



Science & Technology

FORESIGHT

from society to research

Booklet

“Theranostics for P4 Medicine”

21-23 March, 2016 - Florence

WG HEALTH

***Science and Technology Foresight
Interdepartmental Project – CNR (Italy)***

*Coordinator: Ezio ANDRETA
Vice-Coordinator: Giorgio EINAUDI*

WG HEALTH

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Scientific Committee

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ACKNOWLEDGEMENTS

The Science and Technology Foresight Project is an Interdepartmental Project of the National Research Council of Italy (CNR), supported by the Italian Ministry for Education and Research (MIUR) and Area Science Park (Trieste).

Face-to-Face Workshop “*Theranostics for P4 Medicine*” Programme

March 21-23, 2016

Hotel 500, Florence, Italy

MONDAY, March 21st 2016

14:00 – 14:30	Get together and opening	Luigi AMBROSIO
14:30 – 15:30	<i>S&T Foresight: from society to research</i> (Key Lecture)	Luigi NICOLAIS
15:30 – 16:00	Objectives of F2F Workshop	Stephen TAYLOR
16:00	<i>Coffee Break</i>	
16:30 – 18:00	Focus on Cardiovascular diseases	Moderator: <i>Maria Giovanna TRIVELLA</i>
19:30	<i>Dinner</i>	

TUESDAY, March 22nd 2016

08:30 – 10:00	Focus on Metabolic diseases	Moderator: <i>Cecilia BARTOLUCCI</i>
10:00	<i>Coffee Break</i>	
10:30 – 12:00	Focus on Cancer diseases	Moderator: <i>Paolo PAOLETTI</i>
12:30	<i>Lunch Break</i>	
14:30 – 16:00	Focus on Neurological and Neurodegenerative diseases	Moderator: <i>Luca PANI</i>
16:00	<i>Coffee break</i>	
16:30 – 18:30	Interdisciplinary Brainstorming	Moderator: <i>Stephen TAYLOR</i>
19:30	<i>Gala Dinner</i>	

WEDNESDAY, March 23rd 2016

08:30 - 11.00	Discussion session & Preliminary Reports <i>Parallel sessions with all participants, followed by plenary session</i>	
11:00	<i>Coffee Break</i>	
11:30 - 12.30	Conclusion	Moderator: <i>Stephen TAYLOR</i>
13:00	End of meeting	

This is an invitation-only working meeting whose participants are requested to attend all sessions.



CHAIRS

- Cecilia BARTOLUCCI (*National Research Council - CNR, IT*)
 - Luca PANI (*Agenzia Italiana del Farmaco - AIFA, IT*)
 - Paolo PAOLETTI (*Kesios Therapeutics, UK*)
 - Stephen TAYLOR (*Area Science Park, Trieste, IT*)
 - Maria Giovanna TRIVELLA (*National Research Council - CNR, IT*)
-

MD EXPERTS

- Pietro CORTELLI (*Department of Biomedical and Neuromotor Sciences, University of Bologna, IT*)
 - Vincenzo DI LAZZARO (*Policlinico Universitario Campus Biomedico, Roma, IT*)
 - Silvia GIORDANO (*University of Torino Medical School, Torino, IT*)
 - Eleuterio FERRANNINI (*Department of Internal Medicine, University of Pisa, IT*)
 - Giovanna LIUZZO (*Università Cattolica Sacro Cuore di Milano, IT*)
 - Enrico PERNA (*Azienda Ospedaliera Niguarda Ca' Granda, Milan, IT*)
 - Alfredo QUINONES GALVAN (*Fondazione Toscana G. Monasterio, Pisa, IT*)
 - Luigi RICCIARDIELLO (*Department of Medical Science and Surgery, University of Bologna, IT*)
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S&T EXPERTS

- Luigi AMBROSIO (*National Research Council – CNR, IT*)
 - Fiorella BATTAGLIA (*Ludwig-Maximilian-Universität. Munich, DE*)
 - Gabriele BRONZETTI (*Policlinico Sant’Orsola-Malpighi, IT*)
 - Enrico CAPOBIANCO (*Centre for Computational Science - University of Miami, USA*)
 - Alicia CASALS (*Institute of Bioengineering of Catalonia-Robotics, ES*)
 - Abdelhamid ERRACHID (*Institute of Analytical Sciences, Villeurbanne, FR*)
 - Dimitrios FOTIADIS (*Department of Materials Science and Engineering -University of Ioannina, EL*)
 - Claudio FRANCESCHI (*Alma Mater Studiorum – University of Bologna, IT*)
 - Amalia GASTALDELLI (*National Research Council – CNR, IT*)
 - Paul LUKOWICZ (*Institute of Pervasive Technologies, DFKI GmbH, DE*)
 - Peter B. LUPPA (*Institut für Klinische Chemie und Pathobiochemie, DE*)
 - Donata MEDAGLINI (*University of Siena, IT*)
 - Arianna MENCIASSI (*Department of Biorobotics, Scuola Superiore S. Anna, Pisa, IT*)
 - Matteo SANTIN (*Pharmacy and Biomolecular Sciences, Brighton, UK*)
 - Gerard SIEST (*University of Lorraine, Nancy, FR*)
-

INDUSTRIES AND STAKEHOLDERS

- Claudio BECHINI (*Pharma Integration, IT*)
- Patrick BOISSEAU (*European Technology Platform Nanomedicine*)
- Paolo BONARETTI (*ASTER, Italian Ministry of Economic Development, IT*)
- Luca DE BIASE (*Sole 24 Ore – Nova, IT*)
- Renata GRIFANTINI (*Exteronautics, IT*)
- Christina KYRIAKOPOULOU (*DG Research - European Commission*)
- Sandra KWEDER (*Food and Drug Administration, USA*)
- Rafael POPPER (*Manchester Institute of Innovation Research, UK*)

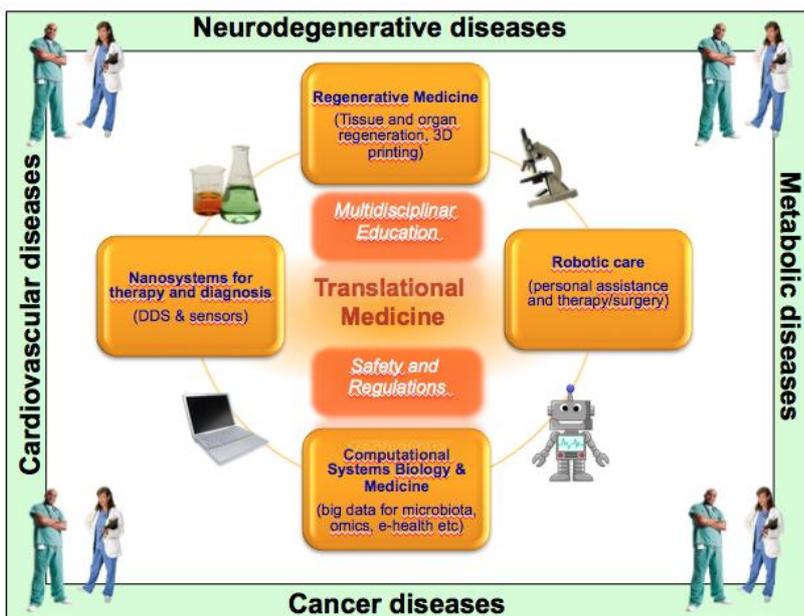
AIM OF THE F2F MEETING

The transition from today population-based “reactive” medicine to the individual patient-centred data-driven medicine of tomorrow is the big challenge that the health system will face in the next years worldwide. Therefore, in addition to the clinical-pathological parameters, many other factors such as inherited genetics, ethnicity, age and gender, lifestyle including nutrition and, more generally, the socio-economic environment will have to be taken into consideration.

Within this frame, the main aim of this F2F meeting will be to collect opinions from international experts in order **to identify long term future needs and bottlenecks in the exploitation of Theranostics for a Preventive, Predictive, Personalized and Participatory Medicine (P4-Medicine)**.

Due to the constructive and not just informative nature of the workshop, this is an invitation-only meeting with approximately 50 participants attending the full 3-days-programme. Clinicians with outstanding competences on pathologies with high social impact (neurodegenerative, cardiovascular, metabolic and cancer diseases) will be asked to present the main challenges in the medium-long term and to share their vision with all participants. Several experts of different technological areas (such as nanotechnologies, material science, tissue regeneration, robotics, bioinformatics etc.) as well as representatives from industries, public administrations and civil society together with relevant policymakers have also been invited.

The highly interdisciplinary character of the meeting will encourage everybody to play an active role *with a visionary and open-minded approach*, taking advantage of the ample time allowed for questions and answers, as well as of plenary and small group discussion. Each expert’s contribution will be crucial for the elaboration of scenarios addressing urgent societal challenges and the validation of a final strategic document finalised **to design the roadmap for an innovative medicine** based on the individual needs of each patient.



Expected Outputs

- ✓ To identify medical needs, bottlenecks, knowledge gaps and new/emerging strategic technological solutions that should be adopted to overcome the obstacles, able to lead to a P4 Medicine.
- ✓ To elaborate scenarios addressing the urgent societal challenges of wellness and healthcare.
- ✓ To validate a final strategic document encompassing the conclusion of two days of discussions, perspectives and recommendations.

Final Objective

To design a time-dimensioned Science & Technology roadmap for an innovative medicine based on the individual needs.

SCIENCE & TECHNOLOGY FORESIGHT CNR PROJECT: from society to research

The approach of the CNR Science and Technology (S&T) Foresight, while driven by societal needs and interested in identifying innovative technologies, puts the scientific research at the core of its scope. Outputs of the projects should be S&T future visionary solutions able to reach the market and have long-term disruptive impacts on the society.

1. FOREGROUND

The Science and Technology Foresight CNR Project seeks to define a medium to long-term vision - 5 to 30 years - in order to elaborate coherent research strategies, and to address serious socially relevant problems related to environment, health, food, energy, security and transportation.

The holistic approach followed in analysing the topics and the active participation of internationally acknowledged experts from universities, research centers, public and private sectors in the foresight activities are two key characteristics of the project. In particular, the experts will attend a series of Face-to-Face (F2F) workshops, each of them focused on specific correlated sub-topics. Preparation of the proceedings will follow each workshop and their dissemination is foreseen at both national and international level.

2. THE METHODOLOGY

The F2F workshops are invitation-only events, organised in such a way as to guarantee the conditions necessary for a free and open debate to participants from a range of backgrounds and positions. A very important element of these workshops is that the participants must have a broad experience and view of the field. This approach is designed to facilitate convergence towards common positions related to research priorities, knowledge gaps and funding needs, and to address the social

acceptability of future products and services and resultant market potential. Three operational phases are required for the implementation of each workshop:

1. the definition of the program,
2. the preparation of preliminary documents,
3. the selection of experts to be invited.

This project aims to introduce a bottom-up approach to collective intelligence. It differs from the methods traditionally used by foresight institutions/bodies because it allows each expert involved to make his or her knowledge available to others, in a reciprocal way, leading to a consolidation and extension of the knowledge of each individual. This approach overcomes the linear view of the individual researcher/research group to develop a systemic, collective and integrated vision, essential in dealing with complexity.

The S&T Foresight network plays a key role for the preparation and implementation of these F2F workshops. The exchange of valuable information and the "validation" of all supporting material exploit the network capacity through the interactive process among the participants at national and international levels.

Along with the project partners (CNR and AREA), all institutions, public and private, international and national, interested in foresight, represent potential target



recipients of the outputs of the network of researchers/technologists.

The time horizon of the future activity will be between 5 and 30 years and it is focusing at present on four topics: Food, Health, Energy and Water.

3. THE WORKING GROUP HEALTH

Promoting health and preventing diseases is essential, not only for the high individual impact of disease but also because increasingly strained healthcare systems, ageing population and high economic cost of diseases make these a social as well as an economic necessity. Within this frame, the health systems will face radical changes



towards a less invasive, more predictive and preventive medicine with tailored therapeutic approaches.

The aim of Working Group Health (WG HEALTH) is to identify, with the support of international experts, the priorities and technological strategies to face the challenges of future **Preventive, Predictive, Personalized and Participatory Medicine (P4-Medicine)** and to define a roadmap to achieve the goal.

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4. THE WG HEALTH EXPLORATORY WORKSHOP

In May 2014 an Exploratory Workshop was held in Bologna (Italy), focused on "Theranostics for personalised medicine" and gathering 7 distinguished scientists from European and US academies and clinics, plus 7 high level experts from the National Research Council of Italy and Area Science Park.

Starting from the analysis of the state-of-the-art, the exploratory workshop "Theranostics for personalized medicine" proceeded with the identification of medium-long term potential technological applications and socio-economic impacts of priority topic areas, pointing out obstacles, gaps in knowledge, education and technology transfer, market needs and potential, societal challenges and social acceptability.

The final aim was to select the specific topics with the highest priority for the future study and analysis and for potential inclusion in future Face to Face (F2F) workshops.

The following priorities were identified:

- *In the short-medium term period (5-10 years)*, the participants have identified **PERSONALIZED NANO-TOOLS** as the main challenge in order to predict the individual response to therapeutic compounds before starting the therapy, to early detect markers of disease, to monitor the illness and to personalize the therapy. Point of Care testing (of blood and other fluidic-phase humoral electrolytes or circulating molecules), smart wearable T-shirts and omics profiling have been identified as technological solutions for a **PREDICTIVE AND PERSONALIZED MEDICINE**.

- *In the long-term period (> 20 years)*, the participants believe that the big challenge is **PREVENTIVE MEDICINE**. The main group of diseases with high social impact for which unmet needs were identified are cancer, neurodegenerative, cardiovascular, metabolic and infectious diseases. Theranostic applications could allow a preventive medicine in these diseases even if they are at

present still far from real application. However, THERANOSTIC NANOSTRUCTURES with the features of multiple detectors (*sensors* of illness, *communicators* of information on state of health in real-time and *actuators* of “therapy” internally regulating health conditions) could represent the matching of emerging technologies able to deliver new and radically innovative medical solutions (such as smart vaccines or smart biosensors) for a preventive medicine.

CONCLUSION

The Road map for a medicine of the future, providing higher quality of life and more efficient use of healthcare resources, will include:

- “creative assembling” of available tools and technologies to develop “*personalized*

smart systems” providing (currently lacking) diagnostic and therapeutic options and whole person fingerprint, through a multidisciplinary approach;

- matching the potential of technologies with social needs, also in terms of communication and creation of new highly specialized stakeholders in healthcare;

- education of the medical doctors of the future able to work in multidisciplinary/interdisciplinary teams;

- **embracing the concept of P4 Medicine (Personalized, Predictive, Preventive and Participatory Medicine).**



5. INVITED EXPERTS

Luigi AMBROSIO

Director of Department of Chemical Sciences and Materials Technology, National Research Council of Italy,
"Embracing multidisciplinary foresight"

Doctoral degree in Chemical Engineering (1982) from University of Naples "Federico II". Adjunct Professor of University of Connecticut, USA (1997-2003) and of University of Naples "Federico II" (1997-2010). Director of Institute of Composites and Biomedical Materials (2009-2012). President of the European Society for Biomaterials (2006-2013). Distinguished Professor at Nanjing Normal University, China. (since 2013). He has been nominated Fellow of the American Institute for Medical and Biological Engineering (March 2001), and Fellow of Biomaterials Science and Engineering (May 2004). Member of the European Commission Advisory Group of the FP7 theme Nanoscience, Nanotechnologies, Materials and New Production Technologies (2006-2008) and Member of High Level Group on Key Enabling Technologies at European Commission (Since 2009).

His research interests include design, characterization and processing of polymers and composites for medical applications and tissue engineering.



Cecilia BARTOLUCCI

Researcher of Institute of Crystallography (CNR) and Coordinator of WG "Food" - Science and Technology Foresight Project

"Duration in Change (J.W. Goethe)"

Since 2013, Coordinator of the WG "Food" within the "Science and Technology Foresight Project" of the CNR, where she holds a position as Researcher at the Institute of Crystallography. She graduated in Chemistry in Rome and, after obtaining a scholarship from the Ministry of Foreign Affairs, started her research activity at the Institut de Chimie Therapeutique in Lausanne, Switzerland. As postdoctoral fellow, with a NATO-CNR Advanced Fellowship, she spent 18 months at the MPI für Medizinische Forschung in Heidelberg, Germany. In 2000 she received a fellowship from the Humboldt Foundation to work as Postdoctoral Research Associate in Protein Crystallography at the MPI für Biochemie, Martinsried, Germany, where she continues to collaborate.

Her wide-ranging research interests allowed her to gain experience in many different sectors. From the synthesis, characterization and structure-activity relationship studies of pharmaceutically active compounds; to the crystallography of biomolecules and functional studies; to nutraceuticals and eventually to food, she learned to value a highly interdisciplinary approach.

The main areas of interest are Food, Nutrition, Protein structures.



Fiorella BATTAGLIA

Assistant Professor, Faculty of Philosophy, Philosophy of Science and the Study of Religion.
Ludwig-Maximilian-Universität. Munich

"Justice is the first virtue of social institutions" John Rawls, A Theory of Justice

Fiorella Battaglia (1960) studied philosophy at the University of Pisa and at the Humboldt University of Berlin. 2004 she completed her Ph.D. at "L'Orientale" University of Naples. 2005 she completed a master dissertation at National Council Research on ethics and epistemology of environmental epidemiology. From 2006 until 2010 she had a research position at the Berlin-Brandenburg Academy of Sciences and Humanities. From 2007 until 2013 she was lecturer at the Department of Philosophy of the Humboldt University. Since 2007 she is permanent visiting lecturer at the Medical School of the University of Pisa. 2013 she got the National Habilitation as Associate Professor of Moral Philosophy in Italy. Since 2013 she works as an Assistant Professor at the Faculty of Philosophy of the Ludwig-Maximilians-Universität of Munich. She has been PI of the EU-project: "Robolaw. Regulating Emerging Robotic Technologies in Europe". Since 2013 she is PI of the EU-project "Credits4Health. Credits-based, people-centric approach for the adoption of healthy life-styles and balanced Mediterranean diet in the frame of social participation and innovation for health promotion". Since 2015 she is PI of the EU-project "ReCriRe: Between the representation of the crisis and the crisis of representation. How crisis changed the symbolic background of European societies and identities: Implication for policies".

The main areas of interest are: Normative Ethics. Meta-ethics. Ethical issues of social and technological research and innovation. Philosophy and ethics of emerging technologies. Responsible Research and Innovation.

**Gabriele BRONZETTI**

Director of Institute of Cardiology, University of Bologna and of Operative Unit of Pediatric Cardiology & cardio-surgery, S.Orsola-Malpighi Hospital, Bologna

"We do not invent anything, we discover"

Gabriele Bronzetti received the Diploma degree in Medicine and Surgery from the University of Bologna in 1993, and the PhD degree in Cardiology from the University of Bologna in 1997. He has been awarded a fellowship at the Division of Cardiology University of Liegi in 1997 (July- December 1997) and two Clinical fellowship in Electrophysiology at the Division of Cardiology, Hospital for Sick Children of Toronto, Canada in 2001 and in 2004. He is currently Professor and tutor of Master in Paediatric Cardiology, University of Bologna, and member of Italian Society of Cardiology and Italian Society of Paediatric Cardiology. He is currently Director of both Institute of Cardiology, University of Bologna and of Operative Unit of Paediatric Cardiology & Cardio-surgery, S.Orsola-Malpighi Hospital, Bologna. He also operates as paediatric cardiologist volunteer at the "All souls mission" in Zimbabwe. He is author and co-author of more than 90 indexed paper in peer-reviewed journals and invited speaker at several national and international conferences. In the last 5 years he was invited speaker at the Word Conference on Antiarrhythmic of Heart Rhythm Society as maximum expert on arrhythmias in childhood. His Clinical skills include Cardiac Electrophysiology and Antiarrhythmic drugs.

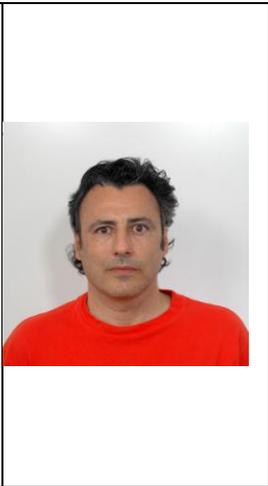
The main areas of interest are: Congenital heart conditions in childhood and young; prevention of young unexpected death; sport medicine.



Enrico CAPOBIANCO

Head of Computational Biology & Bioinformatics, Center for Computational Science, University of Miami
"What's the difference between God and a doctor? God doesn't think to be a doctor"

Holds a Doctorate in Statistical Sciences from University of Padua (Italy). Conducted MPhil at LSE (London, UK), Northwestern University, and graduate studies at UC Berkeley, then postdoc research in computational fields at Stanford University (US) (1994-1998). Held twice a NATO-CNR grant (Stanford, and Niels Bohr Institute & Danish Technical University), ERCIM fellow at CWI (Center for Mathematics and Computer Science) in Amsterdam (NL) in 2001-2. Senior scientist at Boston University, Biomedical Engineering (2004-5), head of methods at Serono (Evry, FR) in 2005, team leader at CRS4 in Sardinia (Italy) in quantitative systems biology (2006-11). Founding PI (2012-5) of the Laboratory of Integrative Systems Medicine at the Institute of Clinical Physiology of CNR, in Pisa (It). Now an associate of CNR. Was CAS research professor in China (2011), ICTP fellow (Trieste, Italy) (2003), visiting professor at Fiocruz in Brazil (2008-10, Program, Capes - FIOCRUZ), and visiting scientist at the Institut des Hautes Études Scientifiques (IHES) in France (2010).
The main areas of interest are: Systems Medicine, Network Science, Big Data.



Alicia CASALS

Professor, Head of the Associate researcher at the Institute for Bioengineering of Catalonia (IBEC)
"Sensor based robot control in rehabilitation, assistance, surgery and training."

Background in Electrical and Electronic Engineering and PhD in Computer Vision. Professor at UPC in the Automatic Control and Computer Engineering Department. Head of the research group on Robotics and Computer Vision at the Centre of Research in Biomedical Engineering. The research is oriented to improve human robot interaction through multimodal perception, focused mainly in the area of medical robotics. In this field she is working in robotic systems and control strategies for rehabilitation, assistance and surgical applications. From 2001 to 2008 coordinator of the Education and Training key area within Euron, the Network of Excellence: European Robotics Network, and IEEE-Robotics and Automation Vice President for Membership in the period 2008-2009. Main awards: International Award on Technology, *Barcelona 1992*, *Barcelona City Award 1998*, and *Narcis Monturiol Medal* from the Catalan Government 1999. From 2007 member of the *Institut d'Estudis Catalans*, the Academy of Catalonia.
The main areas of interest are: Sensor based robot control in rehabilitation, assistance, surgery and training.



Pietro CORTELLI

Full Professor of Neurology, Department of Biomedical and Neuromotor Sciences (DIBINEM), University of Bologna

Pietro Cortelli received the Diploma degree in Medicine and Surgery from the University of Bologna in 1979, the specialization in Neurology, University of Bologna in 1983 and the Ph.D., in Neurological Sciences, University of Verona in 1990. From 2014 Full Professor of Neurology, Department of Biomedical and NeuroMotor Sciences (DIBINEM), University of Bologna.
The main areas of interest are : 1) genetic and phenotypic prion diseases (Fatal Familial Insomnia, Creutzfeldt-Jakob, Gerstmann-Straussler-Scheinker), Parkinson's disease, Amyotrophic Lateral Sclerosis, Familial Hemiplegic migraine; 2) autonomic nervous system in health and disease with a focus on neurological control of the cardiovascular system; 3) autonomic circadian rhythms in relation to wake-sleep cycle in neurodegenerative disorders; 4) autonomic, clinical and neurophysiological aspects of mitochondrial diseases and primary headache.



Vincenzo DI LAZZARO

Director of Clinical Neurology, Campus Bio-Medico University of Rome (UCBM)

“We need to become persons before becoming doctors”

Vincenzo Di Lazzaro is Professor of Neurology, Medical Director for Clinical Neurology and serves as Director for the Neurology Residency Program at Campus Bio-Medico Medical School. The main areas of research are the study of the physiological bases of recovery in stroke and the development of methods of neuromodulation (both invasive and non-invasive) as potential treatment tools for several neurological diseases, movement disorders and stroke in particular. Editor of Case Reports in Medicine; Editor of Neurology Research International; Editor of Behavioural Neurology; Editorial Board of Brain Stimulation.

The main areas of interest are: Clinical Neurology and Neurophysiology.



Abdelhamid ERRACHID EL SALHI

Full professor, University Claude Bernard Lyon1

“Overcome the challenges facing existing diseases”

Abdelhamid Errachid is a Full Professor in Claude Bernard University-Lyon. He has been involved as a principal investigator and team leader in several European Projects under FP6 (DVT-IMP, MAPTech, Nano2Life, Cell-PROM, ARES, VECTOR, SPOT-NOSED), FP7 (SensorART, BOND, SEA-on-a-chip), and H2020 (HEARTEN (Coordinator), MicroMole, DiagCan (coordinator)) as well as NATO (Coordinator), INTAS and TEMPUS International Projects and national Spanish projects (MICROMENCE, MINAHE I, MINAHE II and PETRI). Prof. Errachid is a head of the Micro/Nanotechnology group and expert in the field of BioLab-on-a-chip development.

The main areas of interest are: Analytical chemistry, Micro & nano-biotechnology for health.



Eleuterio FERRANNINI

Full Professor of Internal Medicine at the University of Pisa School of Medicine

Ele Ferrannini is Professor of Internal Medicine at the University of Pisa School of Medicine; Chief of the Metabolism Unit of the CNR (National Research Council) Institute of Clinical Physiology, Pisa; and Clinical Professor of Medicine, Diabetes Division, University of Texas Health Science Center at San Antonio, Texas, USA. His professional education includes: degree in Medicine, at the University of Pisa School of Medicine, 1975; Specialty Board Certification in Nuclear Medicine, at the University of Pisa and Diabetes&Metabolic Disease at the University of Torino, 1978; Visiting Scientist at the Karolinska Institute, Stockholm, Sweden (1977-78); and NIH PhD Fellowship at Yale University School of Medicine (1978-1982).

He is a member of several scientific societies, a founding member and President of the Italian Society of Obesity. He was President on the Executive Council of the European Association for the Study of Diabetes (EASD), and has been Editor-in-Chief of the official Journal of EASD (*Diabetologia*, 1994-1997). He is the Chairman of the European Group for the Study of Insulin Resistance and a member of the EASD Foundation.

The main areas of interest are: insulin resistance and atherosclerosis; oxidative stress on endothelial function; pathogenesis of the fasting hyperglycaemia of diabetes; autoimmunity in adult-onset diabetes; pathophysiology of insulin secretion; hyperinsulinaemia on autonomic nervous system function; pathogenesis of the insulin, resistance and hyperinsulinism in obesity; coronary atherosclerosis in diabetes; pathogenesis of the microvascular dysfunction and proteinuria in adult-onset diabetes.



Dimitrios I. FOTIADIS

Professor, Unit of Medical Technology and Intelligent Information Systems, University of Ioannina

"To integrate the most recent advances of multi-scale modelling in everyday clinical practice"

Dimitrios I. Fotiadis received the Diploma degree in chemical engineering from the National Technical University of Athens, Athens, Greece, in 1985, and the Ph.D. degree in chemical engineering and materials science from the University of Minnesota, Minneapolis, in 1990. He is currently a Professor of Biomedical Engineering in the Department of Materials Science and Engineering, University of Ioannina, Ioannina, Greece, and an Affiliated Member of FORTH, Institute of Molecular Biology and Biotechnology, Dept. of Biomedical Research. He has coordinated and participated in several R&D funded projects.

His research interests include modelling of human tissues and organs and intelligent wearable devices for automated diagnosis.

The main areas of interest are: Biomedical Engineering, Multi-scale modelling, Decision Support Systems.



Claudio FRANCESCHI

Full Professor of Immunology and Director of the Interdepartmental Center for Studies on Bioinformatics and Biocomplexity "Luigi Galvani", University of Bologna.

Full Professor of Immunology at the Universities of Padova (1980-86), Modena (1986-1998) and UNIBO until 2013. Founder and Director of the Interdepartmental Center for Studies on Bioinformatics and Biocomplexity "Luigi Galvani", UNIBO. Director of the Dept of Experimental Pathology, UNIBO (2010-2012). Scientific Director of Italian National Research Center for Aging (INRCA, IRCCS) (1996-2005), a public institution of the Italian Ministry of Health devoted to aging research and care of the elderly. He was coordinator of several European Large Collaborative projects on Aging and Alzheimer disease and WP leader of EU projects on Proteomics and aging, Nutrition and healthy aging, Biomarkers of human aging, and on physical activity and gut microbiome changes lifelong.

The main areas of interest are: i) immunosenescence; ii) conceptualization of the theories of "remodelling of aging", "inflammaging"; iii) pioneering genetic, epigenetic, metabolomic, metagenomic, glycomic studies on centenarians and their offspring as model of successful aging and longevity; iv) nuclear gene and mtDNA polymorphisms associated to human longevity, Alzheimer disease and type 2 diabetes; v) new biomarkers of aging (i.e. gut microbiota).



Amalia GASTALDELLI

Head of Cardiometabolic Risk Group Institute of Clinical Physiology CNR Pisa, Adjunct Associate Professor, University of Texas Health Science Center, San Antonio, Texas, USA

"The future is very open and depends on all of us. It depends on what you and I and many other people do, today, tomorrow, and the day after tomorrow (K Popper)"

EDUCATION: 1990 Laurea in Electronic Engineering University of Padova; 1994 PhD in Biomedical-Engineering Politecnico Milano; 1995 PhD in Human Metabolism, UTMB, USA; **PREVIOUS EMPLOYMENTS:** 2013-14 Adj Prof. Facoltà di Medicina Scuola Superiore S. Anna, Pisa; 2008-09 Director Mass Spectrometry Lab, Fondazione Monasterio, Pisa; 2006-11 Adj. Prof. Biomedical Engineering, University of Pisa; 1996-2008 Head Mass Spectrometry Lab, IFC-CNR, Pisa; 1992-1995 Visiting Scientist UTMB, Galveston, TX USA **CURRENT ACTIVITIES:** Chair and founder of the NAFLD-EASD study group; Director of the European Chapter of American College of Nutrition. *Member of:* board of directors of the American College of Nutrition; committee EASL-EASD-EASO for "Clinical Practice Guidelines for the management of NAFLD"; board of the European Group for the study of Insulin Resistance; board of the Centre Européen pour la Nutrition et la Santé in Lyon, France.

The main areas of interest are: Cardiometabolic diseases, Metabolism, Diabetes, Obesity, NAFLD, non alcoholic fatty liver disease, and nutrition.



Silvia GIORDANO

Full professor of Histology and Embryology at the University of Torino, Italy; Group Leader at the Institute for Cancer Research and Treatment, Candiolo, Torino, Italy.

‘Dreams left in the closet are food for moths’

Dr. Giordano has a longstanding experience in the field of translational oncology. In 1989 she identified and characterized the receptor tyrosine kinase encoded by the MET oncogene and its involvement in human tumors. Recently, her work was aimed at studying the phenomenon of oncogene addiction, the involvement of tyrosine kinase receptors in human tumors, new strategies to target them and the mechanisms of resistance to targeted therapies. She also studied hepatocarcinogenesis and identified genes and microRNAs involved in the first phases of liver cancer development. Recently, she started an innovative research program on gastric cancer, aimed at identifying new therapeutic strategies for this pathology. This project is based on the generation of a platform of patient-derived xenografts, an experimental model that is a valuable tool for personalized medicine strategies. The PI published more than 100 papers in peer reviewed journals, for a total IF of 992 (average IF 9.3). She is president of the Italian Cancerology Society (SIC).
The main areas of interest are: Molecular Oncology, cancer therapy



Giovanna LIUZZO

Professor Catholic University of Sacred Heart, Department of Cardiology, Rome, Italy

In 1992, Dr. Liuzzo started her clinical and basic research studies in the field of ischaemic heart disease; from May 1997 to November 1998 she was research fellow at the Department of Internal Medicine – Division of Cardiology and Division of Immunology – of Mayo Clinic (Rochester, Minnesota, USA); in 1999 she obtained her PhD degree at the Catholic University of Rome; from 2000 she is involved in the direction of the PhD’s School of Cellular and Molecular Cardiology of the same Institution. She is also responsible of the Molecular Biology Laboratory of the Institute of Cardiology. Her research interest is primarily on the pathogenesis of acute coronary syndromes with particular attention to the role of inflammation, immunity, infectious agents, and their link with plaque rupture and thrombosis.
The main areas of interest are: Ischemic Heart Disease, acute coronary syndromes.



Paul LUKOWICZ

Professor/Scientific Director DFKI & TU Kaiserslautern University of Technology; Leader of Embedded Intelligence Research Group/Pervasive Health/Ubiquitous and Wearable Systems

Paul Lukowicz is Professor of Computer Science Deutsches Forschungszentrum für Künstliche Intelligenz (DFKI) and Kaiserslautern University of Technology in Germany where he heads the Embedded Intelligence group. He was previously Professor for Embedded Systems, Faculty of Informatics and Mathematics in Passau and prior to that Full Professor at the University of Medical Informatics, Health Science and Technology (UMIT) in Innsbruck, Austria. He holds an MSc. and a Ph.D. in Computer Science and a MSc. in Physics. His research focuses on context aware ubiquitous and wearable systems including sensing, pattern recognition, system architectures, models of large scale self organized systems, and applications. These include a long history of pervasive health related projects ranging from wearable monitors for cardiac patients, through smartphone based analysis of mood related disorders, to various smart home based AAL approaches.
The main areas of interest are: Cyber-Physische Systeme; Pervasive Computing; Soziale Interaktive Systemes; Wearable Computing; Ubiquitous Computing.



Peter B. LUPPA

Head of the Central Medical Laboratory, Institut für Klinische Chemie und Pathobiochemie Klinikum rechts der Isar der TU München, Germany

Peter Luppa is head researcher of both the Central laboratory of the University hospital RDI and the biosensor research group in the institute. He is POCT coordinator of the RDI, Transfusion coordinator and head of the immunehematological laboratory of the RDI.
 Educational Background: Study of Chemistry 1974-1980 University of Regensburg; Study of Medicine 1980-1986 University of Erlangen-Nueremberg. Doctoral examination (MD) 1986; Specialization in Laboratory Medicine 1986-1994, University hospital Grosshadern, Ludwig Maximilians Universität Munich; Postdoctoral lecture qualification 1993-1997, RDI, Technische Universität Munich. Peter Luppa is Chairman of the working group POCT of the German society for Laboratory Medicine (DGKL).
The main areas of interest are: Bio-sensorics and Point-of-Care Testing (POCT); Steroid biochemistry; Autoantibody analytics.



Arianna MENCIASSI

Full Professor of Bioengineering/Medical Robotics, Area Leader of "Surgical Robotics and Allied Technologies", Scuola Superiore Sant'Anna
"Merging the accuracy of robotics with the potentials of smart and active bio-nano-materials"

Prof. Menciasci obtained the M.Sc. in Physics (Pisa University, 1995) and the Ph.D. in Bioengineering (Scuola Superiore Sant'Anna – SSSA, 1999). She teaches at SSSA and the Pisa University. She carries on an intense research and training activity at high level (master candidates, PhD students, etc.). In 2013-2014, she was Visiting Professor at the Ecole Nationale Supérieure de Mécaniques et des Microtechniques of Besancon (France) and at the Université Pierre Marie Curie in Paris. She coordinates several international projects. She served in the Ed. Board of the IEEE-ASME Trans. on Mechatronics; she is Topic Editor in Medical Robotics of the Int. J. of Advanced Robotic Systems; she is Co-Chair of the IEEE-RAS Tech. Comm. on Surgical Robotics. She is IEEE Senior Member. In 2007, she was awarded with the Well-tech Award (Milan) and the Gonfalone D'Argento (Tuscany Region).
The main research areas of interest are: biomedical robotics, surgical robotics, microsystem technology, nanotechnology, with a special attention to the synergy between robot-assisted therapy and micro/nanotechnology-related solutions.



Luca PANI

Director General of “Agenzia Italiana del Farmaco” (AIFA)

“Be today the visionary of tomorrow”

<p>Luca Pani, Medical Doctor, specialized in Psychiatry is an Expert in Pharmacology and Molecular Biology, and a Fellow of the National Research Council of Italy who currently serves as Director General of the Italian Medicines Agency (AIFA) and is part of the Faculty and the Department of Psychiatry and Behavioural Sciences of the University of Miami School of Medicine. Luca Pani’s professional trajectory has touched several areas of expertise from preclinical study to clinical activity as well as R&D of central nervous system (CNS) drugs, along with his commitment to teaching on experimental and clinical cases. He has attended to national and international regulatory activities for the European Union. During the past decade he has prepared, evaluated and coordinated many national and international research projects and has participated in international bodies and advisory committees worldwide. He is Italian Member of the Committee for Human Medicine Products (CHMP); Member of the Scientific Advice Working Party (SAWP); participant of the Working Party on Central Nervous System (WPCNS); he serves as Chair of the European Union Management Board Telematic Committee (EUMBTC) and Chair of the European Risk Management Strategy Facilitation Group (ERMS-FG) of the European Medicines Agency (EMA) in London (UK); member of the HMA Management Group. Luca Pani is the author of over 140 scientific publications and of several volumes. He has attended more than 1000 conferences, seminars and national and international roundtables as an invited speaker.</p> <p><u>The main areas of interest</u> are: Clinical Neurosciences and Pharmacology.</p>	
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Paolo PAOLETTI

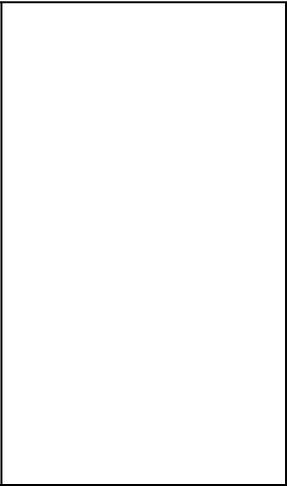
CEO of Kesios Therapeutics Ltd, London

<p>Graduated in Medicine at the University of Pisa, Italy. NIH Fellow at the University of Arizona, USA. Professor of Pulmonary Disease at the University of Pisa, Italy. Many research assignments and grants from Italian Research Council. Member of the Executive Committee of European Respiratory Society.</p> <p>Current Position: CEO of Kesios Therapeutics Ltd (UK Private Company); 2004 – 2015 Senior executive positions in GSK (President of Oncology up to April 3 2015); Current Board Positions: Chairman: Psioxus (UK Private Company); Member: Nucana (UK Private Company); Member: Genmab (Danish Public Company); Member: Forma (USA Private Company).</p> <p>Special Competences: Extensive experience in Research, Development and Commercialization in the Pharmaceutical Industry. Successfully conducted submissions and approvals of new cancer drugs and new indications in USA and in Europe. Seven new medicines for cancer patients during 10 years in GSK and, one new medicine while in Lilly.</p> <p><u>The main areas of interest</u> are: oncology and drug development.</p>	
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Enrico PERNA

Consultant cardiologist at Niguarda Ca' Granda Hospital, Milan, Italy

In 2009 Degree in Medicine, Sant'Andrea Hospital, University "Sapienza", Rome Italy; PhD in Cardiology (Magna cum Laude), Sant'Andrea Hospital, University "Sapienza", Rome, Italy (2015). From 2008 to 2009, he had a Scientific collaboration with "Cardiovascular Research Unit, Division of Cardiology and Institute of Physiology, University of Zurich - Irchel, Zurich, Switzerland". Dr. Perna is currently consultant cardiologist, specialist in heart failure, heart transplantation, ventricular assist devices, Niguarda Ca' Granda Hospital, Milan, Italy. His expertise is on Internal Medicine (General Medicine), Cardiology, Cardiothoracic Surgery.
The main areas of interest:
 - heart failure, including rare cardiomyopathies, acute myocarditis, and cardiogenic shock of ischemic or non-ischemic aetiology;
 - standardised and personalised approach to medical therapy optimization, patient education, multiparameter prognostic evaluation, and planning of follow-up.



A. Galvan QUINONES

Chief of Metabolic and Cardiovascular Risk Unit, Fondazione Toscana Monasterio/CNR, Pisa

"The future does not exist so far and if it does not exist, it is not possible to see; however it is possible to predict on the basis of present knowledge, that already exist and can be seen"
Sant'Agostino, Book XI, Cap. 13, 18.23.

Quiniones Galvan A. is the chief of Metabolic and Cardiovascular Risk factor Unit of Fondazione Toscana G. Monasterio from 2000- to date. He graduated as Medical Doctor at Universidad Nacional Autónoma de México (UNAM), Mexico City in 1988 and received his PhD degree in Biochemistry and Nutrition at the University of Florence in 1997. He is the author of more than 100 paper in peer-reviewed journals.
The main areas of interest: Internal Medicine; clinical obesity and associated conditions; metabolic diseases; personalized therapy; translational and interdisciplinary clinical research; nutrition and obesity; coronary syndrome in diabetic patients.



Luigi RICCIARDIELLO

Professor of Gastroenterology, Department of Medical and Surgical Sciences University of Bologna

"Take personal responsibility for your life (and health) "

Luigi Ricciardiello is Associate Professor of Gastroenterology at the University of Bologna, Italy. He received his Medicine Degree from the University of Bologna in 1994. In 1997 joined the UC San Diego to perform research on colorectal cancer. From March 2005 to 2009 Prof. Ricciardiello was Senior Research Associate at Baylor University Medical Center in Dallas. He is specialized in Gastroenterology (Italy) and Internal Medicine (USA). His clinical and research activities are related to the prevention of colon cancer. He is the Coordinator of the colon cancer screening program at the University Hospital. He is principal investigator of two investigator grants from the Italian Association for Cancer Research and co-coordinator of the EU-FP7 project PATHWAY-27. He has been nominated Chairman of the National Societies Committee of the United European Gastroenterology starting his tenure on January 2017. He has been invited to lecture and to be Chairman at the major international conferences on gastroenterology.
The main areas of interest is Colon cancer prevention



Matteo SANTIN

Professor of Tissue Regeneration at School of Pharmacy and Biomolecular Sciences, University of Brighton and Leader of the Brighton Centre for Regenerative Medicine, University of Brighton.

"Balancing IP exploitation with socially-responsible licensing in areas of research of great public significance and interest"

Matteo Santin received the Honour Degree in Biological Sciences, University of Naples, Italy in 1987, the PhD in Biomaterials, University of Naples, Italy in 1991 and PhD in Biomedical Sciences, University of Brighton, UK in 2001. He is currently Leader of the Brighton Centre for Regenerative Medicine and Professor of Tissue Regeneration, School of Pharmacy and Biomolecular Sciences, University of Brighton, UK. He has been reader in Tissue Regeneration, School of Pharmacy and Biomolecular Sciences, University of Brighton, UK from 2006 to 2010 and Senior Lecturer, School of Pharmacy and Biomolecular Sciences, University of Brighton, UK from 2004 to 2006. From 2001 to 2004 he has been awarded a Senior Research Fellow, EPSRC project, Title: Biocompatible coatings for cardiovascular stents, School of Pharmacy & Biomolecular Sciences, University of Brighton, UK. He also obtained research Fellows/Part time PhD student from 1992 to 2001 by School of Pharmacy & Biomolecular Sciences, University of Brighton, UK (BRITE-EuRam III EC Project Lipostin), Department of Pharmacy, University of Brighton, UK (BRITE-EuRam II EC Human Mobility Fellowship), Institute of Human Anatomy, Faculty of Medicine, University of Turin. From 1989 to 1992 he was researcher of Institute of Protein Biochemistry and Enzymology, Consiglio Nazionale delle Ricerche and in 1992 he was also Visiting Scientist, Institute of Materials Science, University of Connecticut, USA. Project title: Interpenetrated polymer network biomaterials.

The main areas of interest are: Biocompatibility of biomaterials for soft tissue regeneration; Enzyme-grafting to biomaterials for biomedical and biotechnological applications; Regenerative Medicine/Biomaterials, Tissue Engineering.

**Stephen J. TAYLOR**

Director of Marketing, Communications and Business Development, AREA Science Park Trieste

"The future is already here, it's just not evenly distributed"

Stephen Taylor has over twenty five years-experience as a Director and Senior Consultant, helping major firms and government agencies in Europe and North America to access the latest knowledge and expertise for analysis and planning for new business, market research, new product development, and technology commercialization. His collaboration with AREA Science Park (Trieste) started at the beginning of 2009 and in September of the same year he was appointed as Director of the Technology Transfer Department to optimize strategic activities for technology transfer. Since January 2010 he sits on the board of Innovation Factory S.r.l., the in-house incubator of AREA Science Park, with specific responsibility for business competitiveness and internationalization and in May 2011 he was named CEO. In 2015 he became Director of Marketing, Communications and Business Development of AREA Science Park. He is Specialist in Foresight and Technology Road-mapping.

The main areas of interest are: Technology Transfer, Valorisation of Research, Pre-incubation, incubation and acceleration of technology-based Start-ups.



G rard SIEST

President of European Society of Pharmacogenomics and Personalized Therapy (ESPT)

**‘La libert  de choisir est un facteur essentiel de la condition humaine mais qui ne permettrait que des choix capricieux si elle n’ tait orient e par une vision de l’avenir’
 Ren  Dubois (Choisir d’ tre humain).**

Pharm.D., PhD specialization in Biochemistry, Haematology, Bacteriology, Immunology. Gerard Siest is Professor of Molecular Biology and Biochemical Pharmacology at the Faculty of Pharmaceutical Sciences, University Henri Poincar  Nancy 1 (Emeritus). He was Director of the postgraduate course in Biochemical Pharmacology (1977-2003) and Founder and member of Directing Group of DU ‘Th rapie Personnalis e – Pharmacog n tique’. Prof. Siest is a member of the Board of the International Society of Pharmacogenomics (ISP) (since 2002), Editor in Chief of Drug Metabolism and Drug Interactions (since 2010) and Editor in Chief of Drug Metabolism and Drug Interactions (DMDI) (till July 2015). He is also member of the Editorial Boards of: Pharmacogenomics (since 2005); Personalized Medicine (since 2006); International Journal of Clinical Pharmacology and Toxicology (IJCPT) depuis 2013; Pharmacogenomics and Proteomics (since 2014); Practical Laboratory Medicine (since 2014). Prof. Siest is President of the European Society of Pharmacogenomics and Personalised Therapy (ESPT) (since 2011), Member of the ‘Agence Europ enne du M dicament’ (EMA), London - CHMP Pharmacogenomics Working Party (since 2014), Doctor Honoris Causa from Laval and Krakow Universities and member of the Royal Academy of Medicine in Belgium. He was recipient of 27 awards from 16 different countries.

The main areas of interest are: pharmacogenomics and drug metabolizing enzymes and transporters; cardiovascular biomarkers and systems biology for personalized health for cardiovascular drugs; pre-analytical variations of proteomic biomarkers and reference values.



Maria Giovanna TRIVELLA

CNR First Investigator/Head of UOS IFC-CNR Milano Niguarda, Head of Experimental Laboratory Pisa

‘From the guidelines era to the precision medicine, towards health frontiers’

Medical Doctor (1976 Pisa University), Cardiologist. Awarded by the European Science Foundation for the Exploratory Workshop ‘Molecular signaling in cardiovascular and oncological disease: similar and shared pathways’, Pisa July 2008. Participant in the bilateral project FIRB Italy–Canada, IFC-CNR e IBD-NRC, ‘New imaging techniques for the understanding of cardiac disease mechanisms and their management’. Participant to the ARTreat Project, Information and Communication Technologies (ICT) FP7-224297 for Large-scale Integrating Project (IP), ‘Multi-level patient-specific artery and atherogenesis model for outcome prediction, decision support treatment, and virtual hand-on training’.

Coordinator of a Large-scale Integrating Project (IP): ‘SensorART - A remote controlled Sensorized Artificial heart enabling patients empowerment and new therapy approaches’ (FP7-ICT-248763), 2010-2014. Participant to Micro-VAST Project ‘Microsystems for VAscular diagnosticS and inTervention’, Fondazione CARIFI. Participant to ENCODER Project ‘Engineered Nanostructures for Cellular imaging and for intracellular delivery of Optically active Drugs for cardiac hypertrophy’, within the CNR Nanomax Flagship Project. Participant to SMART HealthyEnv Project ‘A Smart Monitoring System for a Healthy ENVIRONMENT’, Tuscany Region. Research Unit responsible, CNR project on ICT application for Health and Society (e-SHS), 2014-2015. Application specialist and Ethical&Privacy Issues Manager in H2020 HEARTEN project ‘A co-operative mHEALTH environment targeting adherence and management of patients suffering from Heart Failure’.

The main areas of interest are: cardiology; translational and interdisciplinary research; experimental medicine; cardiovascular research; pathophysiology; validation of medical devices, sensors and actuators.



