Musical Agents Tutorial

Keon Ju Maverick Lee
Metacreation Lab
Simon Fraser University
keon_maverick@sfu.ca

Philippe Pasquier
Metacreation Lab
Simon Fraser University
pasquier@sfu.ca

Jérôme Nika
STMS Lab
IRCAM
jerome.nika@ircam.fr

Balthazar Bujard
STMS Lab
IRCAM
Balthazar.Bujard@ircam.fr

Arne Eigenfeldt
School of Contemporary Arts
Simon Fraser University
arne_e@sfu.ca

Notto J. W. Thelle
Faculty of Technology, Art and Design
Makerspace - Oslo Metropolitan University
notto@oslomet.no

Bernt Isak Wærstad
Freelance artist
Oslo / Nairobi
berntisak@gmail.com

Oliver Bown
School of Art & Design
University of New South Wales
o.bown@unsw.edu.au

Abstract

This tutorial/workshop brings together a group of presenters actively engaged in the development of musical agent architectures and their use in live performances. Following an introduction and overview of this established subfield of AI music research and practice, a variety of agent architectures will be presented: MASOM/MACAT/MACataRT, Dicy2/OpenTuning, Musebots, SpireMuse/CCCP, and an LLM agent. Participants will receive guidance on working with each architecture. To illustrate and contrast the unique potential of these systems, past and ongoing artistic projects utilizing each architecture will also be showcased and discussed.

1 List of contributors

Coordinators: Philippe Pasquier and Keon Ju Maverick Lee

Presenters:

1. - Philippe Pasquier, Professor, Metacreation Lab, Simon Fraser University
2. - Keon Ju Maverick Lee, Ph.D. candidate, Metacreation Lab, Simon Fraser University
3. - Jérôme Nika, Researcher, STMS Lab - IRCAM
4. - Balthazar Bujard, Ph.D. candidate, STMS Lab - IRCAM
5. - Arne Eigenfeldt, Professor, Simon Fraser University
6. - Notto J. W. Thelle, Head of Section, Makerspace - Oslo Metropolitan University
7. - Bernt Isak Wærstad, Freelance artist - Oslo/Nairobi
8. - Oliver Bown, University of New South Wales

Proceedings of the 6th Conference on AI Music Creativity (AIMC 2025),
Brussels, Belgium, September 10th-12th

2 Musical agent tutorial program

Table 1: Tutorial schedule with presenters and session topics (total duration: 410 minutes).

Duration	Presenter(s)	Session Description
15 min (morning)	Everyone (led by Philippe Pasquier)	Introduction to the tutorial and its presenters.
45 min (morning) + 5 min Q&A	Philippe Pasquier	Introduction to musical agents: An ontology of musical agents is presented, along with a brief survey of selected examples from over 80 architectures developed so far (Tatar and Pasquier, 2019).
15 min (morning)	—	Coffee break.
30 min (morning) + 5 min Q&A	Keon Ju Maverick Lee	MASOM (Tatar and Pasquier, 2017) and MACAT/MACataRT (Lee and Pasquier, 2024).
20 min (morning) + 5 min Q&A	Philippe Pasquier	Artistic application of MASOM, MACAT, and MACataRT.
45 min (morning) + 5 min Q&A	Jérôme Nika	Dicy2 and its artistic application. This session explores the use of Dicy2 in Max and Ableton Live (Nika et al., 2022a,b), highlighting the performance-led process behind its development.
60 min (lunch)	—	Lunch break.
30 min (afternoon) + 5 min Q&A	Balthazar Bujard, Jérôme Nika	OpenTuning – New developments in IRCAM's ISMM group toward tuning musical agents through small curated sets of individual stems.
20 min (afternoon) + 5 min Q&A	Arne Eigenfeldt	Brief overview of artistic collaborations with Musebots (Brown et al., 2018; Eigenfeldt, 2022).
15 min (afternoon)	—	Short break.
45 min (afternoon) + 5 min Q&A	Notto J. W. Thelle, Bernt Isak Wærstad	Introduction to CCCP (Thelle and Wærstad, 2023a,b) and demonstration of the training of musical agents using small datasets with their own material.
30 min (afternoon) + 5 min Q&A	Oliver Bown	Music of the Sails (Bown et al., 2023) using an LLM musical agent as a data interpreter.

Musical agents (Tatar and Pasquier, 2019) are autonomous artificial systems designed to perform musical creative tasks, either partially or fully, by leveraging methods from Artificial Intelligence (AI) and Multi-Agent Systems (MAS). As a subfield of Musical Metacreation (Pasquier et al., 2017)—a domain that bridges computational creativity and generative music practices—musical agents exhibit characteristics such as autonomy, adaptability, communication, and real-time interaction. These agents can function as composition tools, improvisational collaborators, or interactive performance

partners. Their design draws from both scientific and artistic disciplines, encompassing symbolic and audio-based representations, and may involve diverse roles, environments, and human interaction modalities. The typology of musical agents reflects this diversity, highlighting a wide range of architectures from cognitive and reactive models to hybrid systems that support the emergence of creative musical behaviour in real-time settings.

The full-day tutorial outlined in Table 1 spans approximately seven and a half hours (410 minutes, including breaks) and provides a comprehensive, practice-oriented overview of musical agents within the context of musical metacreation. The program is designed to begin in the morning based on the local time, depending on the event schedule. The morning sessions begin with a general introduction, followed by a conceptual and historical overview of musical agents presented by Philippe Pasquier, situating the topic within an ontology of over 80 agent architectures (Tatar and Pasquier, 2019). This is followed by presentations on MASOM (Tatar and Pasquier, 2017) and MACAT/MACataRT (Lee and Pasquier, 2024) by Keon Ju Maverick Lee and a discussion of their artistic applications by Philippe Pasquier. After a lunch break, in the afternoon session, Jérôme Nika presents Dicy2 and its integration with Max and Ableton Live (Nika et al., 2022a,b), followed by a joint session with Balthazar Bujard on OpenTuning and its use in IRCAM's ISMM framework. The program continues with presentations by Arne Eigenfeldt on Musebots (Brown et al., 2018; Eigenfeldt, 2022), and by Notto J. W. Thelle and Bernt Isak Wærstad on CCCP (Thelle and Wærstad, 2023a,b), showcasing real-time agent adaptation in interactive performance settings. Lastly, the program concludes with a presentation by Oliver Bown on using a large language model (LLM) as a data interpreter agent to drive a real-time musification experience at the Sydney Opera House as an art exhibition titled Music of the Sails (Bown et al., 2023). This schedule highlights a balance between theoretical grounding and hands-on demonstrations of the 21st-century musical agent systems.

3 Technical setup

For technical requirements, we will need a video projector and a high-quality sound system, as the tutorial involves presenting and documenting multiple audiovisual artworks. A sound system exceeding standard classroom quality is essential to ensure accurate audio reproduction. Additionally, the ability to control lighting conditions would be beneficial to support the visual components of the presentations.

References

Bown, O., Shave, J., Hill, C., Wright, B., Pegram, C., Ocampo Blanco, R., McFadden, C., and Krol, S. (2023). Music of the sails. Presented at Sydney Opera House Birthday Festival. Generative audiovisual work with live stream and projection mapping in dedicated room. Exhibition dates: 01 October 2023 – 31 October 2024.

Brown, A., Horrigan, M., Eigenfeldt, A., Gifford, T., Field, D., and McCormack, J. (2018). Interacting with musebots. In *New Interfaces for Musical Expression 2018*, pages 19–24. New Interfaces for Musical Expression.

Eigenfeldt, A. (2022). Musebots and i: Collaborating with creative systems. In *The Language of Creative AI: Practices, Aesthetics and Structures*, pages 207–216. Springer.

Lee, K. J. M. and Pasquier, P. (2024). Musical Agent Systems: MACAT and MACataRT. In *In Proceedings of the Creativity and Generative AI NIPS (Neural Information Processing Systems) Workshop 2024*.

Nika, J., Muller, A., Borg, J., Assayag, G., and Ostrowski, M. (2022a). Dicy2 for Max. Technical report, Ircam Forum.

Nika, J., Muller, A., Borg, J., Poletti, M., and Assayag, G. (2022b). Dicy2 for Ableton Live. Technical report, Ircam Forum.

Pasquier, P., Eigenfeldt, A., Bown, O., and Dubnov, S. (2017). An introduction to musical metacreation. *Computers in Entertainment (CIE)*, 14(2):1–14.

Tatar, K. and Pasquier, P. (2017). MASOM: A musical agent architecture based on self-organizing maps, affective computing, and variable Markov models. In *Proceedings of the International Workshop on Musical Metacreation*, volume 10, page 5281.

Tatar, K. and Pasquier, P. (2019). Musical agents: A typology and state of the art towards musical metacreation. *Journal of New Music Research*, 48(1):56–105.

Thelle, N. J. W. and Wærstad, B. I. (2023a). Co-creatives spaces: The machine as a collaborator. In *Proceedings of the International Conference on New Interfaces for Musical Expression*, pages 244–250. Zenodo.

Thelle, N. J. W. and Wærstad, B. I. (2023b). The paradox of creating a cocreator. *Computer Music Journal*, 47(1):9–21.