

# SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

**SPSS2021** 

20-23 September 2021 | Online - Torino, Italy



SECOND JOINT MEETING ON SOIL AND PLANT SYSTEM SCIENCES

# THE SOIL-PLANT-ENVIRONMENT NEXUS AND EMERGING CHALLENGES ACROSS TERRESTRIAL ECOSYSTEMS

Società Italiana di Chimica Agraria (SICA)

Società Italiana di Pedologia (SIPe)

Società Italiana della Scienza del Suolo (SISS)



20-23 September 2021 | Online – Torino, Italy



On behalf of the Italian Society of Agricultural Chemistry (SICA), the Italian Society of Pedology (SIPe) and the Italian Society of Soil Science (SISS), we are delighted to invite you to the Second Joint Meeting on **Soil and Plant System Sciences (SPSS2021)**. The meeting will be held **online** on the **20<sup>th</sup>- 23<sup>rd</sup> September 2021**.

The title of this meeting **“The soil-plant-environment nexus and emerging challenges across terrestrial ecosystems”** sets up the ambitious goal of integrating scientific background, applied research and novel approaches to link soil, plant and environmental aspects over various ecosystems. Physical, chemical and biological properties, mechanisms and processes studied at different scales – from molecular to field – will feed the diversity of experiences, opinions and scientific knowledge.

**SPSS2021** aims at bringing together academic scientists, researchers and research scholars coming from the three Societies to exchange and share their experiences and research results on all aspects dealing with soil-plant sciences. The program will provide opportunities for *open fora* and discussion sessions across a wide range of related disciplines.

The scientific program is structured into three sessions covering from forest and semi-natural ecosystems, to human-impacted areas and agricultural systems, over four days. The core program is coupled with a scientific and cultural excursion following the course of water from alpine glaciers to lowland rice paddies.

The organizing committee  
**Biogeochemistry & Soil Science Group**  
DISAFA, University of Torino





### *Session 1*

## **SOIL AND PLANT SCIENCES IN FOREST AND SEMI-NATURAL ECOSYSTEMS**

After being abandoned for decades, the land used for non-food production are now experiencing new challenges. Forests and forest soils provide a number of ecosystem services and need to be preserved, being they used for wood production or their protecting functions. Nature-like areas range from high-elevation ecosystems to wetlands and coastal areas, from natural parks to pristine environments all over the world, and are nowadays under significant pressure, often enhanced by global change. As examples we may cite the invasion of alien species that affect soil biodiversity and soil-plant feedbacks, the changing hydrological inputs that alter the soil-water cycle and trigger soil erosion, the increase in atmospheric depositions that impact nutrient cycles and availability for plants and microorganisms and, last but not least, the increasing atmospheric CO<sub>2</sub> concentrations with striking consequences on plant productivity, soil organic matter turnover and soil carbon stocks.

In this session we welcome contributions that deal with: 1) soils in forest and nature-like areas, from the challenges of soil mapping in highly variable landscapes to evergreen pedogenic studies; 2) changes in physical, chemical and biological soil characteristics and processes caused by environmental non-anthropogenic stressors; 3) carbon and nutrients dynamics in plants of forest and nature-like areas, including lab simulation experiments and modelling studies dealing with plant-soil feedbacks; 4) losses of soils, nutrients and water from these areas, in whichever form: solid transport, gaseous emissions and solution export; 5) assessment of the quality of forest products and biomasses and of their environmental effects.



### *Session 2*

## **SOIL AND PLANT SCIENCES IN HUMAN-IMPACTED AREAS**

Humanity has been using land for a variety of purposes beside agriculture. The soils of urban and industrialized areas are frequently and sometimes greatly impacted by human activities and differ substantially from natural zonal counterparts in their physical, chemical and biological features, their performed functions, and supported services. The urban metabolism includes the rapid change of land use and causes soil removal, mixing and often sealing.

The remediation of contaminated sites implies strong modification of soil properties, often import of foreign soil materials and biomass matrices, and requires the adaptation of the soil-plant systems, e.g. in phyto- or bioremediation operations. The increasing attention towards community gardens, Nature Based Solutions for greener cities and, last but not least, the requirements of circular economy, all impinge on the use and transformation of urban and periurban land and a new paradigm for the soil-plant relationships.

The session will deal with the changes that anthropogenic activities impose on soil-plant systems within and around urban areas, in industrial settings and remediation operations, such as management and design of urban green infrastructure, waste management, water purification, reclamation and phyto-remediation of contaminated soils.



### *Session 3*

## **SOIL AND PLANT SCIENCES IN SUSTAINABLE FOOD PRODUCTION AND CROPPING SYSTEMS**

Today's agriculture is facing the intricate challenge of providing sufficient food for a rapidly growing world population in a changing environment, while sustainably managing the earth's limited resources that are under increasing pressure. It is abundantly clear that the world needs efficient and sustainable food/forage production systems that call for more efficient resource utilization, resilient cropping systems with lower environmental impact, as well as innovative solutions for increasing food security, quality and safety. These include initiatives that contribute to the definition of a circular agricultural economy as a viable model for minimizing the amount of external inputs for agricultural production, closing nutrient loops and reducing negative impacts on the environment by eliminating losses. Technological advances in agriculture can offer a multitude of opportunities, however their development will depend on a holistic understanding of agro-ecosystem functioning based on the fundamental knowledge of soil-plant-microbe processes.

This session will focus on 1) biotic and abiotic soil processes controlling carbon and nutrients cycling in soils and their interactions; 2) the role of soil biodiversity in determining soil functions; 3) the response of plants to nutrient acquisition and stress factors, and 4) the application of novel technologies for promoting plant growth and stress tolerance, increasing soil fertility and enhancing nutrient/water use efficiency. Particular attention will also be devoted to the effects of agricultural practices on pedogenetic processes and carbon sequestration, the environmental sustainability of cropping systems, food quality and safety, and the provision of essential ecosystem services.

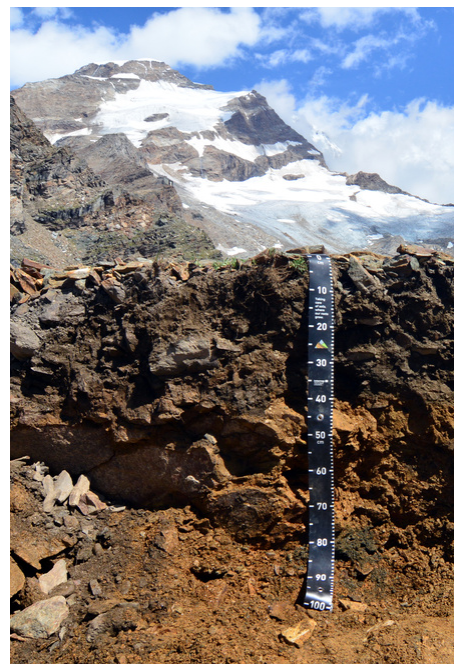


## FOLLOWING WATER: FROM ALPINE GLACIERS TO RICE PADDIES

With the **virtual SPSS2021 field trip**, we aim at showing you a range of sites that could not be reached in normal field trips. We will travel more than 250 km and move from 3000 m to less than 100 m a.s.l. All sites have been the subject of various multidisciplinary studies over the last years carried out either by us or by expert colleagues from other fields of research. To better link the field trip to the topics of the scientific sessions, we divided it into four parts. By doing so we hope to keep you interested and stimulate the discussion.

The virtual field trip will follow the course of water and lead all participants through the exploration of some of the most interesting environments of North-Western Italy.

We will start from Alpine glacial lakes and ponds, high mountain vegetation and striking, hidden soils at the LTER site Istituto Mosso (**Monte Rosa Massif**). At an elevation ranging between about 2600 and 3300 m, the long seasonal snow cover and the cold air temperature shape the landscape, with the presence of periglacial landforms and snowbed ecosystems.





Then, following alpine rivers down to the **Stura di Lanzo floodplain** we will stop at one of few remaining forests that once covered the Po plain. We will show you soils that are more likely to be found in tropical areas than 100 km far from the Alps. However, after having escaped to changes in land use, these sites are now at risk because of the presence of non-indigenous tree species that through physiological adaptations sharply impact nutrient biogeochemical cycles.

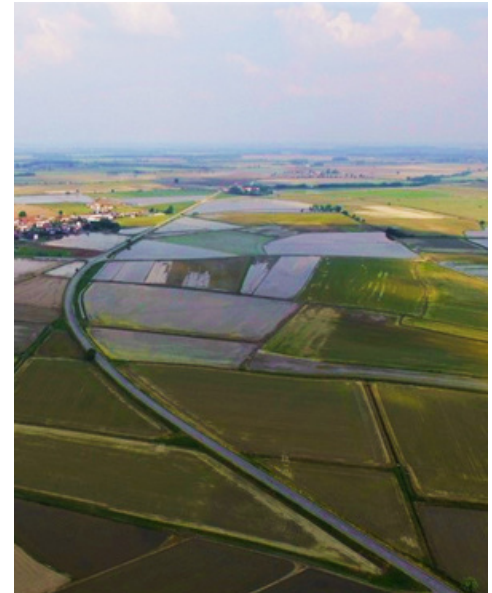


**Torino** is just 10 km away, where the Stura di Lanzo merges with the Po river. Soil contamination is a problem here, as in many big cities that have been heavily industrialized. Industrial districts are now converted in urban parks where plant selection, decontamination techniques and architectural design meet to improve city life quality.

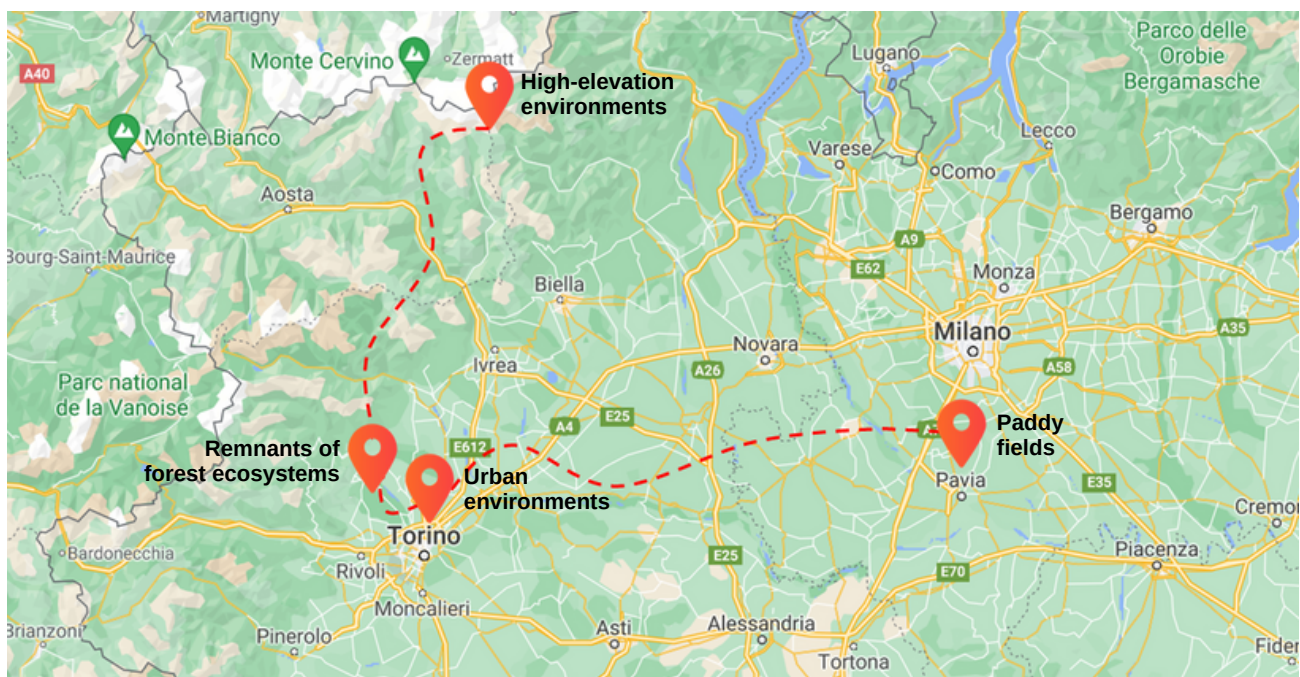




Still following the Po river, we will then leave Torino eastwards and look at how agriculture can shape the landscape. **Lowland rice fields** harbour a large biodiversity, and have been proposed to be listed among the UNESCO world heritage sites. Water management in rice paddies is the main driver of rice yield and quality, but also a key factor determining soil characteristics and processes. Sustainable agriculture in these areas is, however, now facing emerging challenges that require new approaches to combine crop production, resource management and environmental issues.

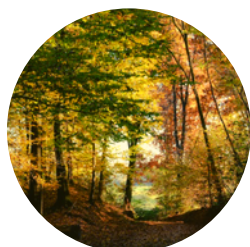


*We will thus end the field trip in Lombardia, but don't worry: it's a virtual field trip, you do not have to come back to Torino by train...*



# Conference programme

Monday, September 20<sup>th</sup>, 8.45 – 16.30



Session 1

## SOIL AND PLANT SCIENCES IN FOREST AND SEMI-NATURAL ECOSYSTEMS

Chairs: Tommaso Chiti, Chiara Ferré

8.45 – 9.15

### Opening session

9.15 – 10.00

**Keynote lecture:** Friederike Lang, Albert-Ludwigs Universität Freiburg (DE)  
*The complexity of forests – an advantage or an obstacle for soil protection*

10.00 – 10.15

Andreetta A., Cecchini G., Marchetto A., Carnicelli S.  
*Monitoring trends and fluxes in deposition and soil solutions through forest ecosystems in Italy*

10.15 – 10.30

Camponi L., Cardelli V., Serrani D., Salvucci A., Agnelli A., Roggero P.P., Cutini A., Corti G., Cocco S.  
*Effects of natural evolution and thinning on soil organic C and nutrient stock under turkey oak (*Quercus cerris* L.) coppice*

10.30 – 10.45

Seidel E., Lopez M.L.C., Bonifacio E., Kurokawa H., Yamanaka T., Celi L.  
*Seasonal phosphorus and nitrogen cycling in four Japanese cool-temperate forest species in Yamagata prefecture, Japan*

10.45 – 11.00

### Coffee break

11.00 – 13.00

**Virtual excursion:** *High-elevation environments*

13.00 – 14.00

### Lunch break

Chairs: Alberto Agnelli, Gloria Falsone

14.00 – 15.00

### Short communications & poster open forum

15.00 – 15.15

### Coffee break

15.15 – 15.30

Di Iorio E., Circelli L., Colombo C.  
*The significance of environmental proxies from the peat bog of the central-southern Apennine and their implications for paleo-environmental reconstructions*



# Conference programme

Monday, September 20<sup>th</sup>, 8.45 – 16.30

---

15.30 – 15.45	<u>Mascetti G.</u> , Ferré C., Gentili R., Comolli R. <i>Alpine soil organic matter and climate change: the case of the upper Adamè Valley</i>
15.45 – 16.00	<u>Giannetta B.</u> , Plaza C., Thompson A.A., Plante A.F., Zaccone C. <i>Iron speciation in fine sand and fine silt and clay fractions across different land uses</i>
16.00 – 16.15	<u>Serrani D.</u> , Cocco S., Cardelli V., D'Ottavio P., Rafael R.B.A., Feniassé D., Vilanculos A., Giosuè C., Tittarelli F., Corti G. <i>Effect of primitive management (slash and burn) on soil physicochemical properties</i>
16.15 – 16.30	Guerrini I.A., Sampaio T.F., <u>Roder L.R.</u> , Murgia I., Capra G.F., Ganga A. <i>Soil recovery in tropical areas affected by heavy machinery traffic for Eucalyptus plantations</i>

Tuesday, September 21<sup>st</sup>, 9.00 – 16.30

---

9.00 – 11.00	<b>Virtual excursion:</b> <i>Remnants of forest ecosystems</i>
11.00 – 11.10	<b>Coffee break</b>
11.10 – 11.40	<b>Sponsor session:</b> <u>Dr. Marian de Reus</u> – Elementar Analysensysteme GmbH <i>Live laboratory insights: how to analyze CNS concentrations and isotope ratios in soil, plant and environmental matrices</i>
11.40 – 11.55	<b>Appreciation of Prof. PIETRO VIOLANTE</b>
11.55 – 13.00	<b>Time for meetings</b> (boards, projects, ...)
13.00 – 14.00	<b>Lunch break</b>
14.00 – 16.00	<b>SICA plenary meeting &amp; SICA Young awards and editorial activities</b>
14.00 – 16.30	<b>SIPe plenary meeting &amp; SIPe award "Best YOUNg PEDologist"</b>

# Conference programme

Wednesday, September 22<sup>nd</sup>, 9.00 – 17.00



## Session 2

### SOIL AND PLANT SCIENCES IN HUMAN-IMPACTED AREAS

Chairs: Marco Landi, Fulvia Tambone

9.00 – 9.45	<b>Keynote lecture:</b> <u>Matthias C. Rillig</u> , Freie Universität Berlin (DE) <i>The impact of global change on soil functions and microbial diversity</i>
9.45 – 10.00	<u>Buscaroli A.</u> , Greggio N., Zannoni D., Dinelli E. <i>Dittrichia viscosa (L.) Greuter and Helicrysum italicum (Roth) G. Don: two interesting species for the phytostabilization of the polluted mine sites of Montevecchio (Sardinia, Italy)</i>
10.00 – 10.15	<u>Napoletano P.</u> , De Marco A., Circelli L., Di Iorio E., Colombo C. <i>Comparison between Technosols and volcanic forest soils assessed with XRF and Vis-NIR spectroscopy</i>
10.15 – 10.30	<u>Rascio I.</u> , Allegretta I., Gattullo C.E., Porfido C., Suranna G., Grisorio R., Spiers K., Falkenberg G., Terzano R. <i>Effects of laboratory-simulated fires on the distribution and speciation of chromium in agricultural soils: An integrated investigation approach</i>
10.30 – 10.45	<u>Signorini M.</u> , Midolo G., Cesco S., Mimmo T., Borruso L. <i>Does soil bacterial and fungal alpha-diversity decrease after heavy metals addition? A meta-analysis</i>
10.45 – 11.00	<b>Coffee break</b>
11.00 – 12.00	<b>Virtual excursion:</b> <i>Urban environments</i>
12.00 – 12.10	<b>Coffee break</b>
12.10 – 13.10	<b>Short communications &amp; poster open forum</b>
13.10 – 14.10	<b>Lunch break</b>

Chairs: Ignazio Allegretta, Erika Di Iorio



# Conference programme

Wednesday, September 22<sup>nd</sup>, 9.00 – 17.00

---

14.10 – 14.25	<u>Cucina M.</u> , De Nisi P., Tambone F., Adani F. <i>The role of waste management in reducing bioplastics' leakage in the environment</i>
14.25 – 14.40	<u>De Mastro F.</u> , Cacace C., Traversa A., Pallara M., Coccozza C., Mottola F., Brunetti G. <i>Influence of chemical and mineralogical soil properties on the adsorption of Sulfamethoxazole and Diclofenac in Mediterranean soils</i>
14.40 – 14.55	<u>Pinna M.V.</u> , Lauro G.P., Diquattro S., Garau M., Senette C., Garau G., Castaldi P. <i>Insights into biochar efficiency in the recovery strategies of soils polluted by herbicides or potentially toxic elements</i>
14.55 – 15.10	<u>Pepe' Sciarria T.</u> , Costa de Oliveira M.A., Mecheri B., D'Epifanio A., Goldfarb J.L., Adani F. <i>Metal-free activated biochar as an oxygen reduction reaction catalyst in single chamber microbial fuel cells</i>
15.10 – 15.20	<b>Coffee break</b>
15.20 – 17.00	<b>SISS plenary meeting &amp; Ballatore award</b>

# Conference programme

Thursday, September 23<sup>rd</sup>, 9.00 – 16.30



## Session 3

### SOIL AND PLANT SCIENCES IN SUSTAINABLE FOOD PRODUCTION AND CROPPING SYSTEMS

Chairs: Antonello Bonfante, Stefano Mocali

9.00 – 9.45	<b>Keynote lecture:</b> <u>Claire Chenu</u> , Joint Research Unit INRAE, Agro Paris Tech, Université Paris-Saclay (FR) <i>Managing organic matter in agricultural soils via plant inputs</i>
9.45 – 10.00	<u>Buffagni V.</u> , Ganugi P., Pii Y., Rouphael Y., Colla G., Trevisan M., Lucini L. <i>The biostimulant effect of protein hydrolysates distinctively mitigate salt stress in lettuce and tomato: a combined phenotyping and metabolomics approach</i>
10.00 – 10.15	<u>Lodovici A.</u> , Buoso S., Miras-Moreno B., Martinelli E., Lucini L., Tomasi N., Zanin L., Pinton R. <i>Interaction between N and Fe nutrition: how N forms can promote Fe acquisition into tomato plants</i>
10.15 – 10.30	<u>Tiziani R.</u> , Trevisan F., Pii Y., Celletti S., Cesco S., Mimmo T. <i>Root exudates reuptake and alteration of carbon isotope fractionation by tomatoes under P deficiency</i>
10.30 – 10.45	<u>Santin M.</u> , Castagna A., Mariottini G., Pomarà L., Sciampagna M.C., Bonzi L., Rallo G., Ginanni M., Gabriele M., Longo V., Ranieri A. <i>Exploiting of halophyte-based farming system: valorization of <i>Salicornia europaea</i> grown in monoculture or intercropped with tomato plants in salt-affected soils</i>
10.45 – 11.00	<b>Coffee break</b>
11.00 – 13.00	<b>Virtual excursion:</b> <i>Rice agroecosystems</i>
13.00 – 14.00	<b>Lunch break</b>



# Conference programme

Thursday, September 23<sup>rd</sup>, 9.00 – 16.30

---

Chairs: Marco Contin, Luigi Lucini

14.00 – 15.00	<b>Short communications &amp; poster open forum</b>
15.00 – 15.10	<b>Coffee break</b>
15.10 – 15.25	<u>Falsone G.</u> , Trenti W., Poesio C., De Feudis M., Bianchini G., Vittori Antisari L. <i>Soil quality: fate and role of organic matter – a study case in temperate climate (Northern Italy) under different land use</i>
15.25 – 15.40	<u>Ganugi P.</u> , Fiorini A., Ardeni F., Caffi T., Bonini P., Taskin E., Puglisi E., Tabaglio V., Trevisan M., Lucini L. <i>Seed treatment with fungal or bacterial biostimulant consortia distinctively modulate root metabolome and rhizosphere community in maize in a coordinate manner</i>
15.40 – 15.55	<u>Ruggiero L.</u> , Fontanella M.C., Amalfitano C., Beone G.M., Adamo P. <i>Geographical traceability of Limone di Sorrento PGI by multielement fingerprinting: the role of not-essential elements</i>
15.55 – 16.10	<u>Sofo A.</u> , Mininni A.N., Dichio B., Mastroleo M., Xylogiannis E. <i>Physical structure and chemical quality of soils in G3 kiwifruit orchards differentially managed</i>
16.10 – 16.30	<b>Closing session</b>

The posters must be uploaded on the website <https://www.convegnospss2021.it/> in .pdf format **within September 10<sup>th</sup>**, specifying the name of the person who will present the poster.

The conveners are warmly invited to visit the poster page on the website and **vote their favorite posters** of each session before **September 16<sup>th</sup>**, by filling the **google form** that the organizers will soon send to all conveners. The first three classified posters of each session will have a *two minutes presentation* during the "Short communications & poster open forum" of their scientific session.

### **Poster platform**

The Short Communications & Poster Open Forum will be hosted on the **REMO Conference** platform, organized in floors and tables. A tutorial video will soon be provided on the conference website.

Each table will host one or more posters presented by the same person in each session. The conveners will have the chance to move among the tables and talk with the people sitting at the same poster table. The posters will be uploaded by the organizers on the whiteboard of each table at the beginning of the conference.



## ORGANIZING COMMITTEE



Franco Ajmone Marsan  
Elisabetta Barberis  
Valter Boero  
Eleonora Bonifacio  
Luisella Celi  
Domenico D'Anna  
Michele D'Amico  
Giovanni De Luca  
Michele Freppaz  
Beatrice Giannetta  
Annapaola Giordano  
Marta Iannicelli  
Cristina Lerda

Yan Li  
Maria Martin  
Sara Martinengo  
Sara Negri  
Elio Padoan  
Emanuele Pintaldi  
Marco Prati  
Morena Rolando  
Daniel Said Pullicino  
Veronica Santoro  
Michela Schiavon  
Silvia Stanchi  
Daniela Vindrola

## SOCIETIES COMMITTEE



Paola Adamo  
Eleonora Bonifacio  
Stefano Cesco  
Giuseppe Corti  
Giovanni Gigliotti  
Sara Marinari  
Teodoro Miano  
Fabio Terribile

## SCIENTIFIC COMMITTEE

Alberto Agnelli  
Maurizio Badiani  
Tommaso Chiti  
Gloria Falsone  
Chiara Ferrè  
Laura Giagnoni

Ignazio Allegretta  
Gian Franco Capra  
Erica Di Iorio  
Marco Landi  
Maria A. Rao  
Fulvia Tambone

Stefania Astolfi  
Antonello Bonfante  
Marco Contin  
Giuseppe Lo Papa  
Luigi Lucini  
Stefano Mocali