

Subject

Experimental Virtual Archeological-Acoustics: Multimodal study of the influence of rooms on the playing techniques of musicians on instruments of the 17th and 18th century at Versailles

Partners

In the context of the collaborative project EVAA, the EVAA_Ver project unites the following team members to provide a PhD funding opportunity (2019-2022):

- [Labo ETIS – U. de Cergy Pontoise](#)
- [Institut Jean Le Rond d'Alembert](#)
- [CRC – Equipe Conservation et recherche](#) du Musée de la musique – Cité de la musique – Philharmonie de Paris
- [Centre de recherche du château de Versailles](#)

This project has been certified by the Cluster of Excellence (Labex) "Patrima - Foundation for Cultural Heritage Science".

Keywords

Virtual acoustics, virtual reality, room acoustics, psychoacoustics, musical acoustic, historically informed performance, musicology, Baroque period, Chateau de Versailles

Thesis topic

The PhD project consists of assisting in the creation of a real-time room acoustic simulator for use with musicians, taking into account the musicians movements and the impact of dynamic source directivity. The simulator will be put into use for studying the impact of room acoustics on musicians playing, focusing on comparisons between Baroque chamber music venues and classical period equivalents (Berlioz time). The thesis work will contribute to the research and documentation of pertinent venues, acoustic measurements of existing venues, and the creation of ecologically valid geometrical acoustics models of some of these venues. The thesis will include a series of perceptual studies examining the impact of acoustic variations on playing, in the context of historically informed performance methods.

Context

Research in the history of music and musical acoustics has led to what is known today as a historically informed performance ([HIP](#)) using period instruments. Historically informed performance consists of an ideal match between musical instrument, repertoire, and playing techniques. However, for the moment, little research has been carried out on the interaction between the musician and the performance space from an acoustic point of view. Thanks to real-time acoustic simulations of historic rooms, the project proposes to include this dimension in the historically informed performance. By positioning the musician, who plays on accurate facsimile of historical instruments, in virtual play spaces, the influence of the

sound and visual environment on the musical practice can be studied. One of the innovative aspects of this thesis subject is to couple a real-time acoustic simulator with a visual room simulator providing musicians with an immersive audio-visual experience. This tool, beyond understanding baroque and classical musical practices will also help to understand the technical evolutions of instruments of the corpus selected in relation to the evolution of the concert halls.

The EVAA_Ver project will build on the results obtained in the [VERSPERA](#) project (Digitization and Modeling of Versailles Plans under the Ancien Regime), funded by the Heritage Science Foundation and the Ministry of Culture. The software developed by ETIS as part of the VERSPERA project makes it possible to rapidly build a 3D visual model of the spaces represented by digitized plans, complimented by graphic design students from the "Heritage, visualization and 3D modeling" program, for a precise and photo-realistic 3D model of spaces that are now missing or modified.

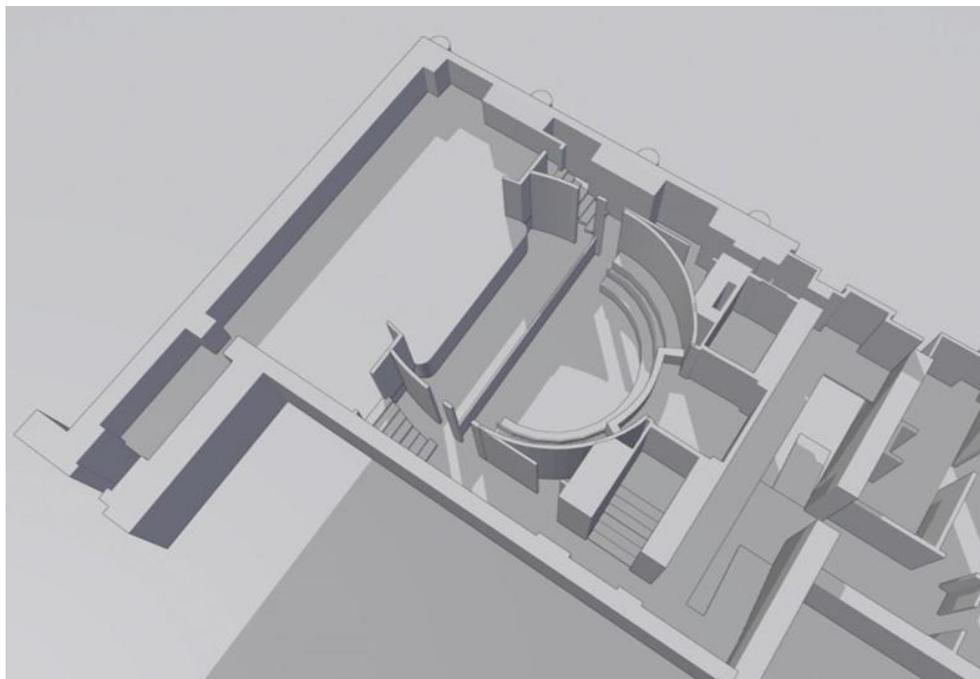


Figure 1: 3D model of a small theatre projected for Louis XV in the castle of Versailles that has never been built (VERSPERA/UCP-LPMN/ETIS).

The project EVAA_Ver will extend VERSPERA by adding the dimension of sound. By associating musicians, acousticians, historians, and computer scientists, EVAA_Ver strives to federate around the same cultural heritage object a diverse and complementary collection of scientific disciplines. Exploring different disciplinary fields, the results of EVAA_Ver and the overall EVAA umbrella project can nourish each other.

Candidate:

The candidate, with a master's degree in acoustics or related fields, will need the skills to work at the intersection of room acoustic modelling, psychoacoustics, archeological acoustics (archeoacoustics) and 3D visualization. An interest/passion for history and music be an additional asset. The ability to work independantly as well as part of a group is fundamental to

a successful candidate. Motivation, self-discipline, and maturity are needed for this highly interdisciplinary and collaborative project.

Supervision:

The PhD will be supervised by both Catherine Lavandier, full professor at the University of Cergy-Pontoise ETIS laboratory UMR 8051, and Brian FG Katz, CNRS Research Director at the Institut d'Alembert, Sorbonne University.

Application:

The position will be opened until the 31st of July 2019. The candidate should be registered at the University of Cergy-Pontoise before the 13th of September. The doctoral contract should start ideally on the 1st of October 2019. Please submit a detailed CV, Master's degree transcript, letter of motivation concerning the proposed subject, and a list of 2 references that can be contacted. Material, PDF format, should be addressed to both catherine.lavandier@u-cergy.fr and brian.katz@sorbonne-universite.fr.

Salary:

The salary of the doctoral contract is 1768,55 euros brut (1421,38 euros net).