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# 4 Postdoc Positions

*DFG-ANR project (fMEG-OPM)*

## Fetal MagnetoEncephaloGraphy with OPM

### Framework

Four postdoctoral research positions are available in the framework of the DFG-ANR funded project fMEG-OPM (PIs Prof. Etienne Labyt, Dr. Mahdi Mahmoudzadeh, Prof. Hubert Preissl, Prof. Fabrice Wallois). This DFG-ANR project opens up a wide range of opportunities to the successful candidate. The successful candidate will benefit from a stimulating scientific environment where it is possible to invite peer researchers, exchange ideas with fellow researchers in the DFG-ANR project fMEG-OPM; about 15 researchers reside at INSERM, CEA, Tübingen labs, interact with each other in the framework of the DFG-ANR project fMEG-OPM. The successful candidates will join the multidisciplinary research groups where s/he will be in close interaction with the team members. The positions are available for 3 years starting May 2022.

The successful candidates will devote the majority of regular working hours to research topics that have been given priority in the fMEG-OPM DFG-ANR project.

# Post-doc Position (#1)

**INSERM U1105 (University of Picardie Jules Verne)**  
Amiens (North of Paris), France

As part of the DFG-ANR funded project, INSERM-lab invites applications for a position as Postdoctoral Researcher in the field of EEG/MEG signal processing.

Key words: Signal processing, Electromagnetic modelling, EEG, MEG, Matlab, Python.

## Job description

The principal research topic aims to use existing datasets and generate simulated data for both the EEG/MEG and fMEG to quantify the strengths and limitations of each signal and relative analysis methodologies and determine the transfer function between the two simulated datasets. We have a large recorded data set and a vast collection of developed methods from former projects.

The successful candidate will use our extensive data sets to build upon existing models and methods, create and develop his or her proper models and methods, create a test bench for joint processing of EEG and MEG, write sustainable code for integration in software packages, and publish his or her findings. Publications of high quality are expected both in the field of modelling or signal processing (IEEE/Elsevier) as in the application field (neuroimage, ...).

## Job profile

The candidate must have completed a PhD in signal processing, applied mathematics, computer science, neuroscience, or related fields. Programming experience with scripting languages such as Matlab or Python are required as well as research experience in statistical signal processing (modelling) and/or machine learning (Electromagnetic forward/inverse problem, filtering, blind source separation, etc.). Experience with biomedical signals such as electroencephalography (EEG) and/or magnetoencephalography (MEG), will be considered an advantage. Applicant should be self-motivated and must have a willingness to do inter-disciplinary research and collaborative teamwork.

Starting date: May 1<sup>st</sup> 2022.

Contract duration: 1 year, renewable for a total of up to 3 years.

Employment level: 100%

Application deadline: applications will be considered until the position is filled

Salary: about €2000 net, re-evaluated according to the candidate's experience

Applications: CV with up-to-date list of publications, a motivation letter, and two recommendation letters should be send to [fabrice.wallois@u-picardie.fr](mailto:fabrice.wallois@u-picardie.fr), copying [etienne.labyt@cea.fr](mailto:etienne.labyt@cea.fr), [hubert.preissl@uni-tuebingen.de](mailto:hubert.preissl@uni-tuebingen.de), [mahdi.mahmoudzadeh@u-picardie.fr](mailto:mahdi.mahmoudzadeh@u-picardie.fr).

Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions related to disabilities, citizenship or gender apply to this position. (please use as email subject “**DFG-ANR INSERM application**”).

# Post-doc Position (#2)

**CEA**  
Lille, France

As part of the DFG-ANR funded project, CEA-lab invites applications for a position as Postdoctoral Researcher in the field of data processing applied to biomagnetic fields recordings.

Key words: Signal processing, Electromagnetic modelling, EEG, MEG, Matlab, Python, QT.

## Job description

This research project follows on a previous project in which we developed a MagnetoEncephaloGraphy (MEG) system based on Helium4 OPM sensors. The aim of this project is to use this OPM MEG system for functional fetal imaging. We are looking for a post doc or an engineer for 18 months to work on the He-OPM array, the data processing and magnetic noise rejection methods. The engineer/post doc will facilitate the use of the He-OPM by improving the software (currently developed in python), numerically controlling the states of He-OPM, so as they can be used by people who are not experts of He-OPM. The engineer will also train the medical team how to use the sensors and will contribute to develop methods for the data processing. This position is based in CEA Tech Lille but the post doc/engineer will have regular travels to Amiens as s/he will need to interact with the medical team.

## Job profile

The main skills for this job are:

- Good knowledge in electromagnetism and signal processing
- Development of spatial and temporal filtering methods and signal decomposition/reconstruction (PCA, ICA, spherical harmonics...)
- Python language, eventually matlab
- You like the on-site experimentation and have willingness to iterate rapidly between the development of signal processing, its practical implementation, and its improvement
- Willingness to take part in the experiences of a clinical trial in close collaboration with the medical and technical teams

Skills not mandatory but will be appreciated:

- Development and implementation of experimental protocols in a medical environment
- Electromagnetic modeling by finite elements

Starting date: May 1<sup>st</sup> 2022.

Contract duration: 18 months.

Employment level: 100%

Application deadline: applications will be considered until the position is filled

Salary: about €2000 net, re-evaluated according to the candidate's experience

Applications: CV with up-to-date list of publications, a motivation letter, and two recommendation letters should be send to [etienne.labyt@cea.fr](mailto:etienne.labyt@cea.fr), [olivier.ducloux@cea.fr](mailto:olivier.ducloux@cea.fr) copying [fabrice.wallois@u-picardie.fr](mailto:fabrice.wallois@u-picardie.fr), [hubert.preissl@uni-tuebingen.de](mailto:hubert.preissl@uni-tuebingen.de), [mahdi.mahmoudzadeh@u-picardie.fr](mailto:mahdi.mahmoudzadeh@u-picardie.fr). (please use as email subject "DFG-ANR CEA application").

Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions related to disabilities, citizenship or gender apply to this position.

# Post-doc Position (#3)

**CEA**  
Lille, France

As part of the DFG-ANR funded project, CEA-lab invites applications for a position as Postdoctoral Researcher in the field of magnetic shielding &, electromagnetic modeling.

Key words: Signal processing, Magnetic shielding, Electromagnetic modelling, EEG, MEG, Matlab, Python.

## Job description

This research project follows on a previous project in which we developed a MagnetoEncephaloGraphy (MEG) system based on Helium4 OPM sensors. The aim of this project is to use this OPM MEG system for functional fetal imaging. One initial step is to record preterm babies. For that, a magnetic shielding is required. We are looking for a post doc or an engineer for 18 months to design the magnetic shielding and interfaces that will hold the He-OPM. The engineer will have to design and test the magnetic shielding to be used inside the incubator, implement measurement noise rejection, and design the mechanical support to hold the He-OPM, i.e., amagnetic helmet and belt. The engineer will take into account the technical constraints related to the environment of a premature baby undergoing neonatal intensive care, measure the ambient magnetic field in order to model and design the shielding. It will then have to test the shielding prototype in real conditions and make any necessary adaptations. This position is based in CEA Tech Lille but the post doc/engineer will have regular travels to Amiens as s/he will need to interact with the medical team.

## Job profile

The main skills for this job are:

- Good knowledge in electromagnetism
- You like the on-site experimentation and have willingness to iterate rapidly between the development of signal processing, its practical implementation, and its improvement
- Willingness to take part in the experiences of a clinical trial in close collaboration with the medical and technical teams
- Sensitivity to the notion of ergonomics and a design-by-use approach
- Knowledge in computer aided design, 3D printing, use of fab labs

Skills not mandatory but will be appreciated

- Electromagnetic modeling / magnetic field attenuation
- Contribution to write the experimental protocols in medical environment

Starting date: May 1<sup>st</sup> 2022.

Contract duration: 18 months.

Employment level: 100%

Application deadline: applications will be considered until the position is filled

Salary: about €2000 net, re-evaluated according to the candidate's experience

Applications: CV with up-to-date list of publications, a motivation letter, and two recommendation letters should be send to [etienne.labyt@cea.fr](mailto:etienne.labyt@cea.fr), [olivier.ducloux@cea.fr](mailto:olivier.ducloux@cea.fr) copying [fabrice.wallois@u-picardie.fr](mailto:fabrice.wallois@u-picardie.fr), [hubert.preissl@uni-tuebingen.de](mailto:hubert.preissl@uni-tuebingen.de), [mahdi.mahmoudzadeh@u-picardie.fr](mailto:mahdi.mahmoudzadeh@u-picardie.fr). (please use as email subject "DFG-ANR CEA application").

Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions related to disabilities, citizenship or gender apply to this position.

# Post-doc Position (#4)

## fMEG -center (University of Tübingen)

Tübingen, Germany

The Fetal Magnetoencephalography (fMEG) Center is a joined research facility of the University of Tübingen and the Helmholtz Center Munich. The major research areas are basic research related to sensory and cognitive development of the human fetus (Moser et al. Dev Cogn Neurosci. 2020, 2021), the effect of maternal metabolism, anthropometry and psychological condition on fetal development (Mat Husin et al. Obesity 2020, Doersam et al. Eur Eat Disord Rev. 2021) and development of data processing for fMEG (Sippel et al. 2019 Comput Methods Programs Biomed.). Further information can be found at: <https://preissl-lab.net/>.

Key words: Signal processing, Electromagnetic modelling, EEG, MEG, Matlab, Python.

### Job description

We are searching for a PotDoc for a three year period to evaluate the application of optically pumped magnetometer (OPM) in fetuses. This includes comparison of recordings between OPM and SQUID, modelling of the development of fetal brain activity and development of advanced data analysis. This project is part of a joined grant funded by the French and German funding agency (ANR/DFG). The position is located in Tübingen, but tight interaction with the research partners in Amiens and Lille is required.

### Job profile

We expect:

- a PhD in a relevant field
- experience with MEG/EEG/fMEG/fNIRS recordings and analysis preferably in young children
- advanced knowledge in MATLAB, UNIX, PHYTON or similar languages
- proven publication track record as first author in peer reviewed journals
- good communication skills (English and also preferably German)
- supervision of Bachelor, Master, PhD and MD students involved the project
- commitment to open science
- willingness to travel between the involved research sites including stays up to several weeks

We offer:

- work in an interdisciplinary group involving psychologists, neuroscientists, biomedical engineers, physicists and physicians.
- access to a SQUID based fMEG system and OPMs
- access to high performance computing and data storage system
- training by courses, seminars and lectures in scientific areas and soft skills
- opportunity to improve teaching capabilities
- implementation of a career development plan
- support for raising additional grants
- A position for a three year period (100%) starting May 1<sup>st</sup> 2022.

We offer remuneration in accordance with TV-L (collective wage agreement for the Public Service of the German Federal States) in addition to all the customary benefits granted to employees working in Public Services. Severely handicapped persons with equal qualifications are given preferential consideration. The University of Tübingen is highly interested to increase its quota of female scientific staff, and therefore emphatically requests women to apply for this position. The

Administration of the University Hospital is responsible for all employment matters. Personnel appointments will be made pursuant to the fundamental stipulations of the legal statutes for universities in Germany. Initial interviews will be performed by Videoconference.

Applications: CV with up-to-date list of publications, a motivation letter, and two recommendation letters should be send to Prof. Hubert Preissl [hubert.preissl@uni-tuebingen.de](mailto:hubert.preissl@uni-tuebingen.de) copying [etienne.labyt@cea.fr](mailto:etienne.labyt@cea.fr), [fabrice.wallois@u-picardie.fr](mailto:fabrice.wallois@u-picardie.fr) , [mahdi.mahmoudzadeh@u-picardie.fr](mailto:mahdi.mahmoudzadeh@u-picardie.fr). Only electronic applications are accepted (please use as email subject “**DFG-ANR Tuebingen application**”).

Candidates are selected exclusively on merit and potential on the basis of submitted application material. No restrictions related to disabilities, citizenship or gender apply to this position.