

FESTIVAL DELLA SCIENZA MEDICA



FIFTH EDITION – INTELLIGENCE OF HEALTH

9-12 MAY 2019 – BOLOGNA

The theme of this year's Festival of Medical Science is "The Intelligence of Health". After "A Long Life", "The Stages of Life", "Innovation versus Tradition" and "Time of Care", once again we are proposing an initiative that cannot be missed. The focus of this fifth edition is to analyse cutting-edge topics at the frontier of medical and health science and technology. Big data, digital platforms for collecting clinical and health data together with IoT (Internet of Things) and AI (Artificial Intelligence) applications in medicine are the focus of this year's event, which also examines the repercussions of these tools and technologies on how illnesses are treated and the promotion of health. The festival will also discuss "intelligent" human behaviour in the context of health, and a number of other highly topical medical and health-related topics that have a cultural, economic and social impact.

World famous scholars and researchers at the forefront of their fields will take centre stage in a series of conferences, debates and meetings with the public, to drive public knowledge on scientific research in the wider medical field and bring greater understanding about these medical topics to as many people as possible. The underlying purpose is to spread medical and scientific culture, especially among young people.

We invite to the Festival of Medical Science at Bologna from 9 to 12 May 2019.

WWW.BOLOGNAMEDICINA.IT

INTELLIGENCE OF MEDICINE

The Intelligence of Medicine belongs to the broader concept of intelligence of health but, because of its particular aspects, it can be examined independently.

This subject matter is both stimulating and potentially ambiguous. It is certainly worth investigating in depth because of its long and fascinating history. While I cannot cover the topic fully here, I will give an overview of the topics involved.

Where does this specific form of intelligence find its home?

Without doubt, where thought can be expressed freely and leads to advancement in research, and not where thought descends into superstition or compliance.

This human intelligence, whatever the form it has taken throughout the centuries, dwells with particular forcefulness in the places of knowledge that were (and are) universities. This is where thought and language were born and have gradually risen to higher levels. Alongside thought and language, are the methods that have, **step by step, defined the concept of “professionalism”** linked to the basic needs of people and their communities, upheld through time by the growing world of technology.

Even back in the Middle Ages, the free intelligence of medicine was visible and connected to a knowledge that we can certainly call philosophical, as it channelled rationality and expressed freedom of thought.

At the end of the 13th century, Bologna was at the centre of this meeting of medicine and philosophy. Gentile da Cingoli made the association between arts, which he saw as philosophy, and medical studies, where Taddeo Alderotti has already left his mark.

This unusual alliance, as it was described, between doctors and philosophers gave rise to a new model of medical studies¹.

Over the centuries, this model was shown to be efficient and effective and was careful to interpret the specific requirements of every historical timeframe, despite several interruptions.

In the light of this, I wish to outline the needs/urgencies found in **today's western society** - because it is clear that these needs/urgencies are closely bound to our economic, social, political and cultural climate. In developing countries, the topics to address, the ones we must understand, interpret and resolve, are certainly not the same as those of the old continent, or Canada, or Japan or the USA.

An ageing population had led to an increase in illnesses directly linked to longer life expectancy. These same illnesses were much rarer a mere one hundred years ago - if only because most of us died before reaching the age where we are more likely to develop them - but now they are affecting more and more people. Here, we are facing emerging new drug resistant viruses and bacteria, the return of - we thought- eradicated diseases linked to an uncontrolled spreading of **pseudo-scientific beliefs, joined by an increasing mistrust in science's capacity to improve human life**. These are just some of the topics that are taking an impregnable hold in our society and are the new challenges for a medicine that must be ever more intelligent.

In order to respond to this increasing complexity, the intelligence of health must include proposals where facilities are more and more advanced, doctors more adaptable and families more involved and knowledgeable.

To achieve this, we must steadily apply the fruits of technological development and our improved drugs. At the same time, we must comply properly and correctly with the need to share objectives and demands, allied in our respect for the person who, in turn, must learn to respect that which society can offer.

¹ C. Crisciani, *L'alchimia dal Medioevo al Rinascimento: scientia o ars?*, in *Il Rinascimento italiano e l'Europa. Le Scienze*, vol. 5, ed. by A. Clericuzio, G. Ernst, with the collaboration of M. Conforti, Treviso, 2008, pp. 111-128.

The intelligence of medicine differs from intelligence applied to other areas of science. It is not merely the expression of pure research, it also embodies treatment and exercises a social function. For physics and chemistry, this intelligence can have a single, continuative interlocutor (space, particles, elements), but in medicine, it must start from the individual scientist, who must be fully conscious of the place in medical practice held by the doctor-patient relationship and that between doctor and society.

This intelligence must interact with potential tools, because, in today's world, it is no longer acceptable to take a passive behaviour towards equipment, instruments, pharmaceutical products and technologies that interface with medicine. We must make it clear that we are dealing, on the one hand, with human beings and their wealth of intelligence, and on the other with tools made through human intellect. By their very nature, these tools work at the behest of humanity, for the good of patients and doctors.

The word "intelligence" has a two-fold meaning. It indicates the set of physical and mental faculties that allow human beings to think, comprehend or explain facts and actions, to elaborate abstract models of reality, to understand and be understood by others and to judge. Intelligence is also the fact or possibility of understanding something and being understood.

Intelligence is, therefore, an intrinsic feature (when we engage in producing something to be understood) and an extrinsic feature (when we understand something outside our own self).

The intelligence of medicine is a concept belonging to the latter case. It implies the partial reproduction of our own innate intellectual activity. This is achieved through tools that are continuously evolving, as well as our human ability to understand the dynamics of health and sickness, and to act in a way that is most likely to protect our own health and that of others.

In this second meaning, the concept of intelligence of medicine is as old as humankind. When we first made our appearance on our planet, we had to put in place behaviour such as to determine what systems would truly be effective in ensuring our survival.

The first meaning of intelligence of health is, on the contrary, relatively new, and has its roots in the last century, when the first computer programmes were used to solve complex problems.

The development of intelligence - with its staunchly rooted offshoot artificial intelligence - meant that the tools linked to this new reality became used in all the fields of human knowledge, especially and to our greatest benefit in the medical sphere.

The intelligence of medicine is progressing, for example, more and more obviously in cancer **treatment, where patients' life expectancy has shot up dramatically following the advancements** in innovative therapies and highly effective, personalised diagnostics, which only a few decades ago were beyond our imagination.

The intelligence of medicine has also upturned the surgical sector, with the arrival of robots that, while unable to carry out surgical procedures totally independently, provide essential assistance working alongside medical teams. Backed by this technology, surgeons can operate more effectively and with greater safety, the outcome is better and there are fewer complications post-surgery.

Lastly, the intelligence of medicine has opened the doors to new possibilities in the field of genomics, and we can use information extrapolated from our own gene pool more and more effectively to prevent and cure illnesses, unlocking new therapeutic possibilities.

In the light of this brief outline, when we talk about intelligence of medicine, we must make this **observation: "The pervasive technology that defines our era places us in front of a non-sensical dilemma on the relationship between man and machine"**².

I believe that we can all share this statement. Machines will always be complementary to our life, and talking about intelligence augmented through technology is an assertion that must be accepted in a secular perspective. This progress implies greater power and potential. Over the

² From an interview by Dr. Luca Altieri, Director of Marketing IBM.

next decades, it will allow human intelligence to voice its entirety and completeness and so express its creativity more fully.

Naturally, none of us is able, for the moment, to know what will happen down the line with artificial intelligence and robotics. Each of us, however, knows or should know, how much we can ask of scientists, especially in these extraordinary times.

Scientists know and want to address what is happening. These are not sudden discoveries that are sprung on them, but developments in knowledge, and are the outcome of human work and greater knowledge. Living, knowing and investigating are all tightly linked and flow throughout human history. Human intelligence has never stopped evolving...

We cannot decide to simply let life take its course, leaving it to others (who are in any case only a few) the task to develop research sectors that we expect will, in future, become necessary, if we want to apply the full potential of such advanced discoveries.

The decisive moment has come to verify their effectiveness. We can create and govern change, retaining what we must preserve and welcoming the new in an informed and constructive manner, without being mere passive recipients.

In this context, the mission of intelligence is, therefore, intrinsically linked to the sectors and the many subject matters involved.

Everything that belongs to sectors dedicated to humanity must be given double consideration, because the development of human intelligence is the prerequisite for the development of everything else.

We must not underestimate empathy, which must be practiced as an essential part of medicine, so much so as to be placed in first place. Apart from discoveries and their importance, what is **important is the relationship that must exist between patient, doctor, the patient's treatment and the management of health and medicine, up to end of life and dignity in dying.**

The revolutionary events that have enveloped the world of medicine through technological developments mean that, in some cases, the situation is dramatic. Treating illness is so strongly dependant on new instruments and technologies geared towards finding the symptoms of **diseases, and so offer diagnosis, that it may erode or even cripple the doctor's role.**

We can already see that the rapid pace of technological evolution at the service of the intelligence of health has set in motion a certain process of ambivalence. As is often the case, intelligence can be a double-edged sword.

Fabio Roversi-Monaco
President, Genus Bononiae. Musei nella Città

INTELLIGENCE OF HEALTH

Health depends on intelligence just as intelligence depends on health. Studies in a discipline known as “**cognitive epidemiology**” – a topic to be discussed at the Festival by psychologist Ian Deary - have shown that higher intelligence, measured as IQ, at the age of 11 lowers the risk of vascular disease, obesity, various chronic diseases, and some mental disorders. More intelligent people fall ill less both as adults and in old age. This effect is not caused by socio-economic status, which is known to inversely correlate with morbidity and mortality. It is directly linked with IQ, which is however an important factor in attaining a socio-economic status that protects health.

Cognitive epidemiology has shown evidence that once people reach the age of 80, health and longevity are mostly impacted by the cognitive decline taking place from the age of 11 to 79. In **particular, it is a person’s fluid or critical cognitive abilities that count rather than initial crystallized intelligence.** These observations apply equally to men and women.

Poor health penalizes intelligence. In countries where children grow up undernourished, or contracting infections – some of which, like malaria, severely affect the brain – suffer cognitive impairments. This has negative knock-on effects not only for the individual but also for the economic, health, and social development prospects of a country. For when too many people remain of low intelligence, it will be more difficult to create a society founded on respect for the individual, economic freedom, justice, the right to health, and so on. Some scholars believe that the infectious disease load as well as undernutrition, which varies from country to country, explains the differences in IQ found around the world. In their opinion, this could also explain the so-called Flynn effect, term that refers to the increase in intelligence observed from the 1930s in Western countries, which could be caused in part by the drop in the prevalence of those infectious diseases, that sap the metabolic energy required in childhood to develop a cognitively efficient brain.

The challenge, facing increasingly personalized healthcare, is to understand how to enable patients to intelligently control their behavior, and therefore avoid or manage risks to health. This includes the threat to health posed by pseudo-medicine. In other words, how can intelligence be improved, in order to avoid the spread of beliefs like homeopathy, acupuncture, and the so-called complementary medicines.

Seen against the backdrop of the data provided by cognitive epidemiology, prevention becomes a question of understanding how education levels and educating women in developing countries **can contribute to improving health. To what extent can we, in today’s affluent complex societies,** prevent our cognitive biases and physiological constraints from giving rise to behavioral patterns that put health at risk?

There is a further forward-looking aspect to consider. The human species has developed machines with artificial intelligence, whose use in medicine is exploding. Indeed, AI will have an enormous impact on the treatment and prevention of disease, and, by the same token, on health promotion.

Some believe that AI will gradually make the physician obsolete. It is unlikely, however, that the physician of the future will resemble the robots of sci-fi movies, uttering diagnoses - almost always

in female voices – and doing everything by themselves, with minimal assistance from man. AI will nonetheless lead to a new kind of physician, who must be able to work with machines, helping them to learn with increasing **versatility and “intelligence” in order to implement practices and decisions** taken on the basis of indicators, and study, i.e. verify, how to apply baseline knowledge to develop new therapies or prevention methods. Something similar happened in the past, when diagnostic techniques made some kinds of semiological expertise obsolete in the clinic.

AI has speeded up the diagnostic process and lowered error rates. Machines are more accurate and faster at checking large amounts of data, a task that would take months for a team of physicians. This means more lives saved. AI will also remove the dramatic uncertainties that are today part of many clinical practices, notably surgery, where robots will soon become smarter and **more independent than humans**. The robot's ability to handle metadata, meta-models, augmented reality, deep learning, and machine learning etc. will increase its ability to work with increasing precision – which in turn means increasing patient safety and confidence. AI may also reduce defensive medicine. **Physicians' mistakes and erroneous diagnoses could be wiped out**, as more accurate, efficient algorithms allow physicians to adopt indisputable standards.

The main problems surrounding the planning and use of AI today, arise from the fact that our psychological flaws and human prejudices are embedded in the algorithms we use, as data collection is based on our biased perspectives. These errors are then carried over to the machine's decision-making processes and in turn feed into the clinical recommendations generated. As a result, some algorithms have been seen to be racist, discriminate against women and children, etc. Data sources must be critically assessed to enable understanding of how the statistical models generated actually work, and how their flaws can be eliminated. Perhaps AI is not a threat because it is likely to become too independent of man, rather because it is still too dependent on man.

Gilberto Corbellini

Scientific Director, Festival della Scienza Medica

THE VENUES

1.

PALAZZO PEPOLI. MUSEO DELLA STORIA DI BOLOGNA

Sala della Cultura

(via Castiglione, 8)

3.

BIBLIOTECA D'ARTE E DI STORIA DI SAN GIORGIO IN POGGIALE

(via Nazario Sauro, 20/2)

4.

SAN COLOMBANO

(via Parigi, 5)

4.

AULA MAGNA DI SANTA LUCIA

(via Castiglione, 36)

5.

AULA ABSIDALE DI SANTA LUCIA

(via de' Chiari, 25)

6.

PALAZZO DELL'ARCHIGINNASIO

Teatro Anatomico

Aula dello Stabat Mater

Aula delle Conferenze Società Medica Chirurgica di Bologna

(piazza Luigi Galvani, 1)

7.

PALAZZO RE ENZO

Salone del Podestà

Sala di Re Enzo

Sala degli Atti

Punto informazioni

(piazza del Nettuno, 1/C)

8.

PALAZZO POGGI

Museo di Palazzo Poggi

(via Luigi Zamboni, 33)

9.

CASA SARACENI

(via Luigi Carlo Farini, 15)

10.

COLLEZIONE DELLE CERE ANATOMICHE “LUIGI CATTANEO”

ISTITUTI ANATOMICI

(via Imerio, 48)

11.

CHIESA DI SAN GIOVANNI IN MONTE

(piazza San Giovanni in Monte, 3)

12.

CONSERVATORIO DI MUSICA GIOVAN BATTISTA MARTINI

Sala Bossi

(piazza Rossini, 2)

13.

AULA BIGARI

(via San Vitale, 59)

14.

TEATRO ARENA FICO EATALYWORLD

(via Paolo Canali 8)

15.

POLICLINICO DI S. ORSOLA

(via Giuseppe Massarenti 9)

16.

OSPEDALE MAGGIORE

(largo Bartolo Nigrisoli, 2)

17.

OSPEDALE BELLARIA

(via Altura, 3)

18.

ISTITUTO ORTOPEDICO RIZZOLI

Sala Vasari

(via Pupilli 1)

19.

HOSPICE BENTIVOGLIO FONDAZIONE SERÀGNOLI

(via Guglielmo Marconi, 43 Bentivoglio – BO)

FESTIVAL CHAPTERS

NOBEL READINGS

John Gurdon, Aaron Ciechanover, Tomas Lindahl: these are the names of the three Nobel prize winners who will speak to us about their discoveries in this edition of the festival together with the methods which enabled them to achieve fundamentally important goals in the fields of medical, clinical and chemical research. A series of not-to-be-missed appointments against the magnificent backdrop of the places in which the first university in the world was founded.

EDUCATIONAL ACTIVITIES

The young and very young have always been the centre of the Medical Science Festival's interest. This year will once again feature initiatives for schools students of all levels and type: a fascinating anatomy lesson at the Teatro Anatomico dell'Archiginnasio for primary school students; the discovery of the changes in the body during adolescence for middle school pupils; the struggle against antimicrobial resistance; the cross-media Geni a bordo event and the La Parola ai giurati format on a bioethics case inspired by a true story for secondary school students.

INTELLIGENCE OF HEALTH

The focus of the fifth edition of the Festival of Medical Science is health intelligence: the new scientific and technological frontiers in clinical research, cure and prevention will be analysed. Special attention will be paid to themes such as digital platforms for the gathering of clinical and health data, IoT (Internet of Things) applications and artificial intelligence in medicine via a discussion on the role of these tools and methodologies for the development of effective treatment in disease cure and health promotion.

NEUROSCIENCES

The neurosciences have always been a central theme at the festival: via contributions from scientists from all the world's universities, themes such as consciousness disturbances, human brain mapping, the genetic and neuro-biological bases of human intelligence and sleep disturbances will be analysed in an attempt to respond to the many questions arising in the context of the functioning of the human brain.

PREVENTION, PHARMACOLOGY AND TOXICOLOGY

What techniques can be used to prevent the onset of conditions and diseases? What good practices can be made use of to look after the health of our bodies? What resources can be marshalled by the institutions to appropriately disseminate medical and scientific information for health prevention? All these questions will be the focus of a series of sessions centring on themes such as cognitive psychology, correct scientific communication methods, pharmaceutical research and appropriate lifestyles to achieve and safeguard health.

INTERSECTIONS

One of the prerogatives of the Medical Science Festival has always been to analyse the scientific world's contents and discoveries via a multi-disciplinary approach: once again a multiplicity of enquiry sectors will be represented on medicine's present and future, passing through disciplines

such as dentistry, urology and orthopaedics and analysing problems linked to the circulation of information in the health field.

HOST COUNTRY

After China, Germany and Mexico, this year the festival's host country will be Spain: once again the initiative takes the form of an occasion with which to compare and contrast the health systems of the various countries, analysing the various management models relating to the management of health related issues.

SPECIAL EVENTS

A packed calendar of side events will be an opportunity to study themes linked to the world of medical science via a different and curious approach: the 2019 festival will accompany us in a historic and anthropological reading of the Pizzica and a series of concerns by the greatest musical institutions of the day.

May 9th

09.00 am – TEATRO ANATOMICO DELL'ARCHIGINNASIO

SHOW AND TELL AT THE ANATOMICAL THEATRE

Young students of the primary school are invited to take part to an “anatomical lesson” in the suggestive Anatomical Theatre of the Archiginnasio. A show where professional entertainers will tell the wonders of the human body in a funny and engaging way.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

09.30/11.00 am – BIBLIOTECA D'ARTE E DI STORIA DI SAN GIORGIO IN POGGIALE

A FOR ADOLESCENCE. CARE FOR THE BODY AND EMOTIONS

Theatrical performance for lower secondary school students

The theatrical performance will lead students in a journey through the changes faced by the body in adolescence. Starting from the scientific explanation of some phenomena that are typical of this season of life, students will learn about and recognize their body and understand how to take care of it.

Besides the physical changes, the performance will deal also with the emotional sensations that characterize adolescence, an age that is as complex as it is full of exciting new things.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

10.30 am – SALA DELLA CULTURA

PRECISION ONCOLOGY: A MEDICAL REVOLUTION ALREADY UNDER WAY

Lella Costa

Paolo Marchetti

Carmine Pinto

Chairperson: Letizia Gabaglio

Made-to-measure treatment seemed an impossible dream just a few decades ago, although it has always been a medical objective. Personalised medicine is a significant improvement in care for all patients. In oncology, diagnostics innovation is bringing with it increasingly precise, accurate and complete identification of the genetic alterations in tumours. This enables the most suitable, targeted treatment to be developed for each individual patient, wherever the tumour itself might be. It is a full-blown revolution and a great promise for patients.

11.00 am – AULA BIGARI

HOW A VIRTUAL SMILE BECOMES A REAL ONE

Lorenzo Breschi

Giovanni Zucchelli

Smiling is a natural facial expression fundamental to human interaction and is of great aesthetic importance in modern society. It is, by definition, the first of the body language actions with which we encounter other people and it is, for this reason, at the heart of interpersonal communication and self-perception. Resolving an aesthetic smile problem frequently involves not only technical skill on the part of a dentist but also aspects which range from the emotional sphere to personal opinions on what beauty is.

It is of primary importance to develop a work flow which enables a clinic to get its final project across to the patient on whom the treatment is to be done. Previewing the expected result, more

commonly known as digital smile design, is useful and essential to increasing patient involvement in planning his or her future smile in order to obtain a personalised and satisfying result.

12.00 pm – SALA DELLA CULTURA

INNOVATIONS IN THE ONCOLOGY IMMUNOTHERAPY FIELD

Massimo Guidoboni

By: **Intesa Sanpaolo**

Istituto Scientifico Romagnolo per lo Studio e la Cura dei Tumori - IRST IRCCS - was founded on one belief: that the struggle against tumours can be won. Constant progress in tumour prevention, treatment efficacy and ongoing progress in research are all very encouraging. This centre is the main nodal point in a network of interconnected operational structures, the basis of highly complex technological research and innovative patient treatments. New oncology immunotherapy developments will be presented here.

03.00 pm – SALA DELLA CULTURA

DIGITAL INNOVATION AND NEW SKILLS IN THE PHARMACEUTICAL SECTOR

Antonio Messina

Human resources are one of the main competitiveness factors in the pharmaceutical sector, a sector which is experiencing a phase of intense change. Robotics, nanotechnology, pharmacogenetics, digitalisation, artificial intelligence, big data and blockchain are transforming the business world, bringing with them new thinking on governance models. These are changes which bring with them not only product but also process innovations triggered by the need to co-ordinate science, technology and various skills in all phases of activity. In this context it is fundamentally important to anticipate **processes and scrutinise the sector's professional needs, both short and long term**, as well as in relation to the new emerging skills and changes in existing ones.

03.30 pm – AULA DELLE CONFERENZE SOCIETÀ MEDICA CHIRURGICA DI BOLOGNA

HOW LONG DOES IT TAKE FOR A DISCOVERY TO BECOME A CURE?

Sergio Abrignani

Fabio Pammolli

The biomedical sciences sector enables certain strategic elements in the relationship between scientific research, innovation and economic growth to be examined both with reference to the mechanisms which guide growth and in relation to the dividing up of innovation work between the public and private spheres. At the same time, ongoing shifts in the scientific and technological research frontier are generating new funding challenges.

04.00 pm – SALA DELLA CULTURA

THE ORIGIN AND DISSEMINATION OF FAKE NEWS IN THE MEDICAL AND HEALTH FIELDS

Enrico Bucci

Claudio Colalacomo

Pier Luigi Lopalco

Chairperson: **Paolo Giacomini**

By: **ELSEVIER**

Scientific communication runs in two directions: between scientists working in the field, i.e. within the scientific community, and between scientists and the wider public, the people as a whole. However, a third route also exists into which vested interests and frequently inaccurate and certainly misleading scientific communication can infiltrate. This is fake news, to use a topical

term. In actual fact, false science has always existed and has always constituted a danger to scientific progress and medical treatment. The involvement of citizens in the scientific debate is an opportunity to be grasped in the light of the new communication methods but in an awareness that decisions must necessarily grow from seeds planted on fertile ground using the scientific method based on the rules and methods which have been guiding the development of human knowledge since the days of Galileo and Newton.

04.00 pm – CASA SARACENI

ORTHOPAEDIC PROSTHETICS

Maurilio Marcacci

Gian Guido Riva

By: Intesa Sanpaolo

Technological innovations are transforming orthopaedics. Orthobiology, favouring the use of new non-invasive treatments such as growth factors or multipotent cells, increasingly constitutes a real hope in arthrosis damage limitation, above all when these are used in the prevention stages. Surgery uses power assisted systems such as robots or computerised guides capable of transforming highly complex procedures into programmable and foreseeable action. Joint replacements will soon be made to measure for patients and the latter's biomechanical properties. Lots of other even more futuristic technological innovations will reduce healing times and increase cure success rates.

05.30 pm – SALONE DEL PODESTÀ

INAUGURATION WITH THE AUTHORITIES

06.00 pm – SALONE DEL PODESTÀ

PRESENTATION OF THE FIFTH EDITION OF THE FESTIVAL DELLA SCIENZA MEDICA

Fabio Roversi Monaco

THE DAWN OF REGENERATIVE MEDICINE

Michele De Luca

Regenerative medicine based on the use of stem cells to reconstruct tissues takes up an important challenge, i.e. the development of advanced effective therapies for rare, genetic and degenerative diseases that are still incurable. It is an approach based on solid basic research on the biochemical, molecular and cellular mechanisms of these diseases and a combination of state-of-the-art technologies of cellular and genetic engineering applied to stem cells. Some results have been achieved also in Italy, with the development of new therapies for corneal burns, immunodeficiencies and epidermolysis bullosa. To the detriment of our Italian scientific excellence, there are still limitations to research freedom that affect the opportunities to study and use embryonic stem cells, already used abroad in several clinical trials, based on "pseudo-ethical" reasons that are scientifically groundless.

07.00 pm – SALONE DEL PODESTÀ 

PROJECT DEBATER - CAN AI BE PERSUASIVE?

Aya Soffer

By: IBM

Project Debater is the first AI system developed to compete in a full-live debate with a human debater. The project, an IBM Grand Challenge, is designed to build coherent, convincing speeches on its own, as well as provide rebuttals to the opponent's main arguments. In February 2019, Project Debater competed against Harish Natarajan, who holds the world record for most debate victories, in an event held in San Francisco and broadcasted live world-wide. In this talk I will share the story of Project Debater, from conception to a climatic final event, describe its underlying technology, and discuss how it can be leveraged for advancing decision making and critical thinking.

9.00 pm – SAN COLOMBANO

TARANTISM: FROM MUSIC TO MEDICINE *ANTIDOTUM TARANTULAE* BY ATHANASIUS KIRCHER

Gino Leonardo Di Mitri

Pierfrancesco Pacoda

Vincenzo Santoro

Liuwe Tamminga

Musicians: **Gianluca Carta** (tambourine), **Domenico Celiberti** (organetto), **Fabio Tricomi** (violin)
For centuries tarantism was popularly considered to be an affliction caused by a spider bite. The antidote to this 'poison' was a music ceremony or cultural syndrome during which the victim of the bite let him or herself go in an uncontrolled dance which, via convulsive movements, led to healing. This belief led to a music tradition typical of the Salento which, in recent times, has been configured into a full blown custom in which marketing and culture coexist: the 'pizzica' renaissance. A journey through the origins of this tradition, its rethinking and local bonds cuts through the historic stages in which one of the principal ethnomusicology forms was created and took shape.

May 10th

09.00 am – TEATRO ANATOMICO DELL'ARCHIGINNASIO

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Young students of the primary school are invited to take part to an “anatomical lesson” in the suggestive Anatomical Theatre of the Archiginnasio. A show where professional entertainers will tell the wonders of the human body in a funny and engaging way.

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09.00 am – SALA DEGLI ATTI

GENIUS ON BOARD in collaboration with: Farindustria

Sergio Pistoï

Andrea Vico

Chairperson: Maurizio Agostini

What can we really find out by examining our genes? What can we expect from biotechnologies? What are the study trajectories and future work prospects in the biotechnology sector? Biotechnology research and application frontiers and future prospects will be examined by Sergio Pistoï and Andrea Vico, two popular science speakers, during a fast-paced and ironic conference-show with sparkling and educational video titbits and simulated ‘genetic tests’. A cross-media event organised in conjunction with Farindustria to get students involved and stimulate them to think about their futures. Smartphones on during the conference! Interaction and dialogue with students will also take the form of SMS and WhatsApp.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

10.00 am – SALA DELLA CULTURA

NEW TECHNOLOGIES IN SURGERY

Livio Presutti

Surgery, both specialist and general, has undergone revolutionary technological progress in recent years. In particular micro-surgery, endoscopic surgery, navigation techniques, robotic technology, new blood vessel coagulation procedures and also the application to surgery of technologies used in other fields such as 4K screens and 3D systems. In the otorhinolaryngology field, as a result of the specific features of this anatomical area and the limited space available, all the technologies listed can be applied and both oncological neck surgery as well as nose and paranasal sinus surgery, ear surgery and surgery on the base of the skull have all profoundly changed as a result of technological progress. Technological progress has had direct positive results on patients in terms of less invasive and more precise surgery with consequently more rapid recovery time frames and better functional outcomes.

10.00 am – STABAT MATER

STRATEGIES FOR INTELLIGENT HEALTH: SMOKING DAMAGE REDUCTION FOR A SMOKE FREE FUTURE

Salvatore Cardellicchio

Stefano Collina

Claudio Cricelli

Stefano Nardini

Umberto Tirelli

Giorgio Trizzino

Chairperson: **Luciano Onder**

Policies inspired by the damage reduction principle are the textbook tools available to legislators **seeking to safeguard people's health (prevention as primary and in the first place) and** in particular in combating tobacco addiction. The non-negotiable priority of the medical community must be people giving up smoking (or not starting) while legislators must adopt the defence and growth of a social wellbeing approach via assistance policies capable of making safeguards more thoroughgoing and effective, generating positive effects on ever wider segments of the population. Technology, innovation and a rigorous scientific research methodology have developed alternative, potentially risk reducing products for adults who cannot or do not want to give up smoking which can reduce/eliminate the fundamental causes which lead to the development of smoking related illnesses. It is a matter of wording and developing appropriate procedures both to guarantee the participation of public and private subjects in the implementation of damage reduction policies and disseminate information in an appropriate and effective manner.

10.00 am – SALA DI RE ENZO

DISASSOCIATIONS BETWEEN CONSCIOUSNESS AND INTELLIGENCE: A FUTURE CHALLENGE

Marcello Massimini

We normally tend to **associate an organism's capacity to adapt and resolve complex problems** (intelligence) with the presence of subjective experience (consciousness). The association between intelligence and consciousness can be violated in the natural world but it risks becoming entirely unreliable as a result of progress in medicine and artificial intelligence. For example, intensive care can save brains with seriously reduced performance which remain conscious, however, while latest generation neural networks with no consciousness whatsoever can demonstrate performance superior to that of healthy human beings. Soon the panorama will be **still more complex and finding one's way around it will require new concepts and tools.**

11.00 am – AULA DELLE CONFERENZE SOCIETÀ MEDICA CHIRURGICA DI BOLOGNA

THE BRAIN: STORIES OF THINKING CELLS

Gianvito Martino

By Gruppo Ospedaliero San Donato

We know a great deal about how the brain works and, at least partially, we know how our 'wonder box' lets us perceive the world around us via our five senses and how it allows us to rework it and translate it into concrete action and abstract thought. Even if we have learnt to understand what the brain is in anatomical and structural terms and understand it, in general terms its functioning remains unknown to us. Not only are we still not able to understand how the various brain cells interact in a detailed way to generate thoughts or concrete action but we have still not accorded

full meaning to words such as intelligence, consciousness, empathy and feelings. And, above all, **we don't know how the mind 'emerges' from our brains!**

Gianvito Martino, Scientific Director of the IRCCS Hospital San Raffaele will discuss these subject matters.

11.00 am – SALA DI RE ENZO

WOULD YOU BET MONEY ON THE SUN NOT RISING TOMORROW? NO? SO WHY DO YOU TAKE HOMOEOPATHIC PRODUCTS, HAVE NEEDLES STUCK IN YOUR BODY, ETC.?

Enrico Bucci

Giulia Carreras

Frequentist inference, commonly used in medical data analysis, supplies no direct information on the probability that a tested research hypothesis is correct. The resulting error is worsened when the hypotheses examined have non-solid scientific bases such as the so-called complementary therapies. In such cases Bayesian statistics considering a priori probability in a tested hypothesis are more appropriate. The authors have demonstrated that the application of Bayesian statistics can change the results of clinical studies into complementary medicines.

11.30 am – SALA DEGLI ATTI

COMBATING ANTI-MICROBIAL RESISTANCE: A GLOBAL CHALLENGE

High School event organized by Farindustria

Sergio Pistoì

Massimo Visentin

Antibiotics are losing their effectiveness at a rate which would have been unthinkable just a few years ago because bacteria have developed strategies capable of neutralising them and some of these have become full-blown super-bacteria. In a not too far distant future, it is possible that antibiotics will no longer function properly when required. What are super-bacteria? Why are they so dangerous? How can we combat the antibiotic resistance phenomenon including via simply washing our hands? This Farindustria initiative takes the form of a scientific journalist interviewing a researcher who will respond to the former's questions using straightforward and effective language and with the help of a microscope and a wash basin.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

11.30 am / 02.30 pm – BIBLIOTECA D'ARTE E DI STORIA DI SAN GIORGIO IN POGGIALE

THE JURY HAS THE FLOOR

Theater event and workshop

A medical case characterized by a strong bioethical problematic aspect will be submitted to the students by way of a basic script. The ending **of the story will be left "open" on purpose, in order** to serve as the starting step for a workshop on the complex scientific, philosophical, and moral issues connected to the case. The students will work in groups, with the support of some expert coordinators, and will thus become the key players of a debate on bioethics. Just like a real jury, they will be summoned to choose the ending **that they deem to be the "fairest" one, and will** explain their decision to their schoolmates.

By reservation only (please reserve by email: festivaldellascienzamedica@genusbononiae.it)

11.30 am – SALA DELLA CULTURA

MALE HYPOFERTILITY

Fulvio Colombo

Patrizia Hrelia

Giuseppe Martorana

The collapse in male fertility rates has reached dramatic proportions in recent years. Specialists are alarmed by the risk to male fertility constituted by environmental factors and the danger that birth rates may collapse in the near future. Over the last forty years male sperm counts in the West have dropped by 50% and the World Health Organisation has had to modify its reference parameters for laboratories as compared with the past! The Italian Health Department has highlighted that one couple in five struggles to procreate naturally, twice as many as 20 years ago, and that causes of infertility (apart from strictly couple related causes) relate to men and women equally.

12.00 pm – SALA DI RE ENZO

SUPERMEN? WHAT ARE THE HUMAN GENETIC IMPROVEMENT SCENARIOS

Massimo Delledonne

New DNA sequencing methodologies and clinical genome progress is allowing our genetic makeup to be read and the information garnered to be used in increasingly accurate ways. The new genome challenge is now writing and reading a synthetic genome which is free of defects and disease predisposition. In a truly near future it will be possible for human beings to be born with a practically perfect, computer designed genetic makeup - but what does perfection mean for a biological species? Will human evolution thus become controllable by mankind itself?

12.00 pm – AULA DELLE CONFERENZE SOCIETÀ MEDICA CHIRURGICA DI BOLOGNA

PHARMACEUTICAL RESEARCH: THE INTELLIGENCE WHICH GENERATES HEALTH

Massimo Scaccabarozzi

Chairperson: **Alma Maria Grandin**

The pharmaceutical industry is an industry which is generated by science and thus by its very nature it is linked to intelligence and evolutions in knowledge, as well as top level R&D and the quality of production and all company activities. In the great innovative phases, when knowledge grew exponentially, pharmaceuticals increased its ability to make increasingly effective cures available. This is what is happening now: precision medicine and digital transformation in the life sciences are capable of radically changing the history of pathologies and responding increasingly well to health demands. These are extraordinary product innovations which can bring with them great benefits and require great process innovations, both corporate and regulatory, guided by the intelligence which enables science, technology, skills and the social context to be integrated if they are to improve access to care.

02.00 pm – CASA SARACENI

INTELLIGENT IMAGING: BIG DATA, RADIOMICS AND RADIOGENOMICS

Gianpaolo Carrafiello

Emanuele Neri

Daniele Regge

Chairperson: **Rita Golfieri**

Image recognition was the first application of artificial intelligence and will shortly be applied to everyday radiological-digital diagnostics thanks to technology based on Deep Learning techniques, algorithms enabling software to learn from experience. Using the so-called big data in an integrated way has enabled Radiomics to be developed as a quantitative analysis of the texture of a radiology image, together with Radiogenomics, associating radiological digital data with gene expression data (especially tumours). Taken together this information will improve the diagnosis, prognosis and treatment of many diseases, especially neoplastic diseases, and enable response to therapy to be forecast.

02.00 pm – SALA DEGLI ATTI

NUTRITION, DRUGS AND GENDER: MYTH OR FACT?

Patrizia Hrelia

Silvana Hrelia

Do men and women respond in the same way to the same drug? Does prevention apply in the same way to men and women? Are men and women equally susceptible to the various illnesses? There are many differences between men and women but the sex-gender differences have still to be accorded their rightful place in clinical practice. Women's drug safety profile is lower than men's and the differences between the genders extends to environmental pollutants, tobacco smoke and many other abused substances as well as botanical cures and dietary supplements. Medicine which aspires to being personalised cannot do without an appropriate gender approach. Gender differences count in terms of food intake, too, as a result of the differences dictated by hormones and other biological and cultural differences. Gender-oriented nutrition is founded on nutritional protocols targeting the various cohorts from a new perspective which takes account of the way in which gender influences food choices but also the diverse metabolic fate of nutrients.

02.30 pm – SALA DI RE ENZO

CONGENITAL CARDIOPATHY SURGERY: EVOLUTIONS AND COMPLEXITY

Gaetano Domenico Gargiulo

By: Intesa Sanpaolo

Every year 1.35 million children affected by congenital cardiopathy are born across the world. If left untreated, 40% of these die in the first year of life and constitute a clinical emergency. Successful surgery for these pathologies is the result of the pioneering vision of doctors whose objective has been to restore anatomy and physiology compatible with life. In 1939, the Journal of the American Medical Association celebrated the first successful surgical correction of Patent ductus arteriosus in a child of seven and inaugurated paediatric heart surgery. Since then progress in anatomical and physio-pathology knowledge of congenital cardiopathies, ongoing research for increasingly corrective surgical operations together with the development of biomaterials and diagnostic means have enabled exciting results to be obtained in the cure of these congenital pathologies.

Over recent decades, early diagnosis - now generally in the foetal stage - is enabling 90% of children operated on for congenital cardiopathies to reach adulthood. Conventional surgery does not always allow the problems linked to the base cardiopathy to be resolved and heart transplant and mechanical ventricles need to be resorted to. Studies into regenerative therapies, biomaterial decellularising processes and stem cell treatment may yet revolutionise paediatric heart surgery.

03.00 pm – SALA DELLA CULTURA

CORRECTING AND REWRITING HUMAN GENOMES: APPLICATIONS AND RULES

Luigi Naldini

Luca Pani

Chairperson: **Rossella Panarese**

By: **Gruppo Ospedaliero San Donato**

Gene editing technologies use molecular scalpels like those deriving from CRISPR to perform surgery on DNA, deactivating or 'rewriting' gene sequences for the purposes of achieving a desired result. Many new advanced therapy doors are opening: strengthening the action of the immune cells against tumours, removing blocks on their action; transplanting cells which are invisible to the immune system thus avoiding them being rejected; and correcting the gene mutations which cause illness accurately. If the efficacy and safety of molecular scalpels continues to increase, important aspects requiring wide ranging public debate will emerge relating to access to these treatments and including issues relating to the commercial exploitation of the various technologies and controls to establish clinical efficacy. Given that the rewriting we are speaking of affects cells which die off when individuals themselves die, the recent episode of the Chinese biologist who claimed to have modified the genome of two children, making the change hereditary, raises old debates on the ethical acceptability of modifying genes which go beyond individual life span to enter the species' gene pool. These subject matters will be covered by Professor Luigi Naldini, Director of the San Raffaele Telethon Institute for Gene Therapy and Professor Luca Pani, Professor of Pharmacology at the University of Modena and Reggio Emilia and of Clinical Psychiatry at the University of Miami (USA).

03.00 pm – SALA DEGLI ATTI

VACCINES: SCIENCE AND SOCIAL MEDIA

Simone Bressan

Rino Rappuoli

Chairperson: **Elena Meli**

How have vaccines evolved in recent years thanks to innovation and new technologies? How can technological progress influence the development of vaccines (recombinant DNA, conjugate and genomic vaccines and, today's synthetic technology and vaccine adjuvants, etc.)? Vaccine development research and innovation is time consuming and carefully controlled and has led to increasingly effective and safe drugs and thus vaccination has become more and more important in infectious disease prevention. Despite this scientific progress, however, social resistance has grown. To understand the nature of this resistance, a web analysis of Italian opinions, language and trends on the vaccine theme will be performed paying special attention to social media contents (Facebook, Twitter, Instagram) and the various discussion spaces (blogs, online articles, forums).

03.30 pm. – SALA DI RE ENZO

INNOVATIONS BY ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA IN MEDICAL RESEARCH

Giovanni Barbara

Laura Calzà

Paola Ceroni

Marco Domenicali

Piera Versura

By: Intesa Sanpaolo

In medicine the journey from base research to the availability of new therapies, products and services is long, complex and risky. It is only with ambitious and innovative research projects that effective solutions to health challenges still lacking an answer can be obtained. Health research is not simply a matter of technologies and products, however, but also of the way services are organised, resources used and systems funded.

In this context it is important to consider the transferability of innovations to facilitate research, the development of new products and benefits, the impact of, and return on, public investments for society. This review of a selection of the university's patents in the Life Science and MedTech spheres describes some of the important scientific results already achieved and prefigures the concrete applications deriving from them.

04.00 pm – CASA SARACENI

AGEING, ALZHEIMER AND ARTIFICIAL INTELLIGENCE

Roberto Bernabei

Today Alzheimer's disease cannot be treated except with certain 'symptomatic' action which cannot slow its development down. In the frequently undiagnosed initial phases, memory deficits can be offset with currently available technologies. This is the basis of the chatbot idea to support patients in this phase of the disease. The potential is for a made-to-measure 'service' for patients, offering the numbers, habits, contacts and methods with which to get into their homes. It is not a therapy in itself but provides proactive methods for those who start getting lost as a result of the illness.

04.00 pm – SALA DEGLI ATTI

THE SARDINIANS' DNA: A KEY TO EXPLAINING HUMAN ILLNESS

Francesco Cucca

New genetic variability characterisation technologies have improved our understanding of the way in which genes and their protein products function in both good health and illness. They have also supplied a powerful tool with which to reconstruct humanity's prehistoric events, supplying information on population movements and adaptation to different environments. Certain examples will show how specific distinctively Sardinian genetic characteristics have led to better understanding of the genetic and functional bases of complex diseases like auto-immune diseases and the evolutionary history of Sardinia and the Europeans.

04.30 pm – AULA ABSIDALE DI SANTA LUCIA

2030: GYNAECOLOGICAL ODYSSEY

Renato Seracchioli

A gynaecologist on the point of retiring (2030) recounts the positive and negative aspects of work now governed by artificial intelligence with a glance at the past, changes and conquests in

gynaecological and reproductive practice, and the future, the ethical and social consequences that these changes may bring with them. It is an imaginary journey in the future of gynaecology, retracing past events: from Louise Brown to the artificial uterus.

04.30 pm – SALA DI RE ENZO

TELEMEDICINE: EXPERIENCE, STATE OF THE ART AND THE FUTURE

Mauro Caliani

Graziamaria Nuzzaco

Gennaro Sosto

Chairperson: Francesco Gabbrielli

By: **Intesa Sanpaolo**

Telemedicine has been spoken of for years. The technologies have continued to progress, the IoT (Internet of Things), Big Data, Cloud and AI concepts have now become part of everyday life **including in doctors' surgeries. The difference must now be made by medical protocols, therapeutic and treatment trajectories, infrastructure and services.** This change is now underway. The vision of the future is also a matter of institutional choices and a wider perspective which encompasses the potential of 5G connections and starts from the role to be played by the hospitals in territorial continuity.

05.00 pm – AULA DELLE CONFERENZE SOCIETÀ MEDICA CHIRURGICA DI BOLOGNA

INTELLIGENT COLLABORATION MODEL: CHRONIC INTESTINAL FAILURE

Sergio Felicioni

Loris Pironi

Elisa Rozzi

Chairperson: **Federica Claudia Galli**

The event presents the virtuous collaboration that, in the field of rare diseases, gathers together associations of patients and centres of excellence. This brings added value to the network with, on the one side, the collective intelligence of expert patients and, on the other, the experience of centre of excellence and the Italian national network of rarer diseases.

In the case of Chronic Intestinal Failure (CIF) - a rare condition that affects less than one thousand people in Italy - this process has been in place for years, with a productive collaboration between the non-profit association "Un Filo per la Vita Onlus" and the centre of excellence Sant'Orsola of Bologna. This work runs alongside that of the Regional Centre for Rare Diseases.

05.00 pm – CASA SARACENI

THE MIND, CITIES, INTELLIGENCE

Franco Farinelli

However different they might seem, explanations for the functioning of cities are exactly the same as the models with which we explain the mind's functioning. **We will thus attempt to put forward a hypothesis on the nature of this similarity and the reasons behind it.** And the history of the city of Bologna will serve to illustrate the mind-city parallel in a case study whose conclusions are generally applicable.

05.00 pm – STABAT MATER

NEW TECHNOLOGIES FOR PREDICTIVE MEDICINE IN CARDIOLOGY AND ONCOLOGY

Luigi Bolondi

Ilja Gardi

Giuseppe Petralia

Claudio Rapezzi

By: Gruppo Villa Maria

The new technologies exploring the human body in the tiniest detail can provide elements of fundamental importance to predicting diseases and early diagnosis. In the cardiology field, morphological coronary exploration via 3D cardiology TACs using Cloud in Back reconstructors is replacing traditional functional techniques used to forecast coronary risk while, in the oncology field, the new Whole body Diffusion MRI technology offers the potential for overall assessments capable of supplementing or replacing PET acquisitions without the use of ionising radiation.

06.00 pm – SALONE DEL PODESTÀ

WHAT ARE THE RISKS TO SPORTSPEOPLE'S HEARTS?

Alessandro Capucci

Ornella Leone

Antonio Pelliccia

Susi Pelotti

Claudio Rapezzi

Gaetano Thiene

Giovanni Tredici

Chairperson: Alma Maria Grandin

Testimony from the world of sport to be understood

Both professional and amateur sportspeople are unfortunately subject to a series of unpleasant cardio-vascular events as the news in recent months, in particular, has shown. How is it possible that potentially lethal events hit young people in apparently exceptional health? Is the problem one of sport itself or is it a question of a pre-existing illness unknown to the sportsperson and undetected by doctors before sportspeople begin their sporting activities?

This round table will try to throw light on this subject and report on what is currently being done in Italy.



09.30 pm – THE GIOVAN BATTISTA MARTINI MUSIC CONSERVATORY – SALA BOSSI

CONCERT BY ORCHESTRA MOZART'S SOLOISTS

ACCADEMIA FILARMONICA

Music by Mozart and Beethoven

In conjunction with: **Farmindustria**

Orchestra Mozart is now one of the top orchestras in the international classical music world. Alongside its great symphony music repertoire, chamber music plays a central role in the orchestra's activities in accordance with the artistic ideas of Claudio Abbado, its director and guide for ten years.

Booking required: info@accademiafilarmonica.it

May 11th

08.30-13.00 – SALA VASARI

MARIO CAMPANACCI MEMORIAL: PIONEER IN THE STUDY AND CURE OF SKELETAL-MUSCLE TUMOURS

Associazione Mario Campanacci and Istituto Ortopedico Rizzoli are commemorating Professor Mario Campanacci twenty years after his death.

Pioneer and internationally recognised expert in the skeletal muscle oncology field, Mario Campanacci set up a multi-disciplinary centre at Rizzoli which became a centre of excellence in both Italy and internationally. This meeting will remember him with testimony from patients, pupils and colleagues. The patient roundtable is designed to lay the foundations for a patient self-help network for sufferers and their families. The association supports the work done by Professor Campanacci in helping patients, fostering clinical research and raising public awareness of sarcoma.

By Associazione Mario Campanacci for the study and cure of skeletal muscle tumours

09.30 am – BIBLIOTECA D'ARTE E DI STORIA DI SAN GIORGIO IN POGGIALE

A FOR ADOLESCENCE. CARE FOR THE BODY AND EMOTIONS

Theatrical performance for lower secondary school students

The theatrical performance will lead students in a journey through the changes faced by the body in adolescence. Starting from the scientific explanation of some phenomena that are typical of this season of life, students will learn about and recognize their body and understand how to take care of it.

Besides the physical changes, the performance will deal also with the emotional sensations that characterize adolescence, an age that is as complex as it is full of exciting new things.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

10.00 am – SALA DELLA CULTURA

INNOVATIONS IN ROBOTIC SURGERY AND 3D IMAGING

Eugenio Brunocilla

Since it was first introduced in the early noughties robotic surgery has revolutionised the treatment of the main urology-oncology pathologies. Thanks to enlarged images and a 3D visor surgeons can see the tiniest anatomical details with extreme precision. Recently the dissemination of 3D printers which enable individual organs to be 'printed' on the basis of radiology images and augmented reality technologies in which reconstructed radiology images can be superimposed onto those of robots opens up new scenarios in which the technology-surgery partnership is fundamental. This new surgical approach is just the beginning of a new era. In the near future artificial intelligence will allow medical procedures at all levels to be automatised with the improvement of medicine's capacity to restore our greatest good - our health - as the outcome.

10.00 am – STABAT MATER

CHOLESTEROL AND THEREABOUTS: NEW RULES AND NEW DRUGS... 10 HOT QUESTIONS FOR THE EXPERTS

Maurizio Averna

Claudio Borghi

Claudio Rapezzi

Chairperson: **Alma Maria Grandin**

The concept of plasma cholesterol "normal value" has radically changed in the last years. In particular, Researchers and Clinicians are increasingly focusing on the LDL fraction; moreover, it has been proved that there is not one "normal value" but different "desirable values" of cholesterol, depending on the characteristics of individuals and their general risk profile. In the last years, the treatment of dyslipidaemia and, in particular, hypercholesterolemia has been enriched with new medicines and strategies.

10.30 am – SALA DI RE ENZO

WHAT WE KNOW ABOUT THE GENETIC AND NEURO-BIOLOGICAL BASES OF HUMAN INTELLIGENCE AND THEIR USES

Pietro Pietrini

We are still in deep water as far as knowledge of neurobiology and the genetics of intelligence are concerned. Neuro-scientists interrogate the brain to establish how its structure and activity generate intelligence, or variations in intelligence. Geneticists seek out hereditary factors. A reliable hypothesis is that intelligence is located in specific groups of brain neurons, many of which are situated in the prefrontal and parietal cortex. The structure of these areas, their activity and the connections between them vary from person to person and correlate with cognitive test performance. Recent estimates show that around 25% of individual intelligence variations are explained by polymorphism at the level of the individual genome nucleotide. Overall, the genes identified thus far explain around 11% of individual variability at educational levels.

11.00 am – SALA DELLA CULTURA

MORE ROBOTS AND LESS BURNOUT TO PREVENT SIDE EFFECTS IN SURGERY

Giorgio Ercolani

Paolo Maria Russo

In oncology surgery in the gastroenterological system, the mini-invasive approach is still the best treatment procedure for the majority of conditions. The benefits for patients deriving from the use of this technique translate into reduced post-operative complication rates, less post-operative

pain, rapid recovery of physical activity, shorter inpatient periods and better aesthetic results. Robotic surgery is a developmental evolution from the laparoscopy technique, further reducing blood loss and enabling mini-invasive procedures even in cases in which laparoscopy is less well suited and more complex to perform. Surgeons frequently have to deal with burn-out, i.e. a condition of chronic work related stress leading to emotional exhaustion, a feeling of limited professional fulfilment and excessive doctor-patient emotional detachment. Burnout has a negative impact not only on the psychological wellbeing of the doctor but also on the quality of his or her work. Reducing the effects of burnout would thus increase motivation and work satisfaction and, at the same time, foster a more positive doctor-patient relationship.

11.00 am – TEATRO ARENA FICO EATALYWORLD

WELLBEING LIFESTYLES: THE BENEFITS OF PHYSICAL EXERCISE

Marco Malaguti

Paolo Pandolfi

Chairperson: **Andrea Segrè**

Physical exercise is an essential factor in a healthy lifestyle. Some anthropologists argue that evolution has made physical activity essential for man. Its effects on heart and lung health is well known. More recently its positive effects on the central nervous system and the ability to combat the development of chronic and degenerative diseases has been discovered. Moderate and gradual physical exercise - itself a form of stress for the body - helps it to deal with ever more stressful situations.

11.30 am – SALA DI RE ENZO

OBSTRUCTIVE SLEEP APNEA: CAUSES, EFFECTS AND CURES

Giuseppe Plazzi

Venerino Poletti

Claudio Vicini

Obstructive sleep apnea syndrome (OSAS) affects 2-4% of the general population and over 20% in certain age groups. It is a serious and growing health, social and financial problem which affects both men and women. Late or failed diagnosis or late treatment determines an increase in death and birth rates in those affected with corresponding increases in direct and indirect health costs. Non-suitably treated patients have high comorbidity and complications risks, high risk of road and work accidents and low productivity due to an increase in absenteeism and reduced work performance. The treatment of patients with OSAS, at all ages, requires the intervention of a multidisciplinary panel of experts: diagnosis and therapy must be co-ordinated between various specialists, especially neurologists, otorhinolaryngologists, dentists and pneumologists with the ultimate aim being to guarantee optimal, full intervention.

12.00 – SALA DELLA CULTURA

DIABETES AND HIGH PERFORMANCE MEDICINE: CONVERGENCE BETWEEN HUMAN AND ARTIFICIAL INTELLIGENCE

Lorenzo Piemonti

By: **Gruppo Ospedaliero San Donato**

Medicine can be conceived of as an ecosystem founded on relationship and process, a dynamic reality in which science is a non-dogmatic but fundamental and essential interpretation tool. Whilst doctors still work primarily on the basis of data generated by clinical biochemistry and imaging, however advanced, what we need today is to integrate genetics into the

aetiopathogenesis and cure framework and develop technological platforms capable of evaluating and measuring the various aspects of the individual's relationship with the ecosystem. Lorenzo Piemonti, Director of the Diabetes Research Institute, IRCCS Hospital San Raffaele, will discuss these subject matters.

12.00 – STABAT MATER

VACCINES: PSYCHOLOGY, SOCIETY AND POLITICS

Robert Böhm

Nicoletta Luppi

All the world's countries have policies designed to prevent infectious diseases with safe and effective vaccines. But almost every country has to deal with doubts and suspicions about vaccines which can lead to a refusal to vaccinate. What determines attitude to vaccines? Understanding what leads to such decisions can help us to shape effective strategies to foster successful public health policies in individual countries. Rejecting vaccines depends on decision making psychology which can, in some cases, be changed to make vaccination acceptable while in other cases action is useless. Targeted communication strategies would appear to be more promising, affordable and effective than those preferred by health policy makers which attempt to restore faith in vaccination in general.

02.00 pm – STABAT MATER

TRANSFERRING HEALTH SPHERE KNOW-HOW VIA AUGMENTED AND VIRTUAL REALITY

Ken Swain

By: EON Reality

The rapid evolution of Virtual Reality, Augmented Reality, Artificial Intelligence and the Internet of Things are going to have a disruptive effect on many sectors including Healthcare.

These technologies were all separate industries - but their convergence will propel digital simulation and training to new heights. This means that the future of AR and VR in Healthcare will almost certainly be much more intelligent and sophisticated, helping to free up health professionals to do their jobs even more effectively...and technology can help take care of the rest. We will be looking at future trends for Learning and Knowledge Transfer, together with innovative case studies incorporating AR and VR and emerging technologies.

02.00 pm – AULA ABSIDALE DI SANTA LUCIA

A NEW ERA IS BEGINNING. ALZHEIMER SYNDROME PREVENTION?

Arnaldo Benini

Dementia in the elderly is due to a person's genetic makeup which cannot be modified and determines how long a person will live and how long their neurons and synapses will work efficiently. Alongside these factors, environment and lifestyle factors, the so-called epigenetic factors, also play a part. In contrast to genetic structure, these can be influenced by generic prevention measures which are advisable for a longer, healthier life. There is rarely a single cause for Alzheimer neurodegenerative disease. It is a syndrome with a range of causes, the most important of which is cardiovascular disease, especially high blood pressure from middle age onwards. Rigorous epidemiological studies have shown that the prevention of dementia is possible if action is taken in time not on the amyloid beta, which mean nothing, but the various

epigenetic diseases. Risk of dementia can be reduced by up to 70%. Once dementia has begun it is not curable.

02.30 pm – CASA SARACENI

RESEARCH AND INNOVATION IN THE THIRD MILLENNIUM FOR PATIENT WELLBEING IN THE FIELD OF LIFE SCIENCES FROM DIGITAL TO START-UPS

Fabrizio Landi

By: **Intesa Sanpaolo**

The future of pharmaceutical, biotechnological and med-tech research is increasingly based on our ability to think up innovative, sensational solutions which also make use of the digital world (think of the use of virtual models to avoid pre and clinical tests on animals and human beings) as compared to the conventional development of pharmaceutical and biomedical products. The large firms recognise this. Already, today, two-thirds of new pharmaceutical products emerge from independent research done at innovative start-ups. This is a one-off opportunity for Italy with its rich intellectual resources and biological know-how but it is limited to the number of large sector firms: helping these initiatives requires hard work, investment, working methods and discipline but is a not-to-be-missed opportunity.

03.00 pm – STABAT MATER

ANTI-NMDA RECEPTOR ENCEPHALITIS AND RELATED DISORDERS

Francesc Graus

Neuroimmunological research has provided robust evidence that neurons may be the target of an autoimmune attack and that in some instances antibodies against synaptic proteins are responsible for the encephalitis that may or may not be associated with cancer (paraneoplastic). Of particular interest is the encephalitis associated with antibodies to extracellular epitopes of the NR1 subunit of the NMDA receptor. Patients with this syndrome, children and young women, present with severe psychiatric symptoms, decrease of consciousness, seizures, dyskinesias, and autonomic instability.

03.00 pm – AULA ABSIDALE DI SANTA LUCIA

RISK OF TOXICITY FOR HEALTH OF FOOD AND SUPPLEMENTS

Giorgio Fedrizzi

Fabiana Morroni

Chairperson: **Luigi Bolondi**

Our food and everything we consume has changed profoundly as compared to earlier human history. The consequences of this on our health are still partly unknown. The main problem is food 'safety'. The current approach is EC wide, taking into consideration the challenges of globalisation and variations in food habits. On an EC level, food safety is 'from farm to fork' in approach and all action taken to control foodstuffs begins with the very earliest growing and production phases and continues to controlling what turns up on our dining tables including materials which come into contact with foods. To bring this to fruition various EC supervision plans apply. Alongside these monitoring is done to assess potential 'new' emerging risks. The second problem is the supplements and vegetable extracts market which has a 3 billion Euro turnover in Italy alone. In this last year 65% of the population has taken at least one supplement on the basis of expectations of improved health. But are those taking these aware of the possible safety and quality risks? The

supplements world is so broad that it encompasses serious and effective products alongside useless and damaging ones.

03.30 pm – CASA SARACENI

FROM NEW RECONSTRUCTIONAL TECHNOLOGIES, NEW HOPE FOR CHILDREN WITH BONE TUMOURS

Marco Manfrini

The two main bone sarcomas (osteosarcoma and Ewing's sarcoma) are rare diseases (estimated at 100-120 new cases per year) which hit the young, with children accounting for over half of all cases. Once fatal, the prognosis for these diseases has improved hugely over the last 50 years and around 70% of patients now have the same life expectancy rates as their peers. Skeletal surgery has evolved at the same time, enabling amputations to be avoided, and in the last 20 years innovative surgical strategies have widened the range of reconstruction options and opened the door to exciting prospects of psycho-physical recovery for children with bone cancer. Istituto Rizzoli's experience is an area of excellence for Bologna in Italian, European and global terms.

3.30/5.00 pm – BIBLIOTECA D'ARTE E DI STORIA DI SAN GIORGIO IN POGGIALE

A FOR ADOLESCENCE. CARE FOR THE BODY AND EMOTIONS

Theatrical performance

The theatrical performance will lead young adolescents in a journey through the changes faced by the body in adolescence. Starting from the scientific explanation of some phenomena that are typical of this season of life, they will learn about and recognize their body and understand how to take care of it. Besides the physical changes, the performance will deal also with the emotional sensations that characterize adolescence, an age that is as complex as it is full of exciting new things.

Booking required (email festivaldellascienzamedica@genusbononiae.it)

04.00 pm – STABAT MATER

WHY ARE HIGHER CHILDHOOD IQ SCORES RELATED TO BETTER HEALTH AND LONGER LIFE?

Ian J. Deary

Cognitive ability (intelligence) test scores from childhood are associated with how long people live, and the risk of some illnesses. This is the field of cognitive epidemiology. I describe some recent studies that illustrate advances in the field, including those involving the Scottish Mental Surveys of 1932 and 1947. I describe some of the causes of death, illnesses, and health behaviours that are associated with intelligence assessed in youth. Some possible causes of intelligence-health associations are described, including genetic contributions.

04.00 pm – SALA DELLA CULTURA

DIGITALISATION OF THE DOCTOR-PATIENT RELATIONSHIP: LIGHT AND SHADOW

Susi Pelotti

Maria Giulia Roversi Monaco

In what way does digital health change the traditional doctor-patient relationship and the way medicine is taught? Change in the doctor-patient relationship in the direction of a shared decision making process model is guided by the need to put patients centre stage in the healing process as the keys to a public health policy sensitive to the personal values of the sick person. This is the

context into which mobile health tools, with their advantages and risks, fit and are to be analysed in the light of legal pronouncements on the form and content of consent to medical practices.

04.30 pm – CASA SARACENI

BI-REX, 4.0 INDUSTRY, AT THE SERVICE OF HEALTH

Lorenzo Chiari

By: Intesa Sanpaolo

BI-REX (Big Data Innovation & Research EXcellence) is one of eight skill centres funded by MISE in the context of the 4.0 Industry Plan. It is a public-private consortium whose seat is in Bologna with 57 partners including universities, research centres and excellence firms for the purposes of assisting firms and SMEs in particular in adopting the technologies they need to qualify as Industry 4.0. Biomedicale plays a significant role in the vertical chains **which the centre's projects will focus on**. Here the most sophisticated technologies for Big Data and Data Security, Additive Manufacturing and collaborative robotics will be tested in terms of their potential to innovate the ways in which research and clinical practice now deal with our health in an in-depth way. The round table which will see the participation of BI-REX's **main biomedical partners will present a project roadmap and reflect on the significance for our socio-economic system beginning with Health 4.0 reasoning**.

04.30 pm – AULA DELLE CONFERENZE SOCIETÀ MEDICA CHIRURGICA DI BOLOGNA

FROM PHARMACOGENETICS TO PERSONALISED AND PRECISION MEDICINE: CHALLENGES AND OPPORTUNITIES

Sabrina Angelini

Ettore Capoluongo

Gloria Ravegnini

Chairperson: Giorgio Cantelli Forti

In memory of Dr. Franco Pannuti

Gastrointestinal stromal tumour (GIST) treatment involves the removal of tumours followed, in the case of patients considered high risk, in chemotherapy. The new frontier in personalised or precision medicine involves investigating specific molecules called microRNA and lncRNA which tumour cells release into the blood for communication purposes. Research is attempting to understand whether these might be the key to understanding why tumours tend to return only in some individuals.

Liquid biopsy is a new tool with which to diagnose and monitor cancers and forecast response to **therapy. The tumour's natural history can be followed via a blood test. Identifying mutations in tumour DNA present in the blood stream enables the most suitable therapies for individual patients to be identified. Furthermore, it allows the development of the disease to be monitored during treatment and the tumour's learning to resist its effects to be quickly identified.**

05.00 pm – SALA DELLA CULTURA

BIG DATA AND PRIVACY LAW

Giusella Finocchiaro

Augusta Iannini

The availability of big data makes possible every elaboration conceivable at a limited cost and with widely available technologies. In the health context, applications range from health purposes to science research and preventative medicine. Underlying every elaboration model is information which, if referred to an actual person, is legally considered personal data. Constraints

are imposed on this huge wealth of information according to European laws, protecting digital identity and individual privacy. Safeguarding the 'electronic body' would thus seem to be juxtaposed to that of the material body. Defining a balance of relevant rights is thus a necessity.

05.00 pm – AULA ABSIDALE DI SANTA LUCIA

URIC ACID AND MENTAL EFFICACY: THE FIRST EXAMPLE OF BIOLOGICAL WASTE RECYCLING

Claudio Borghi

Giovambattista Desideri

Francesco Galassi

Chairperson: Michele Mirabella

Of the mysterious substances circulating around our bodies, uric acid is one of the most interesting in evolutionary, physiological and clinical terms. Uric acid is the end product of protein digestion and is apparently a waste product whose recycling can have both positive and negative effects. The ability to produce uric acid is typical of primates (and thus man) and Dalmatian dogs, the only species in the history of evolution who have lost a key gene (uricase) which is indispensable to transforming it into an inert compound. In man it is believed that increases in uric acid levels contributed to the development of intelligence and motor skill growth and it is precisely this evidence which generated the hypothesis that it is precisely uric acid plasma and tissue levels which relate to cognitive capacity and the efficacy of the human mind.

05.30 pm – STABAT MATER

THE THREE BROTHERS WHO NEVER SLEEP AND OTHER SLEEP DISTURBANCE CASES

Luigi De Gennaro

Giuseppe Plazzi

The invention of video polysomnography - the chance to record video images of patients sleeping in a laboratory lit with infra-red lights and synchronise these with polysomnography recordings - has led to rapid progress in sleep disturbance studies. Many atypical behaviours which can appear during sleep alone have been documented and classified over the last thirty years. Certain stories of these patients and the discovery of the parasomnia they suffered from have been collected into the book *The Three Brothers who Never Sleep and Other Sleep Disturbance Cases*. In a narrative form, from the starting point of real life observations, the most frequent pathologies are outlined, such as insomnia, restless legs syndrome, pavor nocturnus, sleep walking, hypnic jerks during sleep and sleep paralysis but also rare conditions such as narcolepsy, REM sleep behaviour disturbances, nocturnal epilepsy, propriospinal myoclonus, sexsomnia, the fatal family insomnia story and legal cases such as violence or murder committed while asleep and cases of pharmaceutical intoxication which can conceal consciousness disturbances triggered by endogenous intoxication.

06.00 pm – SALONE DEL PODESTÀ

LOPSIDED DIETS AND WHERE TO FIND THEM

Dario Bressanini

The first diet book was published in 1863: *A Letter on Corpulence Addressed to the Public*. Since then bookshop shelves have filled up with dozens of diet books from those based on a single food - such as celery or pineapple - to those which exclude something, like lactose or yeast. But also diets on which scientific debate is still raging: low carbohydrate or low fat or high in fat or high in protein. It is not surprising that people find it confusing. What does scientific research have to say about all these diets?

07.00 pm – SALONE DEL PODESTÀ 

PAST, PRESENT, AND FUTURE OF NUCLEAR REPROGRAMMING

John Gurdon

Chairman: **Lucio Ildebrando Maria Cocco**

Experiments involving transferring the nucleus of a somatic cell into an egg cell whose nucleus has been removed (cloning) dates to the end of the 19th century and the first success dates to 1952. In the 1960s nuclear transfer technology was developed experimentally with various results on amphibians and it was discovered that egg cells are capable of reprogramming the nucleus of a somatic cell to produce a new living animal. The birth of the first cloned mammal (Dolly) was only registered in 1997. What applications of these results have already been completed and what are the future prospects of this vast study and clinical development, but also industrial, sector deriving from the use of nuclear transfer technology? This research raises questions of an ethical nature which need to be taken on in the light of the scientific framework of knowledge.

09.00 pm – CHIESA DI SAN GIOVANNI IN MONTE

CONCERT WITH THE YOUNG MUSICIANS EUROPEAN ORCHESTRA CONDUCTED BY PAOLO OLMI, WITH THE PARTICIPATION OF THE CORO DELLE VOCI BIANCHE OF THE TEATRO COMUNALE CONDUCTED BY ALHAMBRA SUPERCHI

P. Mascagni, C. Saint-Saens, G. Fauré, A. Vivaldi, J.S. Bach

In collaboration with the **Fondazione Luisa Fanti Melloni**

May 12th

10.00 am – STABAT MATER

THE GREAT EXPLORATION EXPEDITIONS INTO THE HUMAN BRAIN: WHAT IS HAPPENING AND WHAT IS BEING DISCOVERED

Fiorenzo Conti

The development of studies on the brain has been an extraordinarily fertile field over recent decades with important consequences on both knowledge and neurological and neuropsychiatric illness planes. And with unexpected interest from the media and experts in other disciplines.

It is thus not surprising that research funding agencies have accorded neuroscience priority importance in their policies. Within this framework, the USA and Europe have played a pre-eminent role, launching two mega projects (BRAIN Initiative, Human Brain Project) which have generated interest amongst both researchers and the non-expert. How are these organised? How have they been received? How have they been managed? What have the results been?

10.00 am – SALA DELLA CULTURA

INTERNATIONAL NETWORKS AS PROMOTERS OF CLINICAL RESEARCH

Stefano Aliberti

The way clinical scientific research is done has changed radically over the last 20 years and the web has made a significant contribution to making the results of scientific study more generalisable and thus more applicable in clinical practice. The centre stage players in international scientific research networks are no longer the researchers but the regulatory bodies, institutions, pharmaceutical companies and, above all, patients which can now potentially design clinical studies and play a central part in the dissemination and implementation of the results.

10.30 am – ISTITUTI ANATOMICI

DID ULYSSES MEET MOBY DICK WITH A COLT OR A SMITH & WESSON?) A GPS TO NAVIGATE THE BRAIN

Diego Mazzatenta

In recent years, neurosurgery is pushing out towards unexplored paths, reaching places that only lately were impossible to reach or foresee. Finding a way between the macroscopic and the microscopic can bring immense benefits to the life of patients. Neuro-navigation is a technology that allows the surgeon to set a route through the convolutions of the brain, avoiding sensitive brain tissue. In a "journey" straddling cinema, history and technology, we describe how this technology helps neurosurgeons during surgery.

11.00 am – STABAT MATER

TWENTY-THREE YEARS AFTER DOLLY: HOW SHOULD CLONING TECHNOLOGY BE USED?

Cesare Galli

The motives guiding the development of animal cloning technology were animal husbandry related and designed to obtain copies of animals of high genetic value or whose phenotype was known. This goal is still a valid one. All or nearly all mammals have been successfully cloned and cloning has turned out to be a potent base research tool with which to study genome reprogramming. The biological opportunities and limits of the technique - still to be perfected - have shifted attention in the direction of cloning to generate animal models in both animal husbandry and medical fields, integrating cloning with genetic engineering and genome editing.

11.00 am – SALA DELLA CULTURA

HEALTH AND DISEASE HOLOGRAMS

Lorenzo Menicanti

Omar Pappalardo

By: Gruppo Ospedaliero San Donato

Augmented reality, namely the viewing of 3D holograms in addition to information from the surrounding world will be one of medical science's next great leaps forward. In particular, together with biomedical image technologies (TAC, ecography), it will enable specific patient 3D models to be viewed and interacted with for the organs of interest in an intuitive, interactive and shareable way. With this technology it is possible to virtually enter the human body to explore its anatomy and pathologies with diagnosis, cure and, especially, medical education benefits.

Professor Lorenzo Menicanti, Scientific Director at IRCCS Policlinic San Donato, and Omar Pappalardo (Bioengineer, 3D and Computer Simulation Laboratory) will discuss this subject matter.

11.00 am – BIBLIOTECA D'ARTE E DI STORIA DI S. GIORGIO IN POGGIALE

THE WEBECOME ABC TO PREVENT MALAISE FACTORS IN GENERATION B YOUNG PEOPLE

Nicoletta Bernasconi

Simone Colombo

By: Intesa Sanpaolo

Important things have to be carefully prepared and nothing is more important than the intellectual and social growth of children and young people.

On one hand there are difficulties and full-blown threats including dietary disorders, addictions, discrimination, bullying and cyber bullying.

On the other there are opportunities: development of future skills, abilities and attitudes which are unanimously considered to be the true passepartout for the younger generations.

Solid prevention and effective education for the young emerges from a family-school pact: this alliance requires increasingly evolved tools and expert contents.

11.30 am – SALONE DEL PODESTÀ

THE REVOLUTION OF PERSONALIZED MEDICINE: ARE WE GOING TO CURE ALL DISEASES AND AT WHAT PRICE?

Aaron Ciechanover

Chairperson: Piergiorgio Strata

Life expectancy increased by at least thirty years in the twentieth century. Will it continue to increase? How long will we live? Much will depend on new technological devices, the ability to substitute degenerated tissues with functional tissues and on new drugs. Above all, it will depend on the availability of less casual procedures to discover new treatments given that these are still developed using molecule screening without an understanding of the action mechanisms involved and on the assumption that diseases are the same in different people. Targeted strategies to forecast efficacy and effects in each individual patient are required. As we are genetically and epigenetically unique, we do not all have the same prostate cancer or the same diabetes and treatment needs to be tailor-made or carefully personalised. This requires using technologies which determine individual molecular and biochemical profiles. This new medicine is costly and raises bioethical issues, in particular as regards privacy safeguards.

03.00 pm – ISTITUTI ANATOMICI

TRADITION AND INNOVATION IN HIP, SPINE AND FOOT SURGERY AT ISTITUTO ORTOPEDICO RIZZOLI

Cesare Faldini

Alberto Corrado Di Martino

Antonio Mazzotti

Alberto Ruffilli

Istituto Rizzoli is a global benchmark in research, innovation and assistance. Its hip surgery is based on mini invasive and conservational operations. Spondylolisthesis (when one vertebrae slips over another) and scoliosis surgery now allows for effective corrective work limited to the deformed section of the spine, enabling patients to recover much of their movement. The mini invasive approach to deformities such as bunions and flat feet is the result of research and innovation in the foot surgery field.

June 14th

10.00 am – AULA MAGNA DI SANTA LUCIA

ANTAREX CALCULATES DRUGS TO BLOCK EPIDEMICS WITH INTELLIGENCE

Marcello Allegretti

Synthesising a drug as quickly as possible, taking on or blocking an epidemic of infectious agents on a large scale - this the **international scientific community's great challenge**. **With this in mind** Consorzio Antarex's intelligent super-calculation platform was set up as a public-private project involving Dompé farmaceutici, Politecnico di Milano and Cineca, in the context of 3 million Euro funding from H2020 for High Performing Computing. Antarex is the sector's most advanced intelligent super-calculation platform. It is made up of a chemical library of 300 million molecules and up to 30 biological targets with an elaboration capacity of 10 million molecules in 100 seconds and a cost per screening of 4000 Euros (1 billion molecules). Applied to the epidemiological crisis caused by the Zika virus, currently with no effective cure, the platform has identified molecules potentially capable of inhibiting five of the seven virus proteins and biological experimentation is now under way. The project is a model for scientific research and the pharmaceutical industry which is opening the way to shortening the time frames for essential public health treatments, allowing for rapid availability of potential drugs to be assessed in ultra-rapid time frames.

11.00 am – AULA MAGNA DI SANTA LUCIA



DNA INSTABILITY AND POSSIBLE ALTERNATIVE LIFE FORMS

Tomas Lindahl

Chairperson: **Lucio Ildebrando Maria Cocco**

Human cancer is generally associated with mutagenic changes in tumour suppressor genes and oncogenes. While some of those deleterious mutations may be caused by radiation and other environmental agents, a large proportion is likely to be due to unavoidable endogenous chemical DNA damage by hydrolysis and oxidation, in combination with imperfect repair. Major forms of such spontaneous DNA alterations and the relevant DNA repair mechanisms will be described. One or several simple life forms appeared early in the lifetime of our Earth. Strategies of ongoing searches for unusual life forms include studies in the presence of high concentrations of organic solvents such as glycol under anaerobic conditions.

June 18th

06.30 pm – BIBLIOTECA UNIVERSITARIA (via Zamboni 35)

DONATION TO BOLOGNA UNIVERSITY OF THE ORIGINAL GASPARE TAGLIACOZZI, *DE CURTORUM CHIRURGIA PER INSITIONEM*

Paolo Giovanni Morselli

Gaspare Tagliacozzi, universally considered a Western master in reconstructive plastic surgery, taught at Alma Mater Studiorum – Università di Bologna from 1570. In his *De curtorum chirurgia per insitionem* - Plastic Surgery by Grafting - he described the 'Italian method' for facial reconstruction surgery in particular for the nose, lips and ears. The original text will be donated in the presence of the Magnifico Rettore, Francesco Ubertini, and of the CEO of Istituto Ganassini, Dr. Giuseppe Ganassini di Camerati, to Bologna's University Library. To celebrate this event, the

activities of Professor Gaspare Tagliacozzi at the university, the reconstruction methods described in his book and some aspects of his life in the city will be presented.

All Festival della Scienza Medica events are free and open to the public while seats last, unless otherwise indicated.

The program may suffer some minor variation. Please check on the website www.bolognamedicina.it

The da Vinci robot at Palazzo Pepoli

Outside the operating room, but functioning perfectly in such a way as to simulate inter-operator movements: this is what visitors to Palazzo Pepoli (via Castiglione, 8) will be offered at one of the most interesting places at Bologna's **Festival of Medical Science**.

For the entire duration of the event, from **9th to 12th May**, a specialist clinic will enable visitors to see for themselves and gain a better understanding of the functions of the Vinci Xi robot system, which has been working alongside surgeons in various specialisms since 2014.

Da Vinci is a robotic technology produced by Californian firm Intuitive Surgical distributed in Italy by Ab Medica. It is considered today's most evolved platform for mini-invasive surgery and is made up of three parts:

A **console** which is the control centre which surgeons control remotely via joystick and pedals. Thanks to a visor which can magnify anatomical details up to ten times their size, doctors will obtain a precise, accurate 3D view. The **operator's actions are faithfully reproduced by the robot** which can make them extremely sure and accurate, eliminating natural physiological tremors.

A **patient cart** equipped with four arms on which miniaturised operating tools and an endoscopic **video camera will be mounted**. The **'trocar' used allows for a freedom of movement based on a grand total of 7 axes and over 540°**, characteristics which enable surgeons to reach difficult anatomical locations without damaging delicate nerves and blood vessels.

A **vision cart** which contains the central image processing and elaboration unit.

The use of the da Vinci robot ensures benefits for both doctors and patients and its advantages are thus twofold.

- Reduced incisions
- Limited blood loss
- Limited transfusion risk
- Precision in both demolition and reconstruction phases
- Less post-operative pain
- Reduced in-patient periods
- Rapid return to normal functioning

Maximum 10 participants per visit (15 minutes for each visit)

Booking required within May 7th, on www.bolognamedicina.it

Colophon

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Show and tell at the anatomical Theatre

Actresses: Giulia Quadrelli, Lucrezia Giovanardi

A for Adolescence. Care for the body and emotions – Theatrical performance

Actors: Luisa Borini, Roberto Giovenco

Work on the play: Francesca Marra

The Jury has the floor – Theater event and workshop

Actress: Giulia Quadrelli

Entertainers: Gloria Albonetti, Prisca Amoroso, Elisa Baioni, Luca Ielasi, Paola Panciroli

Stage technicians

Giorgia Casadei, Pietro Alex Marra

In the newsboy role

Francesca Canè, Emily Ianeselli, Roberto Simone

Thanks to

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