ableton Live with the DICY2 framework. This environment is already widely used by collaborating musicians across various genres, which made it a natural choice for prototyping. A first proof of concept included sending warp markers from Ableton into the agent's MuBu system and retrieving segmentation markers back into the DAW environment. These experiments aimed to create a more fluid interaction between performers and machine agents by allowing Ableton's flexible editing environment to act as both a source of analysis data and a recipient of machine-generated structural information.

A second area of work focused on visualization and editing within REAPER. I contributed to the design of a module that makes the processes of segmentation, clustering, and adaptation within semi-autonomous agents more intelligible to musicians. The interface offers options such as hiding or revealing markers, as well as comparing the outputs of multiple analyses on the same audio file, which makes it possible to assess how different parameters affect the system's behavior.

The most significant addition was the development of an editing workflow that allows users to correct or adjust the corpus directly through REAPER's interface, and then export the revised material for use in a Max patcher. While this approach is less tightly integrated than the Max for Live prototype in Ableton, it offers a more complete and accessible tool for managing corpora. This expanded functionality supports a more iterative and musician-centered practice, aligning corpus preparation with the tools already familiar to performers.

Together, these activities represent an effort to strengthen the technical infrastructure for improvisation with agents: enabling musicians to interact with corpora in DAW environments, making machine learning processes more intelligible, and aligning these tools with the practical needs of performers.

## **Secondary / Parallel Activities**

Beyond these technical developments, I took part in a number of activities that expanded the scope of my stay. I gave a 45-minute presentation as part of the STMS series at IRCAM, where I introduced my doctoral project and demonstrated both an excerpt of an eTube performance and a prototype of the visualization tool. The presentation generated questions and discussions around co-creativity, the transparency of AI processes in musical contexts, and the artistic potential of semi-autonomous systems.

I also participated in meetings and seminars organized by the ISMM team, which allowed me to exchange with researchers working on related topics such as real-time interaction, gesture analysis, and machine listening. Informal discussions with doctoral students and postdoctoral fellows were an important part of the residency, as they provided multiple perspectives on methodological approaches and artistic applications.

## **Outcomes & Impact**

The tools developed during this stay will soon be made available on GitHub, ensuring broader access and continued refinement. The residency also strengthened collaborations with IRCAM researchers, further bridging the research communities between Montreal and Paris. Finally, I am in the process of preparing a thorough report on the work accomplished, which will be shared with collaborators and supporting organizations.

## **Future Directions**

The next steps will focus on consolidating the prototypes developed during this stay into stable tools, including Max for Live devices and a visualization module within REAPER. These tools will be directly integrated into my doctoral research on improvisation practices with semi-autonomous agents. A co-authored publication with colleagues at IRCAM is also planned, presenting the results of an artistic workshop that incorporated these technologies.

## **Acknowledgments**

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