**Special Topics Proposal Application**

*The primary goal of the Special Topics sessions is to succinctly introduce the debate on controversial questions in the field of neurofeedback research. The time allotted for each session is 45 minutes. Depending on the number and type of submissions, we may be able to extend the allotted time. Special Topics proposal format: 1-2 pages, 12 point font, 1” margins*.

Special Topics Title: **Real-time fMRI Quality Control**

 Submitter information:

* Name: Stavros Skouras, PhD
* Position: Principal Investigator / Marie Sklodowska-Curie Fellow
* Institution: Barcelonabeta Brain Research Center  / Pompeu Fabra University
* Email address: [sskouras@fpmaragall.org](mailto:sskouras@fpmaragall.org)

**• What is the main question?**

What are the caveats of real-time neuroimaging research practices? Can we eventually arrive at a set of guidelines and recommendations for quality control, to be employed by all researchers across the field of real-time fMRI neurofeedback?

**• Why is this an important question to neurofeedback researchers?**

With the recent exponential increase in rt-fMRI studies, especially from new research groups, it is easy for tacit quality assurance practices to be neglected.

A lack of commonly accepted standard recommendations means that a novel neurofeedback researcher, or even neurofeedback researchers with a background in standard off-line analysis, has no precise guidelines to adhere to in a real-time fMRI setting, in order to benefit from the accumulated experience of the field and ensure that even one’s first experiment will not be flawed by technological challenges that other researchers have already resolved in older labs. This is a problem that in the long run can become damaging to the entire field of real-time neurofeedback.

In this special session, we have invited a few experienced rt-fMRI researchers to share their experiences and approaches to overcoming common caveats of real-time practices, in an attempt to eventually integrate various approaches to real-time quality control into a coherent set of recommendations for best practices.

**• Is there extant literature to support different sides of the debate?**

This is a special topic with different sides that are complementary rather than opposing one another. This is so, because it seems that different labs have placed differential emphasis on particular aspects of quality control, often depending on the particularities of the research questions addressed and the technological apparatus available.

The literature on this topic is relatively limited and this is precisely why the functional neurofeedback community must collaborate on establishing more precise criteria. This topic is controversial because most people agree on the need for quality assurance but there is no fixed set of recommendations for best practices. In classical off-line imaging projects, rigorous QA approaches have mostly taken a ‘back seat’ in favor or alternative analyses. Rt-fMRI experiments by their design are much more demanding on imaging quality, since imaging is no passive but rather an integral part of the experimental design itself.

Some of the ensuing issues, that our speakers have placed differential emphasis on, include: optimizing filtering procedures, controlling timing accuracy, maximizing SNR and CNR, controlling for physiological noise, ensuring data consistency, discarding outliers, selecting reproducible ROIs, correcting for field distortions and working in real-time at 7T.

**• What is the proposed schedule of speakers?**

1) **Klaus Mathiak** (Uniklinik RWTH Aachen):

*Standard QA measures and available online tools for QA in anatomical/functional MRI*

10' plus 2' for questions

2) **Lydia Hellrung** (University of Zurich):

*Motion control, physiological confounds and neurofeedback quality control*

10' plus 2' for questions

3) **Johan van der Meer** (Otto-von-Guericke University / University of Amsterdam):

*Online distortion correction and real-time quality control at 7T*

10' plus 2' for questions

4) One additional speaker to be confirmed **OR**

additional questions towards all speakers.

Approximately 8’