

## OPEN POSITION AT “ENSTA PARISTECH” IN THE FIELD OF MUSICAL ACOUSTICS

**BATWOMAN** (Basic Acoustics Training - & Workprogram On Methodologies for Acoustics - Network) is the **Initial Training Network (ITN)** No. 605867, funded under the FP7 Marie Curie programme of the EC. **Duration:** Sep. 1, 2013 - Aug. 31, 2017.

**BACKGROUND:** The BATWOMAN ITN aims at structuring research training in basic and advanced acoustics and setting up a work program on methodologies for acoustics for skills development in a highly diverse research field offering multiple career options.

The consortium consists of renowned public and private partners from musical acoustics, room acoustics and automotive acoustics who will merge their existing knowledge, extend it jointly and complement it with insights of recent sound perception research, (Fig. 1.) This will exploit existing synergies and overcome obvious fragmentation in research, methodology and basic as well as advanced acoustics training.

Providing interdisciplinary training and joining or exchanging methodology in research, is expected to have a strong impact on the skills of trained researchers as far as sound design capabilities, modelling accuracy, efficiency and applicable frequency range is concerned. Adding the understanding of human auditory perception will help to tackle the hard problem of sound quality parameters and to better understand stimulating effects on well-being and cognition of people exposed to sound, but also harmful effects, like annoyance or even deteriorating cognitive performance.

The ITN will provide interdisciplinary and intersectoral research training for excellence. It will structure existing PhD-level training in acoustics setting up European curricula with compatible and recognised courses offered by Universities and private enterprises. Simultaneously it will push the state of the art in vibro-acoustic modelling and in interdisciplinary design optimisation by initiating a joint research effort increasing critical mass. The complementary structure of the network will make it not to

break apart after the ITN project period. It is rather expected that the methodologies used to analyse, design and optimise transport vehicles, rooms and musical instruments will grow together and will be further developed in an interdisciplinary joint effort.

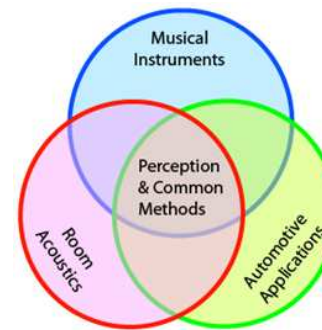


Fig. 1: BATWOMAN R&D scope.



Fig. 2: BATWOMAN consortium.

**CONSORTIUM:** contains partners (6 universities, 1 research institutes and 4 companies) specialised in three specific application fields of acoustics: Automotive sector, room acoustics and musical instrument acoustics, see Fig. 2. The industrial partners bring in application knowledge and expertise, and the research partners bring in a range of engineering methodologies, the capability of PhD research training, provision of courses and dissemination of results.

**COORDINATOR:** ViF - Kompetenzzentrum - Das virtuelle Fahrzeug Forschungsgesellschaft mbH, <http://www.v2c2.at/> in Graz, Austria. GRESIMO Coordinator: **Dr. Michael Nöst**, [Michael.Noest@v2c2.at](mailto:Michael.Noest@v2c2.at)

**MARIE CURIE ELIGIBILITY CRITERIA** – in short:

- **Early-Stage Researcher (ESR):** holds an MSc degree in Engineering and has less than 4 years of experience and has not yet been awarded a doctoral degree<sup>1</sup>.

Within BATWOMAN, ENSTA ParisTech (<http://ume.ensta-paristech.fr>) is looking for an ESR (Duration 36 months) focusing on “Nonlinear vibrations, sound quality, coupling phenomena in keyboards and percussive instruments”

Objectives: - develop modeling and numerical simulations of complex stringed and percussive instruments, with particular emphasis on nonlinear vibrations and coupling phenomena. - get a better understanding of these complex sound sources. - obtain accurate models for sound synthesis, over a wide frequency range, and accounting for the high sensitivity of the human ear.

Tasks and methodology: - Develop a time-domain physical model composed by a set of equations that govern the vibrations and the wave propagation in all constitutive parts of the instruments and the surrounding air, and the coupling conditions between all parts. - Develop dedicated numerical formulation of this model ensuring stability and reduced dispersion. - Validate the results of the simulations through time and spectral analysis of the obtained waveforms, and by comparisons with sound and vibrations measured on real instruments. - Examine to what extent, and under which conditions the developed models of musical instruments can be transposed to other industrial and automotive systems for which high sound quality is requested.

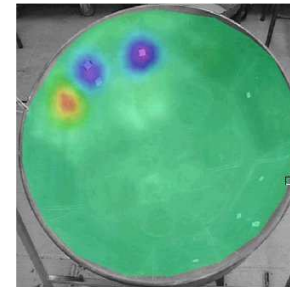
**CANDIDATE PROFILE:** All candidates must be fluent in spoken and written English. The research is highly multidisciplinary. An ideal candidate has an M.Sc. in engineering (e.g. mechanics, materials, electronics, physics) and an adequate mathematical & computational background.

- Specific experience with simulation methodologies and software tools is an advantage.
- Knowledge in acoustics of fluids and structures is highly welcome
- Knowledge of programming languages (C/C++, Fortran, Visual.Basic, ...) and/or knowledge of Matlab are an advantage.
- All members of the network are equal opportunity employers, both female and male candidates are invited to apply.

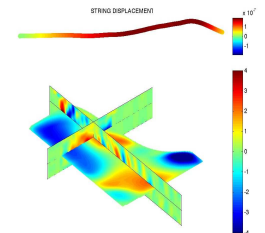
The research activities will mainly be carried out at Partner **ENSTA ParisTech** located in (**Palaiseau, France**), possibly combined with research visits and/or short-term secondments to other members of the network.

**APPLY NOW!** Start date target: between 1 January and 1 April 2014

**APPLICATION:** To apply, please send a **detailed CV** together with a **letter of motivation** and **names of reference(s)** to



**Prof. Antoine Chaigne**  
antoine.chaigne@ensta-paristech.fr  
Unit of Mechanical Engineering (UME)  
828, Bd des Maréchaux  
91762 Palaiseau cedex,  
FRANCE



The remuneration will be in line with the EC rules for Marie Curie grant holders and consists of a salary augmented by a net mobility allowance. <http://cordis.europa.eu/fp7>.

<sup>1</sup> The research experience includes the period since gaining a university degree giving the candidate access to doctoral studies (the degree must entitle the holder to embark on doctoral studies, without having to acquire any further qualifications) or already in possession of a doctoral degree, independently of the time taken to acquire it. Among others, following criteria apply for eligibility:

- the researcher shall not be a national of the State in which the hosting partner's research team is located
- at the time of appointment, the researcher may not have resided or carried out her/his main activity in the country of the hosting partner for more than 12 months in the 3 years immediately prior to her/his appointment
- women are especially encouraged to apply.