

PostDoc position available: Uncertainty Principles in Signal Processing, and Applications to Audio Signals

A 1-year PostDoc position is available at the *Signal and Image Processing group* at LAMP (Laboratoire d'Analyse, Topologie et Probabilités, a pure and applied mathematics laboratory at Aix-Marseille University, Marseille, France). The position is funded by UNLocX (a project sponsored by the European Commission within the FET programme), whose aim is to investigate Uncertainty Principles and their impact in Signal processing and more general data processing. There is a possibility of extending the position to a second year, on another related project.

Subject:

The Signal and Image Processing group at LAMP¹ is developing mathematical models and algorithms for signal representation, analysis and processing. In the framework of the UNLocX project², these problems are addressed in connection with uncertainty principles, the goal being to design waveform systems that are optimal for signal representation. First results have already been obtained, that include new mathematical formulations for uncertainty principles, and new algorithms for designing optimal waveforms, either generically or in view of selected applications.

The goal of the PostDoc project is twofold. A first aspect will be to develop further the current results, and develop software tools suitable for dissemination within UNLocX. The second aspect will be oriented towards audio applications, the goal will be to design optimal waveform systems for selected audio signal analysis and processing problems (analysis, synthesis, coding,...)

The group at LAMP gathers approximately 15 researchers, PostDocs and PhD students, with expertise in various fields of mathematical and statistical signal processing. The recruited PostDoc will also have occasions to interact with other groups within the UNLocX project, including mathematicians and engineers, in particular in Vienna (Austria), Aschaffenburg and Bremen (Germany) and Lausanne (Switzerland). The research will be done in collaboration with Genesis, a SME located in Aix en Provence (near Marseille).

Profile:

The candidate will either be an applied mathematician with interest in signal processing, statistical modeling and audio applications, and good programming skills, or originate from signal processing and/or computer science, with good knowledge in statistics and applied mathematics.

Keywords: uncertainty principles, signal processing, sparsity, audio applications

Starting date: before september 2012

Location: LAMP Marseille, CMI, 39 rue Joliot-Curie, 13453 Marseille Cedex 13, France

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1 <http://www.lamp.univ-mrs.fr/>

2 <http://unlocx.math.uni-bremen.de/>

PostDoc position available: Signal Processing for Brain Computer Interfaces

A 1-year PostDoc position is available at the *Signal and Image Processing group* at LAMP (Laboratoire d'Analyse, Topologie et Probabilités, a pure and applied mathematics laboratory at Aix-Marseille University, Marseille, France). The position is funded by *CoAdapt* (a project sponsored by ANR, the french funding research agency), whose aim is to develop new techniques and algorithms at the interface of signal processing and machine learning, in the framework of BCI applications.

Subject:

The Signal and Image Processing group at LAMP¹ is developing mathematical models and algorithms for analysis and processing of neurophysiological signals, in particular in the context of *Brain Computer Interfaces* (BCI). In the framework of the CoAdapt project², the team is involved in the definition of features suitable for integration into BCI learning schemes. Models involving time-frequency or more general frame representations (mdct, gabor frames, wavelets, wavelet packets...) and statistical modeling (hidden markov models, mixed effects models, sparsity penalized regression models...) have been developed, together with corresponding inference algorithms.

The goal of the PostDoc project is twofold. A first aspect will be to analyze and develop further these approaches, develop software tools suitable for dissemination within CoAdapt, and validate them on datasets provided by CoAdapt partners, in view of possible integration in BCI paradigms (such as P300 speller, motor imagination,...). A second aspect will be to explore possible integration into online machine learning strategies (the current approaches are essentially offline approaches), again in connection with other CoAdapt partners.

The group at LAMP gathers approximately 15 researchers, PostDocs and PhD students, with expertise in various fields of mathematical and statistical signal processing. The recruited PostDoc will also have occasions to interact with other groups within the CoAdapt project, including neuroscientists and computer scientists.

Profile:

The candidate will either be an applied mathematician with interest in signal processing, statistical modeling and neuroscience applications, and good programming skills, or originate from signal processing and/or computer science, with good knowledge in statistics and applied mathematics. Prior experience on neurophysiological signal processing would be appreciated. Some knowledge in machine learning would also be welcome.

Starting date: before september 2012

Location: LAMP Marseille, CMI, 39 rue Joliot-Curie, 13453 Marseille Cedex 13, France

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¹ <http://www.lamp.univ-mrs.fr/>

² <https://twiki-sop.inria.fr/twiki/bin/view/Projets/Athena/CoAdapt/WebHome>