Dr Sami KARKAR
R&D Consultant
Acoustics & Vibrations

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1. RESEARCH EXPERTISE

Multiphysics simulation (electromechanical coupling, RF-mechanical, piezoelectricity...)

Experimental techniques in mechanical vibrations and acoustics

Smart materials for acoustics and vibrations

Active acoustic metamaterials

Numerical methods for nonlinear systems

Acoustics of musical instruments

Climate physics

2. PROFESSIONAL EXPERIENCE

2019—	**Freelance consultant:** R&D in acoustics and vibrations
2016—2019	**Research fellow at ECL-CNRS (Lyon, France):** Multiphysics coupling, RF-mechanical coupling, piezoelectric effect, active acoustic metamaterials, non reciprocal acoustics, acoustic black holes, experimental acoustics
2013—2015	**Research fellow at EPFL (Swiss Federal Institute of Technology - Switzerland):** Electroacoustics, room acoustics, vibrations and noise control, active acoustic metamaterials, multiphysics simulation, experimental methods in acoustics
2012—2013	**Researcher – engineer at CEA Saclay (France):** Climate physics, atmosphere reduced models
2009—2012	**Doctoral studies at LMA–CNRS (Marseille, France):** “Numerical methods for nonlinear dynamical systems; application to self-sustained oscillations in musical instruments” *(*dir. Prof Dr B. Cochelin and Dr C. Vergez)
2008	**Attaché for academic and scientific cooperation at the French Embassy in Turkey (Ankara, Turkey)**
2007 **(6 months)**	**Master’s research project at LMA-CNRS (Marseille, France):** Physics of musical instruments, processing and perception of musical audio signals: classification and identification of sounds from the saxophone family, natural and processed. (dir. Dr R. Kronland & DR P. Guillemain)
2005 **(5 months)**	**Master 1st year research project at UNSW (Sydney, Australia):** M locking in the transverse flute. Theory, Models, Experiments. (dir. Pr. Dr. Joe Wolfe)
2004 **(1 month)**	**Bachelor project at ENSTA-Paristech (Gifs-sur-Yvette, France):** Design and construction of a vortex ring generator (dir. Dr. Olivier Cadot)

3. INDUSTRIAL COLLABORATIONS

Plastic Omnium: design and optimization through simulation of frequency-steerable ultrasonic transducer for thin plates (2020-2021, ECL-CNRS)

ENGIE: advanced signal processing techniques for rotating machines monitoring through simple accelerometer sensors (2020-2021, freelance + academic collab.)

Airbus: “ETNAA” ANR project with – augmented acoustic black holes (2018, ECL-CNRS)

Plastic Omnium: simulation, design and experimental proof-of-concept of directive transducers for guided waves in thin plates (2017, ECL-CNRS)

Safran Nacelles: “ENOVAL” European project on active acoustic liners for turbojet engine nacelles noise mitigating (2015-2017, EPFL)

Radiall: DGA-funded project (French military research agency) coll. with Thales on mechanically induced RF noise in connectors (2016, ECL-CNRS)

SNCF: feasibility study of an electroacoustic transducer for train track alarm signalling (2015, EPFL)

PSI Audio & Goldmund: active low frequency absorbers for room modal equalization (2013-2015 EPFL)

Peugeot SA: low frequency electroacoustic absorbers for modal equalization in automobile vehicles (2014, EPFL)

4. ACADEMIC COLLABORATIONS

2025	**LAM** Laboratoire d’Acoustique Musicale – Institut Jean le Rond ð’Alembert (Sorbonne Université – CNRS, Paris - FR)
2020-2021	**LASPI** Laboratoire d’Analyse des SIgnaux et Processus Industriels, IUT Roanne, Université Jean Monnet (St-Étienne, FR)
2018	**LAUM** Laboratoire d’Acoustique de l’Université du Mans (Le Mans, FR)
2016-2021 & 2025	**LTDS** Laboratoire de Tribologie et Dynamique des Systèmes (École Centrale de Lyon – CNRS, Lyon - FR)
2015-2017	**LEMA/LTS2** Laboratoire d’Électromagnétisme et d’Acoustique / Laboratoire de Traitement du Signal 2 (École polytechnique fédérale de Lausanne, Lausanne - Switzerland) **LTDS** (ECL-CNRS, Lyon - FRANCE) **FEMTO-ST** (UBFC-CNRS, Besançon - France)

5. DEGREES AND QUALIFICATIONS

2013 & 2018	**Qualification for Assistant Professor positions (France)**
2012	**Doctorate in Acoustics** (Aix-Marseille University)
2007	**Master 2 Mechanics, Physics and Modelling** (Aix-Marseille University) major in Acoustics – w. hon.
2006	**“Agrégation” - Competitive state exam in Physics** for high school teacher’s qualification (France)
2005	**1st year Master in Fundamental Physics** (ENS Cachan / UPMC)
2004	**Bachelor in Fundamental Physics** (ENS Cachan / UPMC)
2003	**Bachelor in Mechanical Engineering** (ENS Cachan / UPMC)
2002-2008	**École Normale Supérieure de Cachan**

6. TEACHING EXPERIENCE

2020—2025	**Foreigner's Entrance Exam (AST 2nd year):** physics oral examinator *Ecole des Mines (Paris, France)*
2022—2025	**Course: Acoustics of Musical Instruments (for musicians)** *Sibelius Academy, University of the Arts Helsinki (Finland)*
2016—2018	**Supervision of student projects, and of Bachelor, Master and Doctoral students** Distributed control, smart materials, adaptive structures, active metamaterials, bibliographic techniques, simulation, experimental methods *ECL-CNRS (Lyon, France)*
2013—2017	**Supervision of Master and Doctoral students** Intelligent acoustic materials, adaptive structures, active metamaterials, electroacoustics, room acoustics, impedance control *EPFL (Lausanne, Switzerland)*
2013—2014	**Lecture in Acoustics (Bachelor and 1st year Master)** acoustical physics, music acoustics, electroacoustics *EPFL (Lausanne, Switzerland)*
2009—2011	**Teaching Assistant:** practical and oral examination preparation for the "CAPES" state competitive exam for secondary school teachers in Physics *Aix-Marseille Université*
2009—2011	**Supervision of student research projects (Bachelor level)** theory, numerical models, acquisition and processing of acoustical signals *LMA–CNRS (Marseille, France)*
2006—2007	**Private lessons (bachelor level)** maths, physics et chemistry
2005—2006	**High-school teaching internship:** lectures and practicals in physics and chemistry (final year level) *Lycée Louis-le-Grand (Paris, France)*