

# ADVANCED PHYSICS FOR MEDICINE

Rome, 16-18 September 2019  
Sapienza University, Physics Department Aula Conversi

**Nanotechnology for Medicine**

**X-rays for Medicine**

**Magnetic Resonance Imaging**

**Advanced 2D/3D techniques for  
Medicine**

**Theoretical Physics for  
BioMedicine**

## Scientific Committee

- Alessia Cedola (CNR-Nanotec)
- Inna Bukreeva (CNR-Nanotec)
- Michela Fratini (CNR-Nanotec)
- Alberto Bravin (ESRF)
- Antonio Uccelli (Ospedale Policlinico San Martino Genova)
- Nicole Kerlero de Rosbo (University of Genova)
- Federico Giove (Centro Fermi, Roma)
- Angelo Quattrini (Ospedale San Raffaele Milano)
- Giuseppe Gigli (CNR-Nanotec)
- Marta Moraschi (Centro Fermi, Roma)
- Fabrizio Bardelli (CNR-Nanotec)

## Organization Committee

- Alessia Cedola (CNR-Nanotec)
- Inna Bukreeva (CNR-Nanotec)
- Michela Fratini (CNR-Nanotec)
- Alberto Bravin (ESRF)
- Fabrizio Bardelli (CNR-Nanotec)
- Laura Maugeri (CNR-Nanotec)
- Alessia Sanna (CNR-Nanotec)
- Nicola Pieroni (CNR-Nanotec)
- Francesca Palermo (CNR-Nanotec)
- Ginevra Begani (CNR-Nanotec)



imagine  optics

  
Elettra Sincrotrone Trieste

**CENTRO FERMÍ**  
MUSEO STORICO DELLA FISICA  
E  
CENTRO STUDI E RICERCHE  
ENRICO FERMÍ

**ZEISS**



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## Practical Information

*The workshop will be held at  
Physics Department (**Building  
Marconi**) of Sapienza  
University, Room "Aula  
Conversi", 1st floor*



Scan me

*The workshop site is at  
walking distance from the  
**Termini Central Station** (15  
min)*



Scan me

*The **Hotel Laurentia** is also at  
walking distance from both  
University (10 min) and the  
Termini Station (20 min)*



Scan me

*The **Roof Garden of the Hotel  
Forum** (social dinner) is  
located in the Historical  
center at about 3 kilometers  
from the University*



Scan me

[www.tomalab-cnr-nanotec.it/APM2019.html](http://www.tomalab-cnr-nanotec.it/APM2019.html)



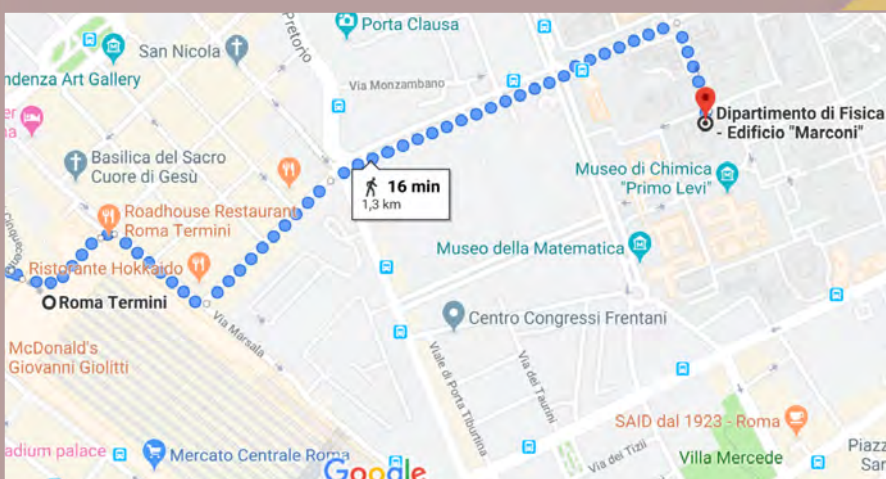
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## Workshop Location



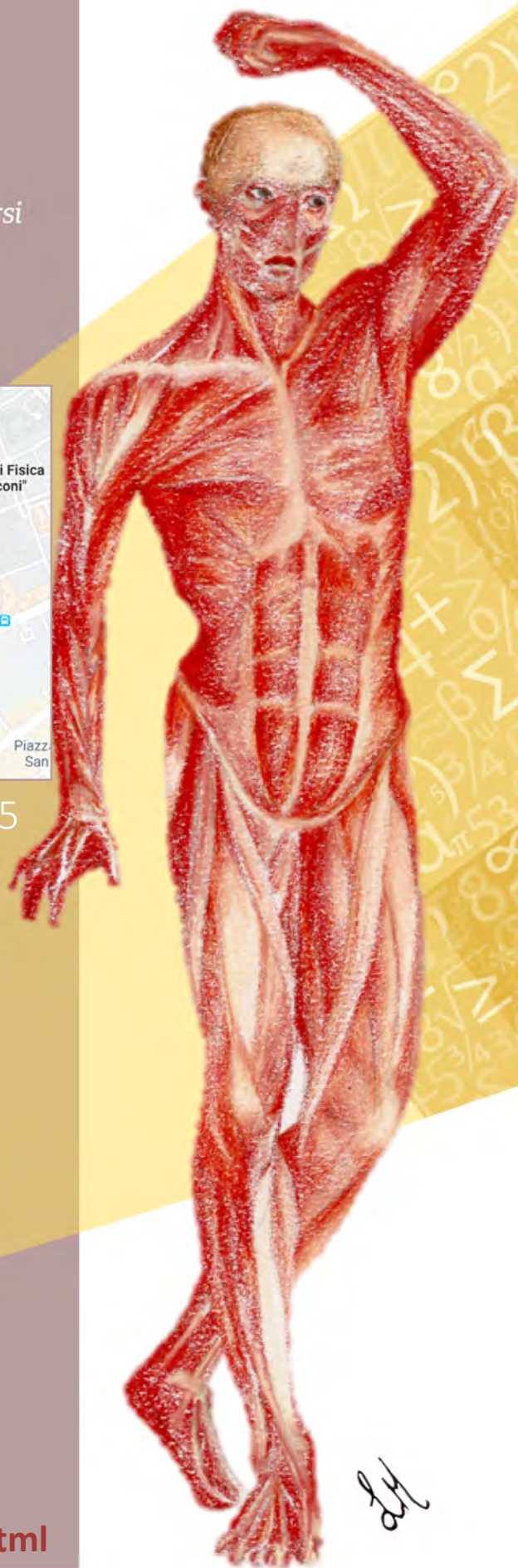
Roma Termini to Piazzale Aldo Moro, 5

### Sapienza University



Building Marconi (CU013)  
Aula Conversi (N. 132) I floor

[www.tomalab-cnr-nanotec.it/APM2019.html](http://www.tomalab-cnr-nanotec.it/APM2019.html)

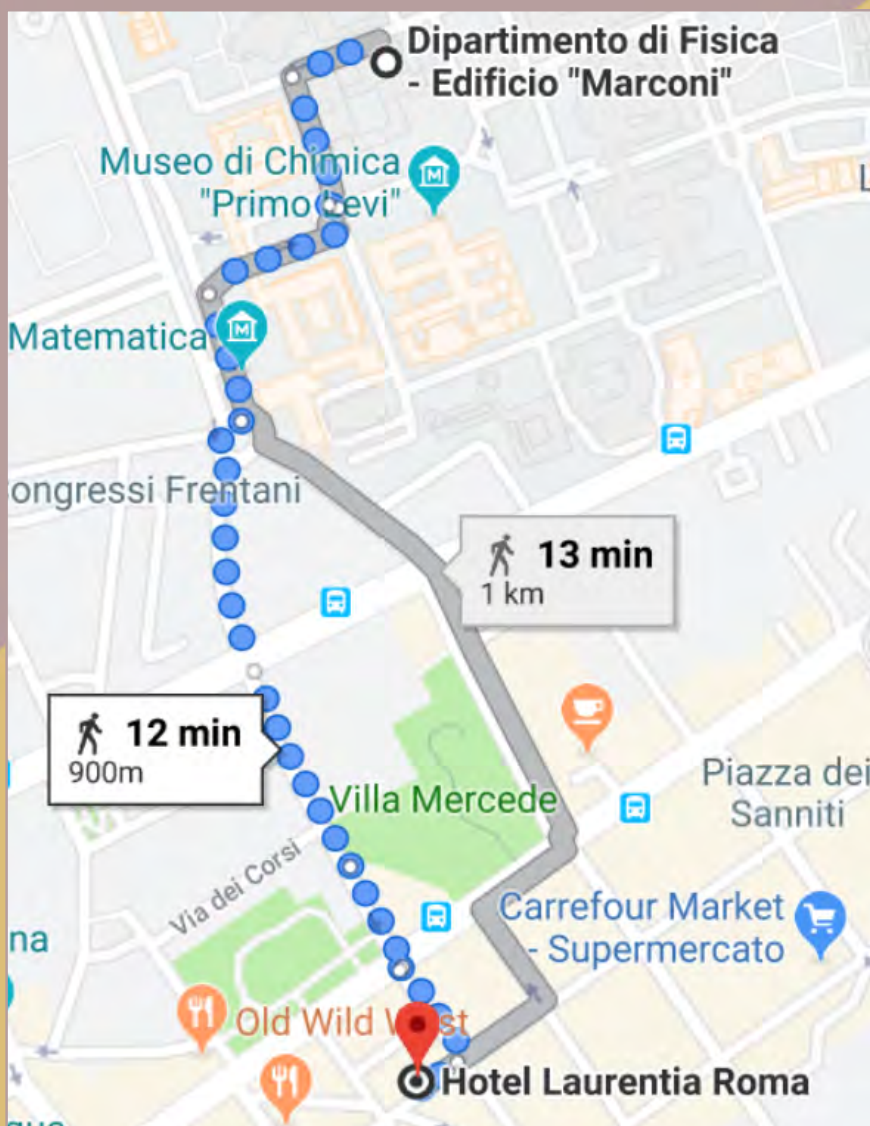




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## Hotel Laurentia



Largo degli Osci 63 Roma

+39 06 4450218

[www.hotellaurentia.com](http://www.hotellaurentia.com)

[www.tomalab-cnr-nanotec.it/APM2019.html](http://www.tomalab-cnr-nanotec.it/APM2019.html)





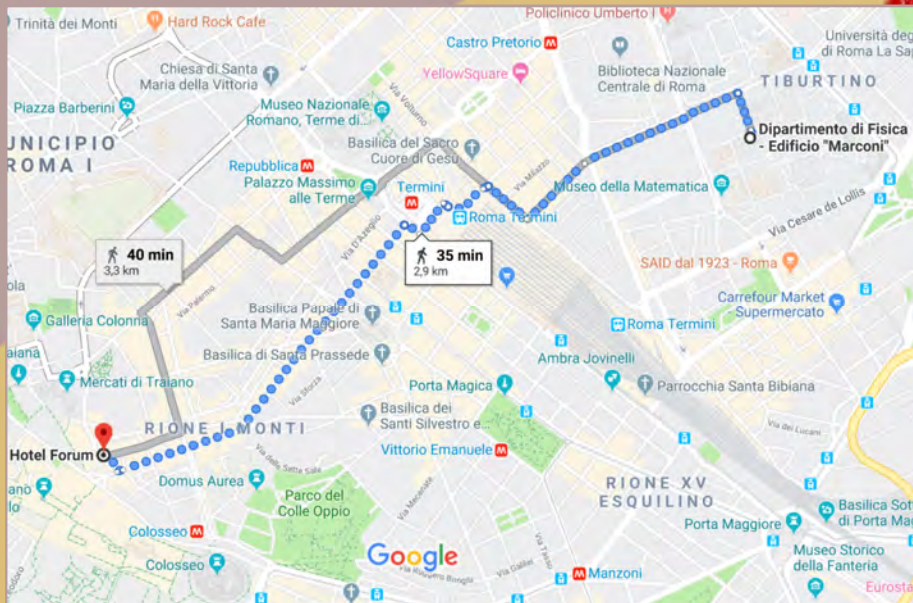
# ADVANCED PHYSICS FOR MEDICINE

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Social Dinner

ROOF GARDEN HOTEL FORUM

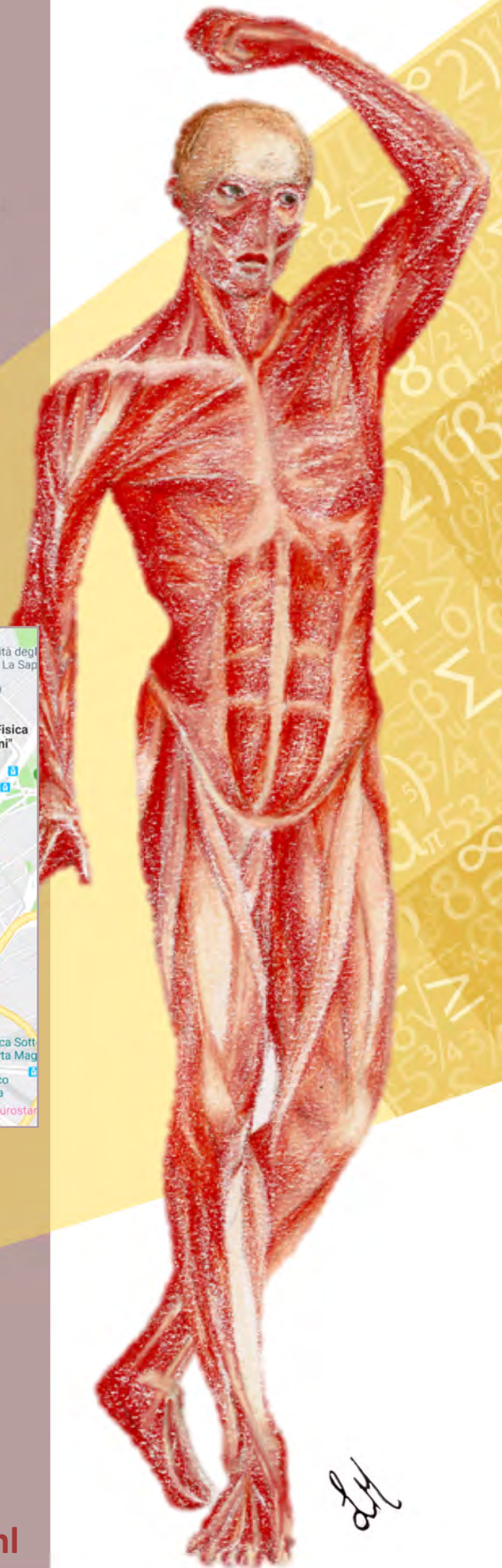
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Via Tor de' Conti, 25

+39 06 6798446

[www.tomalab-cnr-nanotec.it/APM2019.html](http://www.tomalab-cnr-nanotec.it/APM2019.html)



## Monday 16<sup>th</sup> September

### 1. Nanotechnology for Medicine

*Prof. R. Bartolino and Prof. G. Gigli*

	13:30 – 14:00	Registration
<b>Session I: AULA CONVERSI</b>	14:15 - 14:45	Welcome addresses: <b>Prof. P. Mataloni</b> , <i>Department of Physics, Sapienza University, Director</i> <b>Prof. M. Inguscio</b> , <i>CNR, President</i>
	14:45 – 15:00	<b>Prof. G. Gigli</b> , <i>CNR Nanotec Director</i> <i>Advanced Physics for Medicine at CNR-NANOTEC</i>
	15:00 - 15:15	<b>Dr. A. Cedola</b> , <i>CNR Nanotec Rome</i> <i>Introduction and motivation of the workshop</i>
	15:20 - 15:40	<b>Prof. F. Stellacci</b> , <i>Institute of Materials and Institute of Bioengineering, École Polytechnique Fédérale de Lausanne (Switzerland)</i> <i>Nanoparticles and Cells, Proteins, and Viruses Lessons Learned</i>
	15:45 - 16:05	<b>Dr. L. Sancey</b> , <i>Institute for Advanced Biosciences, Grenoble (France)</i> <i>Exploring nanomedicine for cancer theranostic investigations</i>
	16:05 - 16:35	Coffee break
	16:35 - 16:55	<b>Dr. A. Quarta</b> , <i>CNR Nanotec, Lecce (Italy)</i> <i>Inorganic nanoparticles in medicine: the nano-bio interface</i>
	17:00 - 17:20	<b>Prof. L. Moroni</b> , <i>Maastricht University, MERLN Institute for Technology-Inspired Regenerative Medicine, Maastricht (The Netherlands)</i> <i>Additive manufacturing or bioprinting? Where materials and biology complexity meet</i>
	17:25 - 17:45	<b>Dr. A. Rainer</b> , <i>Università Campus Bio-Medico di Roma</i> <i>In vitro platforms for understanding cardiac mechanobiology</i>
	17:45 - 18:00	Question time
	18:05 - 18:20	<b>Dr. B. Cortese</b> , <i>CNR Nanotec, Rome (Italy)</i> <i>Cellular microenvironment modulates the electrotaxis of glioblastoma cells</i>
	18:25 - 18:40	<b>Prof. G. Ruocco</b> , <i>Center for Life Nano Science, Fondazione Istituto Italiano di Tecnologia (IIT); Department of Physics, Sapienza University of Rome (Italy)</i> <i>From super-resolution to high throughput Brillouin microscopy at CLNS</i>
	19:00 - 21:00	<i>Welcome party on the Terrace</i> <i>A highlight of ATOM, STAR and Tecnomed projects</i>

## Tuesday 17<sup>th</sup> September

### Morning session

#### 2. X-Rays and PET for Medicine

Dr. A. Bravin and Prof. N. Saini

<b>Session II: AULA CONVERSI</b>	09:00 – 09:20	<b>Prof. A. Uccelli</b> , Full Professor in Neurology, Scientific Director, Ospedale Policlinico San Martino (IRCCS). Dipartimento di Neuroscienze, Riabilitazione, Oftalmologia, Genetica e Scienze Materno-infantili (DINOEMI) - Università di Genova (Italy)  <i>Mesenchymal stem cells for the treatment of neurodegenerative diseases</i>
	09:20 - 09:40	<b>Prof. A. Olivo</b> , Department of Medical Physics and Biomedical Engineering, University College London (United Kingdom)  <i>Enhanced sensitivity to soft biological tissues through fast and dose-efficient laboratory-based phase contrast CT</i>
	09:40 - 10:00	<b>Dr. N. Kerlero de Rosbo</b> , University of Genoa (Italy)  <i>Use of XPCT to study the implication of the gut/brain axis in the pathogenesis of experimental autoimmune encephalomyelitis, murine model for multiple sclerosis</i>
	10:00 - 10:20	<b>Question time</b>
	10:20 - 10:50	Coffee break
	10:50 - 11:10	<b>Dr. C. Balducci</b> , Istituto Mario Negri IRCCS, Milano (Italy)  <i><math>\beta</math>-amyloid oligomers, neuroinflammation and the gut microbiota: the multi-factorial nature of Alzheimer's disease</i>
	11:10 - 11:30	<b>Tomalab</b> , CNR-Nanotec, Rome (Italy)  <i>X-ray Phase Contrast applied to neurodegenerative diseases</i>
	11:30 - 11:45	<b>Question time</b>
	11:45 - 12:05	<b>Dr. G. Tromba</b> , Elettra-Synchrotron, Trieste (Italy)  <i>Synchrotron radiation for biomedical imaging: Status and prospects</i>
	12:05 - 12:25	<b>Prof. P. Coan</b> , Munich Universität, Munich (Germany)  <i>The role of multi-scale phase contrast CT in neuro-imaging and -radiotherapy</i>
	12:25 - 12:45	<b>Dr. M. Reichardt</b> , Universität Göttingen (Germany)  <i>X-ray Phase Contrast Tomography of neuronal tissue</i>
	12:45 - 13:05	<b>Question time</b>
	13:05 – 13:25	<b>Prof. J. Prior</b> , PhD MD, Lausanne University Hospital and University of Lausanne, Lausanne, (Switzerland)  <i>State of the art digital PET technology and its current clinical applications</i>
	13:25 – 13:45	<b>Prof. M. Conti</b> , PET Physics R&D, Siemens Molecular Imaging, Knoxville, Tennessee, USA  <i>State of the art of PET technology and current challenges</i>
	13:45 – 14:00	<b>Question time</b>
14:00 -15:30	<b>Buffet lunch and poster session</b>	



<b>Tuesday 17<sup>th</sup> September</b>		
<b>Afternoon session</b>		
<b>3. Magnetic resonance imaging</b>		
<i>Dr. M. Fratini and Dr. M. Moraschi</i>		
<b>Session III: AULA CONVERSI</b>	15:30 – 15:50	<b>Prof. M. Inglese</b> , <i>DINO GMI, University of Genoa (Italy)</i> <i>Clinical applications of <sup>23</sup>Na MRI</i>
	15:50 - 16:10	<b>Dr. C. Voena</b> , <i>INFN -Sezione di Roma (Italy)</i> <i>Development of <sup>19</sup>F MRI</i>
	16:10 - 16:25	<b>Question time</b>
	16:25 - 16:40	<b>Coffee break</b>
	16:40 – 17:00	<b>Prof. R. Wise</b> , <i>CUBRIC, Cardiff University (UK) &amp; ITAB, University of Chieti-Pescara (Italy)</i> <i>Multi-parametric MRI of brain physiology: Developing fMRI to quantify brain function</i>
	17:00-17:20	<b>Prof. P. Summers</b> , <i>Department of Biomedical, Metabolic and Neural Sciences, University of Modena and Reggio Emilia, Modena (Italy)</i> <i>MRI at the service of research and clinical application</i>
	17:20 - 17:35	<b>Question time</b>
	17:35 - 17:50	<b>Dr. F. Giove</b> , <i>Museo storico della fisica e Centro studi e ricerche “Enrico Fermi”, Rome (Italy)</i> <i>Scale-invariant rearrangement of resting state networks in the human brain under sustained stimulation</i>
	17:50 - 18:10	<b>Coffee break</b>
	18:10 - 18:25	<b>Dr. S. Capuani</b> , <i>Istituto dei Sistemi Complessi (ISC), Rome (Italy)</i> <i>Anomalous diffusion by NMR to increase the intrinsic resolution of MRI investigations</i>
	18:25 - 18:45	<b>Prof. O. Grohn</b> , <i>A.I. Virtanen Institute, University of Eastern Finland, Kuopio (Finland)</i> <i>Simultaneous EEG/fMRI and brain stimulation in awake rat - promises, challenges and solutions</i>
	18:45 - 19:00	<b>Prof. G. Iannetti</b> , <i>Center for Life Nano Science, Fondazione Istituto Italiano di Tecnologia (IIT), Rome (Italy); Department of Neuroscience, Physiology and Pharmacology, University College London, (United Kingdom)</i> <i>The search for pain biomarkers in the human brain (tentative)</i>
	19:00-19:15	<b>Question time</b>
21:00 -	<b>Workshop dinner</b>	



**Wednesday 18<sup>th</sup> September**  
**Morning session**

**4. Advanced 2D/3D Techniques for biomedicine**

*Dr. A. Cedola and Dr. F. Bardelli*

	09:00 – 09:20	<b>Dr. R. Hlushchuk</b> , <i>Institute of Anatomy, University of Bern (Switzerland)</i> <i>MicroangiCT: State-of-the-art ex vivo microvascular imaging</i>
<b>Session IV: AULA CONVERSI</b>	09:25 - 09:45	<b>Dr. M. Mastrogiacomo</b> , <i>Dipartimento di Medicina Interna e Specialità Mediche (DIMI), University of Genoa, Genoa (Italy)</i> <i>Inside the bone: Tissue engineering and regenerative medicine applications in orthopedics (tentative)</i>
	09:50 - 10:10	<b>Dr. G. Campi</b> , <i>Institute of Crystallography, CNR, Rome (Italy)</i> <i>Synchrotron x-ray diffraction imaging of heterogeneous biological matter</i>
	10:10 - 10:45	<b>Question time</b>
	10:45 - 11:15	<b>Coffee break</b>
	11:15 - 11:35	<b>Dr. A. Sierra Lopez</b> , <i>A.I. Virtanen Institute, University of Eastern Finland, Kuopio (Finland)</i> <i>Multiscale imaging of the brain</i>
	11:40 - 12:00	<b>Dr. E. Micotti</b> , <i>Istituto di Ricerche Farmacologiche, Istituto Mario Negri IRCCS, Milan (Italy)</i> <i>High Field MRI in murine models</i>
	12:00 - 12:20	<b>Question time</b>
	12:20 - 12:35	<b>Zeiss, Italy</b> <i>Products and novelties</i>
	12:40 - 13:30	<b>Light lunch</b>
	13:35 - 13:50	<b>Imagine Optic</b> <i>Products and novelties</i>
	13:55- 14:10	<b>Dr. I. Viola</b> , <i>CNR Nanotec, Rome (Italy)</i> <i>Advanced technologies for medicine</i>
	14:15- 14:30	<b>Dr. R. Angelini</b> , <i>Istituto dei Sistemi Complessi del Consiglio Nazionale delle Ricerche (ISC-CNR), Rome (Italy)</i> <i>Microgels: From responsive colloids to biomaterials</i>

<b>Afternoon session</b>		
<b>5. Theoretical Physics for Bio-Medicine</b>		
<i>Dr. I. Bukreeva and Dr. L. Leuzzi</i>		
<b>Session V: AULA CONVERSI</b>	14:30 – 14:50	<b>Dr. E. Cinquemani</b> , <i>INRIA Grenoble- Rhône Alpes , Grenoble (France)</i> <i>Enhanced production of heterologous proteins by a synthetic microbial consortium: Conditions and tradeoffs</i>
	14:55 – 15:15	<b>Prof. C. Bosia</b> , <i>Politecnico di Torino &amp; IIG</i> <i>Extrinsic microRNA noise as a driver of bimodal gene expression</i>
	15:15 - 15:40	Coffee break
	15:40 - 16:00	<b>Dr. T. Gili</b> , <i>IMT School for Advanced Studies, Lucca (Italy)</i> <i>Functional brain network topology in psychiatric di</i>
	16:05 - 16:25	<b>Dr. A. De Martino</b> , <i>CNR Nanotec, Rome (Italy)</i> <i>From carbon overflow to the Warburg effect: Insights from mathematical models</i>
	16:30 - 16:50	Question time and Conclusions <b>Dr. A. Bravin</b>