

The MPEi project. Designing an artistic research and teaching ecosystem around the latest digital musical instruments in the context of the new Université Côte d'Azur.

In 2015, a consortium of companies (Apple, Roli, KMI, Moog...) worked on an extension of the widely used MIDI (Musical Instrument Digital Interface) protocol that was called MPE (Multidimensional Polyphonic Expression). By extension, this name was kept for an emerging class of digital instruments based on fingers 3D continuous pressure to produce sounds. Pressure wasn't really used in traditional acoustic instruments as a primary gesture to produce sounds, and past acoustic and electronic instruments generally use gestures with only one or rarely two spatial dimensions. This new class of instruments uses full 3D gestures in a polyphonic way, by far more accurate than before, thanks to the latest sensors and embedded DSP technologies. These instruments seem very promising and several companies have already invested in their development (Haken Audio *Continuum* in 2002, Eigenlabs *Eigenharp* in 2009, Madrona Labs *Soundplane* in 2009, RLDesign *LinnStrument* in 2015, Roli *Seaboard* in 2015, KMI *K-Board4* and *BopPad* in 2016...). But there is a huge gap between the releases of such high-end instruments and the digital musical creation and practice in general, since all categories of instruments need a specific environment to be massively deployed, such as having sets of new compositions, trained performers and new pedagogical tools for large groups initial learning.

The *Université Côte d'Azur* is a new association of universities and higher education institutions (*ComUE*) created in 2015 and labelled IDEX (*Initiative d'Excellence*) by the French government in 2016. It regroups 13 institutions including art schools. In this context, the MPEi research project was launch in September 2017 by the Conservatory of Nice within the core program "Art and Sciences". This project brings together several institutions: Conservatory of Nice, University of Nice, CIRM National Center for Musical Creation, CNRS National Center for Scientific Research, *PolyTechNice*... with the ambition to integrate musical schools (middle and high schools, conservatory) and research centers from different fields (composition, musicology, electronic, computer science, pedagogy) in a complete environment for developing new digital instruments music creation (historical analysis, researches on repertoire and performance, gesture studies, development and experimentation of new pedagogical tools and instruments, sensors, RF communications, DSP...).

The aim of this communication is to present how we have built a research and teaching ecosystem around a practical musical field on new digital instruments. The two central questions at the origin of the project were "what we can play with these new expressive instruments?" and "how we can learn to play these new gestures?". It's really the second question which influence the most the way that we build the program, because training new performers on new instruments is really a challenge that take a long time and implies a lot of researches on different fields, from performance studies to technological development of adapted tools for pedagogy. For this, we will show two practical examples of didactical experimentations: with a small group of master students, and with a large group of middle school student.



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