

International School of Advanced Magnetic Resonance Applications

in

Medicine and Neuroscience



Director: Prof Girolamo Garreffa

Advanced Course in Neuroscience Palermo MAY 3-4-5, 2019

The advanced course of the *International School of Advanced Magnetic Resonance Applications in Medicine and Neuroscience* will focus on Brain Investigation highlighting the recent progresses in MR methodologies and technologies applied also in clinical practice with exploring all possible benefits in harmony with the WHO objectives of personalized medicine. These advancements require a constant update of skills and knowledge within the single or multimodal MR practice also in terms of quality of investigation and safety of the patient. MR techniques introduced and elaborated in the basic course will be further developed with the collaboration of national and international experts, not only with the aim of good practice but also exploring different new scenarios. The great potential of advanced MR diagnostics and how it aids precision medicine will be discussed, as well as High and Ultra-High field MR systems.

DRAFT Program

1th DAY Friday May 3 (Morning Session)

9:00 – 14:00

MR Technology and Safety: Review and Perspectives

LANGUAGE: English/Italian

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| 8:30 | Participants registration |
| 9:00 | Greetings to Participants of Organizing Committee |
| 9:15 | G. Garreffa, Adv. MR in Neuroscience State of the Art and Perspectives. |
| 10:00 | M. Marrale, Adv. MR in Neuroscience Summary and Revision of Main Techniques |
| 10:45 | A. Galante, Double Tuned MRI Coils |
| 11:20 | F. Fasano, Ultra-high gradients MRI to challenge human brain microstructure. A journey into technology, physics and physiology |
| 12:00 | Coffee Break |
| 12:20 | N. Mallia Higher Magnetic Field, Higher Frequencies, what about MR Safety? |
| 12:40 | A. Galante Metamaterials-enhanced MRI |
| 13:20 – 13:30 | Discussion and Closing Session |

1th DAY Friday May 3 (Afternoon Session)

15:00 – 18:30

Brain (Dis)Function Investigation:
The Finest Knowledge for a Better Quality of Life

LANGUAGE: English/Italian

Chairmen:

Dr **Fabio Trombetta**, President of SSFSR, Dott. **Paolo Guzzanti**, Journalist and Writer; Prof. **Massimo Midiri**, Radiologist Director of Radiology Department at *Policlinico P. Giaccone Università di Palermo*; Prof. **Girolamo Garreffa** – Physicist – Director of the *International School of Advanced MR Applications in Medicine & Neuroscience.*; *Honorary Member of SSFSR (Roma, Palermo)*; Dott. **Paolo Pirrotta**, Scientific Director of magazine “*InSanitas*”.

15:00 F. Trombetta, G. Garreffa, M. Midiri:

Welcome to all Participants at the Course Presentation Session

15.30 Prof. Paolo Maria Rossini – Neurologist – Director of *Istituto di Neurologia Università Cattolica del Sacro Cuore (Roma)*, **Opening Lecture:**

“The modern electroencephalogram in the scenario of functional Magnetic Resonance Imaging”

16:00 **Prof. Robert Turner** – Physicist – Director at the *Max Planck Institute for Human Cognitive and Brain Sciences (Leipzig, De)*

16:15 **Prof. Carlo Cosimo Quattrocchi** – Neuroradiologist – Director of *UOC Neuroradiologia Campus Biomedico (Roma)*

16.25 **Prof Angelo Galante** – Physicist – Università dell’Aquila

16:40 Coffee Break

17:00 **Dr Vincenzo Marra** – Neuroscientist – University of Leicester (UK)

17:10 **Prof. Louis Lemieux** – Physicist – *Professor of Physics Applied to Medicine, UCL Institute of Neurology, London.*

17:20 **Prof. Vittorio Pizzella** – Physicist – *Director of Neuroscience Department, Imaging and Clinical Science, ITAB, Università di Chieti*

17:30 **Dr Cesare Gagliardo** – Neuroradiologist – Researcher at Dept. of Radiology at *Policlinico P. Giaccone Università di Palermo.*

17:40 **Dr Maria R. Novembre** – Clinical Psychologist at C.I.P.A. and member of I.A.A.P

17:50 **Dr Antonella Filastro**, Clinical Psychologist - *Director of IPUE School, Rome.*

18:00 Round Table and Discussion with Journalists and all Participants

18:30 Closing Session

2nd DAY Saturday May 4 (Morning Session)

9:00 – 13:45

Brain Function Investigation: looking for new fronts of Diagnosis & Therapy

1-Electrophysiology and Multimodal MRI in Neurosciences.

LANGUAGE: English/Italian

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| 9:00 | EPhys | V. Marra, | <i>“From Single Synapse to Networks”</i> |
| 9:40 | MEPhys | Louis Lemieux, | <i>EEG-fMRI</i> |
| 10:20 | MEPhys | Luigi Bianchi | <i>From Neurofeedback to Brain-Computer Interfaces</i> |
| 11:00 | | | Coffee Break |
| 11:20 | MEG | V. Pizzella, | <i>Brain functional connectivity: a perspective from MEG</i> |
| 12:00 | MEG | S. Della Penna | <i>Dynamics of MEG connectivity: methods and applications</i> |
| 12:40 | MMRI | M. Marrale, | <i>Basic Physics of MRgFUS</i> |
| 13:00 | MRgFUS | C. Gagliardo, | <i>“Trans-cranial MR-guided focused ultrasound: The future of non-invasive surgery is here”</i> |
| 13: 45 | | | <i>Discussion & Closing Session</i> |

2nd DAY Saturday May 4 (Afternoon Session)

15:00 – 18:00

2-Advanced MR Investigations & Applications

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| 15:00 | Robert Turner, | <i>“Brain Structure, Function and the Value of Ultra-High Field MRI”</i> |
| 15:40 | C. Quattrocchi | <i>Complexity of advanced imaging in neuroscience: pitfalls and confounds</i> |
| 16:20 | G. Grasso | <i>Surgical treatment of cerebral Glioma: state of Art and future Perspectives</i> |
| 16:50 | G. K. Ricciardi | <i>“MRI techniques for functional neurosurgery planning, guidance and monitoring”</i> |
| 17:30 | | <i>Discussion and Closing Session</i> |

3rd DAY Sunday May 5 (Morning Session)

9:00 – 13:00

Applied Neuroscience: from Modeling to Clinical Practice

- 9:00** *The Role of MRI in Neurosurgery practice: Brain Surgery, Deep Brain & Spinal Cord Stimulation*
(Tommaso Tufo, Policlinico Gemelli-Roma)
- 9:40** *GENERAL ANESTHESIA: how do we turn consciousness off/on?*
Marco Cavaglià (Anesthetist) Politecnico di Torino, Dept. Aerospace Engineering
- 10:20** *The Dark Side of Brain Function: The Brain Hyper-Oscillator Model*
(Garreffa)
- 11:00** **Coffee Break**
- 11:30** *The Dark Side of Brain Tissues: Interstitial Fluid Flow*
(Quattrocchi)
- 12:10** *Cardiac MRI: State of Art and Perspectives*
(M. Midiri)
- 12:40** *Discussion*
- 13:00** *Closing Session*

13:00 – 14:00 *Quick Lunch (Catering)*

3rd DAY Sunday May 5 (Afternoon, Final Session)

14:00 – 17:00

What Else?

(Lectures of MR Scanners Manufacturers Specialists/Clinical Scientists)

14:00-17:00

LECTURERS (not definitive):

Bianchi Luigi, Univ. Tor Vergata, Roma

Cavaglia Marco, Anesthetist and Neuroscientist Researcher at Dept. of Aerospace Engineering, Politecnico di Torino.

Della Penna, Itab Chieti

Fasano Fabrizio, Cardiff, UK

Gagliardo Cesare, Università di Palermo

Galante Angelo, Università dell'Aquila

Garreffa Girolamo - Sapienza Università di Roma

Grasso Giuseppe, Università di Palermo

Lemieux Louis, University College of London (UCL, UK)

Marra Vincenzo, University of Leicester (UK)

Marrale Maurizio, Università di Palermo

Midiri Massimo, Università di Palermo

Pizzella Vittorio, Università di Chieti

Quattrocchi Carlo, Università Campus Biomedico, Roma

Rossini Paolo Maria, Università Cattolica del Sacro Cuore, Roma

Ricciardi Giuseppe, Università di Verona

Tufo Tommaso, Policlinico A. Gemelli, Roma

Turner Robert, Max Planck Institute Leipzig (De)