

Dear Participant,

it is our great pleasure to welcome you to Bardonecchia, Italy for the 4th Winter School of the European Society for Molecular Imaging (ESMI). TOPIM stands for “hot TOPics in molecular IMaging”. As in previous years, our effort is to concentrate on one aspect at the forefront of Molecular Imaging, a hot topic. Since 2007, TOPIM is an annual event aiming at covering an exciting aspect of application or technique of molecular imaging every year, chosen according to its pertinence and timeliness.

Looking back at the hot topics of the previous years:

- 2007: Imaging in Neurodegeneration and Neuroinflammation
- 2008: Imaging in Nano Objects
- 2009: Dual and Innovative Imaging Modalities

Molecular Imaging has gained in the past years a strong influence on medicine and biology, leading the way in exploiting molecular, biological and genetic information to develop precise, precocious and predictive *in vivo* diagnostic methods. These methods are increasingly precious for the follow-up and the evaluation of new treatments of many pathological states. Two of the features of imaging – the bridge that it creates between biology, chemistry, physics and mathematics, and its growing importance in medicine – suffice to justify the creation of the European Society for Molecular Imaging (ESMI) with organisation of annual meetings like TOPIM. But even more crucial is the fact that imaging is asserting itself as an original means of discovery, and opens new avenues to address specifically the *in vivo* kinetics of disease specific molecular events. TOPIM aims at bringing scientists from various fields together and providing a “think tank” to foster new ideas and inter-disciplinary cross connections through discussions between participants. By combining expert descriptions of the most up-to-date imaging technologies and/or applications TOPIM contributes in collectively describing the imaging approaches, categorizing them and drawing the landscape of *in vivo* imaging applied to a specific scientific issue.

With the occasion of the fourth TOPIM edition, it appeared timely to engage the discussion on Imaging Systems Biology. How hot this topic for imaging scientists is could impressively be seen during our first meetings as programme committee where we discussed the various perspectives of bringing the multi-faceted phenomena studied in systems biology together with the overall goal in imaging science of how to visualise some

of these aspects in the *in vivo* system. The effort of this winter school is to better understand uses of imaging in REAL Systems Biology problems, and/or redefine Systems Biology investigations to include the advantages of imaging, such as longitudinal readings etc. We are eager to learn what tools Systems Biology can bring to Molecular Imaging as well as what Molecular Imaging can do to integrate biological data into systems. At the same time, TOPIM is the ideal opportunity to set our seeds into our new generation of students who will hopefully bring the field even further.

We – the TOPIM 2010 programme committee have been most fortunate to attract a panel of prestigious speakers, all at the fore point of research in their discipline. We would like to thank them heartily, especially those who have travelled a long way to Italy, for having accepted to share their knowledge with us. We are really looking forward to hear about the basic paradigms of Systems Biology and their impact on Molecular Imaging and try to develop ideas on how Molecular Imaging can drive Systems Biology as well as to see demonstrations of methods to explore the biological knowledge to interpret data and to guide experiments.

We would like as well to warmly thank our sponsors, many of them being with us from the very beginning of the ESMI, for their generous support. Furthermore, we would like to point out that this year’s meeting would not take place without the support and close collaboration with the European Network of Excellence DiMI – Diagnostic Molecular Imaging.

We would like to address our warmest welcome to all of you, and to encourage you to participate without restriction in the scientific debates as well as to enjoy the beauties of the mountains surrounding us.

The TOPIM 2010 Scientific Committee:

- Andreas H. Jacobs, ESMI President
- Clemens W.G.M. Lowik, ESMI Vice President
- Bertrand Tavitian, ESMI Past President
- Silvio Aime, ESMI Secretary
- John Clark, ESMI Council Member
- Vasilis Ntziachristos, ESMI Member