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Brian F. G. Katz

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Direction scientifique du volume

Béatrice CASEAU

Frédéric BILLIET

Comité Scientifique

Frédéric BILLIET (Sorbonne Université)

Susan BOYNTON (Columbia University)

Béatrice CASEAU (Sorbonne Université)

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Théodora PSYCHOYOU (Sorbonne Université)

Coordination des publications du Collegium Musicæ

Achille DAVY-RIGAUX

Direction du Collegium Musicæ

Théodora PSYCHOYOU

Coordination d'édition

Nancy HACHEM

Secrétariat de rédaction

Lucia Maria ORLANDI

Design graphique

Adeline GOYET

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The Past Has Ears

An interdisciplinary project in digital archaeoacoustics

Brian F.G. KATZ

Institut Jean Le Rond d'Alembert, CNRS, Sorbonne Université, France
brian.katz@sorbonne-universite.fr

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THE PAST HAS EARS

An interdisciplinary project in digital archaeoacoustics

Brian F.G. KATZ

Hearing is one of our most pervasive senses. There is no equivalent to closing our eyes, or averting our gaze, for the ears. With the recent adoption of UNESCO resolution 39 C/49, “The importance of sound in today’s world: promoting best practices”, we are now entering a new era where the acoustic soundscape of places both existing and historical merit reflection, preservation, and scientific study. (PHE project proposal, 2019)

PROJECT OVERVIEW

When we think about great architectural achievements in European history, such as ancient amphitheatres or gothic cathedrals, their importance is strongly tied to their acoustic environment. The acoustics of a heritage site is an intangible consequence of the space’s tangible construction and furnishings. It is ephemeral, while also a concrete result of the physical nature of the environment. Through the “Past Has Ears” project (the PHE project),¹ we explore how via measurements, research, and virtual reconstructions the acoustics of heritage spaces can be documented, reconstructed, and experienced for spaces both existing and in various altered states. Inspired by the project’s namesake (Phé, for the constellation Phoenix), and the relatively recent fires at Notre-Dame Cathedral in Paris (2019) and Teatro La Fenice opera hall in Venice (1996, “La Fenice” also meaning Phoenix), the PHE project focuses on the preservation, conservation, and reconstruction of heritage sites, bringing them back from the ashes for use by researchers, stake holders, cultural institutions, and the general public (Katz, Murphy and Farina, 2020, 2022).

Comprising research teams with experience in acoustic reconstructions and historical research, paired with national heritage monuments of acoustic importance, the consortium will develop a joint methodology for addressing relevant archaeological acoustics issues across Europe with historians of different disciplines.

1 EU JPI Cultural Heritage project PHE (20-JPIC-0002-FS), <http://phe.pasthasears.eu>.

CONCEPT

Reflecting on many great architectural achievements in history, such as Greek and Roman amphitheatres or Gothic cathedrals, their importance is tied to their acoustic environment. The design of many historic sites can be linked to their acoustics and such histories are part of their cultural heritage.

Through teams of researchers from the physical sciences, social sciences and the humanities, and digital sciences, the PHE consortium represents a highly interdisciplinary group of specialists and stakeholders with the aim of establishing a new and coherent approach to acoustic cultural heritage. To be clear, the acoustics of a heritage site is an intangible consequence of the space's tangible construction. It is ephemeral, precisely linked to the physical nature of the construction and its environment. With changes in cultural use and customs over time, the associated acoustics of many places has changed accordingly, by design consequence. In combining historical, cultural, and architectural studies with innovative acoustic modelling techniques, we can recreate and experience on a human scale the successive acoustic states of heritage sites.

Three heritage sites from the participating countries join the consortium as active Associated Partners. These sites are the Tindari Theatre (IT), Notre-Dame de Paris Cathedral (FR), and The Houses of Parliament (UK). Later in the project, the French team further included the Palais des Papes in Avignon. Throughout the project, these institutions participated as case studies, representing public sites of importance in the form of an ancient Greek theatre (far from its original condition), a Gothic cathedral (in the midst of recovering from a serious catastrophe, inaccessible to the public for some years), and the House of Commons (publicly inaccessible but of significant importance).

For historical research, PHE brings sound to the forefront of attention, focussing on analysis, recreation, and communication of the intangible heritage of sound and soundscapes. As an innovative research tool, historically authentic simulations and reconstructions provide a new perspective for understanding, interpreting, and experiencing the past. Such sensorial and perceptual experiences can confirm, or contradict, hypotheses and assumptions based on insufficient information or fragile extrapolations. The ability to take an immersive perspective provides the opportunity to recontextualize interpretations of written documentation and witness accounts. Such understandings can be easily communicated to the public, through similar mediated experiences, rather than simply through traditional written elements, providing a new means of information transmission and community engagement. The PHE project is notable in two respects, its focus on interdisciplinary research around cultural acoustic heritage, and its efforts toward the use of popular

communication platforms for disseminating the results of research to the general community.

FROM DATA TO EARS

The acoustics of a space is immersive, spatial, and due to the nature of auditory perception, egocentric (first-person reference frame, individual), in contrast to visual perception of an object, which can be observed from “outside” (e.g., bird’s eye view), or where the observation position does not seriously affect the information conveyed. Consequently, presentation methods for communicating acoustic heritage must represent the spatially immersive and listener-centric nature of acoustics.

Due to the intangible nature of acoustics, and reactive nature of room acoustics, in that it does not “sound” on its own, requiring a sound source to be heard, the choice of sound material and its presentation have significant impacts on information transmission to users when attempting to provide a relevant and meaningful experience. Choice of source material are highly pertinent in raising awareness and integrating acoustic heritage in its cultural and societal context. The connection of heritage sites to their surroundings, through soundscape analysis and reconstruction, provides further means for communicating the temporal and cultural context, raising awareness of heritage’s importance as a whole.

“Auralization” is the sound equivalent of visualization for the results of modelling techniques. The auditory presentation of accurate acoustical numerical models, through auralization over headphones or speaker arrays, allows users to experience spatial acoustic properties of a site as if present.

For musicological research, PHE is centered around the approach termed Experimental Virtual Archaeological-Acoustics, where virtual reconstructions of historical contexts are created and evaluated by musicologists, in response to enquiries and hypothesis of interest (Mullins, Canfield-Dafilou and Katz, 2022, 2023). Musicians can even be situated into virtual interactive environments where they can perform in acoustically ecologically valid situations across history (Mullins, *et al.*, 2021; Mullins and Katz, 2023).

GOTHIC RESONANCES

Many musicologists have sought to demonstrate the link and interactions between acoustic space and the practice and evolution of musical repertoires. How can we not link, for example, the new construction of the choir of

Notre-Dame at the end of the 12th century and the abundance of polyphonic experimentation known as the school of Notre-Dame de Paris? Other places, such as the Great Chapelle (or Chapelle Clémentine) in the Palais des Papes in Avignon, lead researchers to ask the same questions about significant relationships between architecture, musical interpretation and compositional techniques. The same is true of studies, from all periods, of chapels or large domed churches in the architectural tradition of the Christian East.

The international symposium *Gothic Resonances*, organized by the PHE project, is an opportunity to take stock of research in the fields of archaeoacoustics in connection with musicology, history, and art history, while also taking into account the perspective of performers of sacred medieval chant who experiment with the acoustics of concert venues to find favourable resonances under Gothic vaults. Collaboration between researchers in the humanities and the sound sciences has become a major field in early music research. The very object of these questions now allows for innovative field experiments in archaeoacoustics and linked to musicological research centred on the interaction of a production site with the musical and vocal gesture. The choice of musical corpus must therefore be accompanied by research into musical iconography and archival studies to better locate the singers, their number and age, and to describe the furniture, hangings and textiles of the clothes, which had a definite influence on the resonance of the voices. This interdisciplinary research on the virtual reconstruction of heritage sound spaces has led to the creation of three-dimensional acoustic sound models using the principle of auralisation.

These new sensory experiences of architectural space open up innovative scientific perspectives between theory and practice and promote new ways of re-creating and disseminating musical heritage that deserve to be shared and discussed.

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De nombreux musicologues ont cherché à démontrer le lien et les interactions entre l'espace acoustique et la pratique et l'évolution des répertoires musicaux. Comment ne pas lier, par exemple, la nouvelle construction du chœur de Notre-Dame à la fin du XII^e siècle et ce foisonnement d'expérimentations polyphoniques désigné par l'expression « École Notre Dame de Paris » ? D'autres lieux, comme la Chapelle Saint-Pierre Saint-Paul du Palais de Papes en Avignon amènent les chercheurs à se poser les mêmes questions sur une interaction forte entre architectures, interprétations musicales et techniques de composition. Il en est de même dans le cadre des études, toutes périodes confondues, sur les saintes chapelles ou les grandes églises à coupole de tradition architecturale orientale.

Cet ouvrage rassemble des études présentées au colloque international *Résonances gothiques*. Colloque d'archéoacoustique, organisé du 7 au 9 septembre 2023 au Palais des Papes Convention Center d'Avignon, à l'initiative des projets de recherche The Past Has Ears (PHE) et The Past Has Ears at Notre-Dame (PHEND), avec Sorbonne Université (IReMus et Institut Jean le Rond d'Alembert), l'IUF, le PRISM, et Aix Marseille Université, en collaboration avec Avignon Tourisme, pour faire le point sur les recherches dans les domaines de l'archéoacoustique en lien avec la musicologie, l'histoire et l'histoire de l'art, tout en interrogeant le point de vue des interprètes de chant sacré médiéval qui expérimentent l'acoustique des salles de concert pour trouver des résonances favorables sous les voûtes gothiques.



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