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Communication project by *Gaetano Ferretti*

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*Space Economy*  
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Column  
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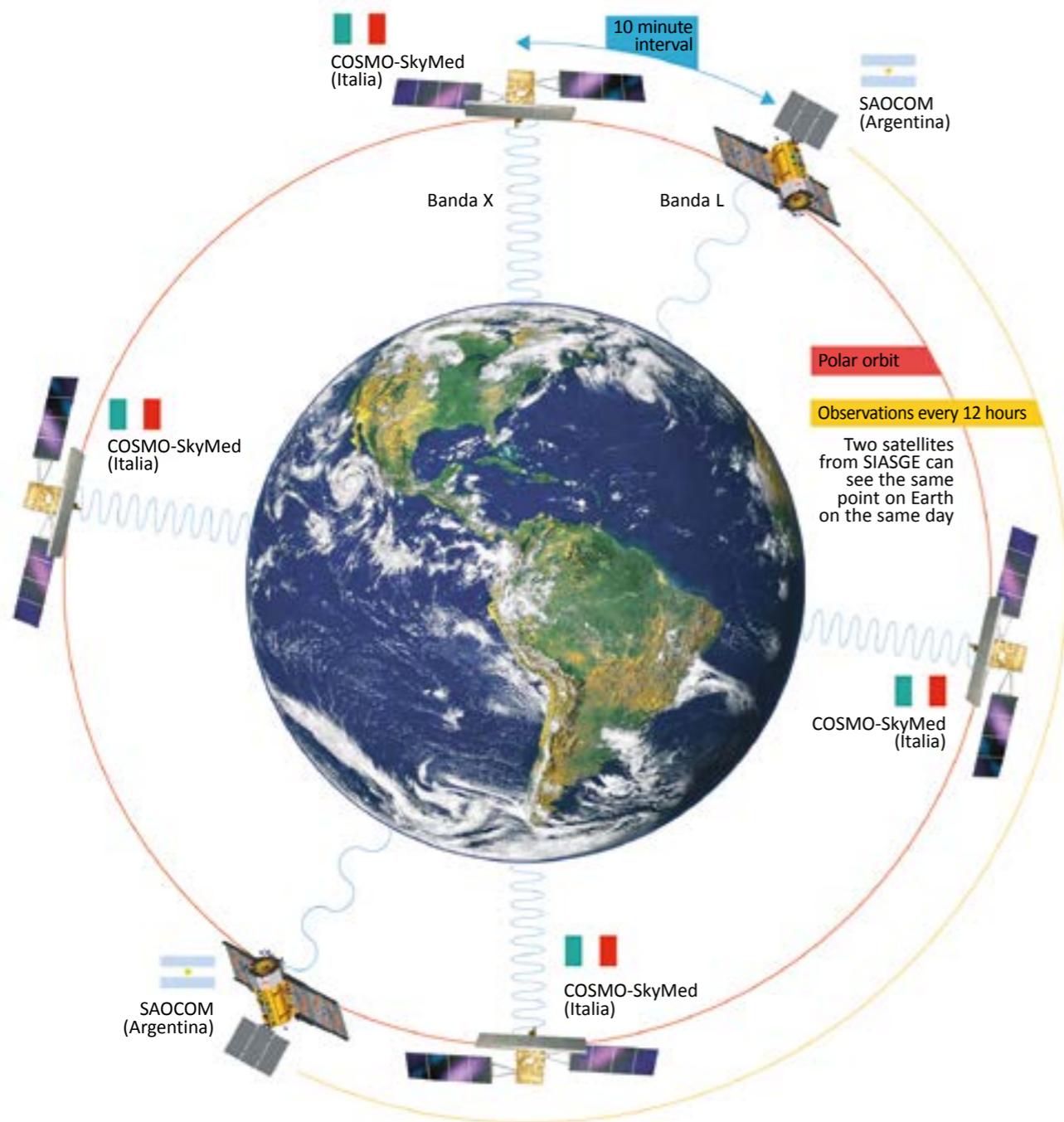
Perito Moreno glacier  
*Patagonia*

*the cover Roberto Battiston*



# SAOCOM 1A

SIASGE: ARGENTINE AND ITALIAN RADARS IN SPACE



Ministerio de Ciencia, Tecnología e Innovación Productiva  
Presidencia de la Nación



Argentina's National Space Activities Commission (CONAE) established the SAOCOM mission in order to meet information requirements for the socio-productive sectors considered in the National Space Plan, as well as to integrate operationally the Italian-Argentine System of Satellites for Emergency Management (SIASGE), which was set up through a collaboration between Argentina's CONAE and Italy's ASI space agencies. The main objectives of the SAOCOM Mission are firstly to obtain soil moisture maps for important practical applications in agriculture and hydrology, and secondly to obtain useful informa-

tion for mapping terrestrial topography and identifying surface movements. With the SAOCOM 1A and 1B observation satellites, Argentina is set to complete the SIASGE Satellite System, which has a constellation of four Italian COSMO-SkyMed satellites. The System is the only one of its kind in the world. SAOCOM 1A is scheduled for launch on 7th October, 2018, with SAOCOM 1B due to follow in 2019. The SAOCOM satellites will be controlled and managed from the CONAE Teófilo Tabanera Space Centre's Mission Control located in the province of Córdoba. The data will be received and then sent to users in Argentina and around the world.



# *the cover* Roberto Battiston

## Italy and Argentina - *space to be shared*

*ASI plays a crucial role as regards the development of the space sector in the South American country, which will host the Forum on 1st November*

This is an important phase for South American space research, and for the Argentinian one in particular. Within a month, the launch of the first satellite of the SAOCOM constellation (on 29th September from the Vanderberg Base in the USA) will be followed by the third International Space Forum, planned for 1st November in Buenos Aires, which, on this occasion, will focus on the Latin America Countries. These two events are part of

a complex growth process, in which Italy has played a crucial role over the last twenty years - this can be seen in the very name of the programme of which the satellite launch is part, SIASGE, which stands for Italian-Argentine Satellite System for Environmental Emergency Management and Economic Development. And the Forum itself - following on from those in Trento in 2016 and Nairobi in 2017 - came out of the stimulus provided by the Italian Space Diplomacy.

One of the leading figures in this process is Roberto Battiston, President of ASI - Italian Space Agency. In 2016, at the time of the first Forum, he was Vice-President of IAF (a position now filled by another Italian, Gabriella Arrigo). "The outcome of space programmes is concretely achieved many years after investments are made, - says Mr Battiston - "the first agreements between us and Argentina were reached in the 1990s, when Italy was beginning to operate on the X-band, that is, using short



DAVID PARKER HUMAN AND ROBOTIC ESA FLIGHT MANAGER WITH ROBERTO BATTISTON FOR THE SIGNING OF AN AGREEMENT



PH COSMO-SKYMED@ASI, ELABORATO E-GEOS SPA

LOS RIOS ECUADOR IMAGINE COSMO SKYMED ASI - E-GEOS

waves, to create an innovative constellation of satellites". This was the operating strategy giving rise to the COSMO-SkyMed system, which now has four satellites in orbit, and operates in a

sector as delicate as that of emergencies. "At that time - continues the President - Argentina decided to invest with us in a similar programme, but based on L-band, of about 30 centimetres,

to see to other strategic sectors, such as agriculture, for example. On the basis of these shared objectives, Italy invested 52 million Euro in Argentina, to contribute to its mission

## the cover

◀ – a significant contribution for establishing a collaboration relationship that has been strategic for us for more than ten years now”. Thanks to a joint plan involving orbits, observation angles and return times, the SIASGE system’s purpose is to integrate data and applications deriving from the two satellite constellations: COSMO-SkyMed and SAOCOM. The architecture of this cooperation is based on a merged and balanced range of contributions: ASI contributes to building the Argentinian satellites, offers the data from the COSMO-SkyMed system, and makes its Matera Space Center

available, against the possibility to use data from the SAOCOM system and the Argentinian Space Center in Cordoba, as well as SAOCOM data related to specific geographical areas on an exclusive basis. “Following the launch of the first Italian-Argentinian satellite, a double constellation is now in orbit, both on the X and the L band - explains Mr Battiston - a powerful, significant situation in a sector in which there are few satellites, because they are complex and expensive to build. Besides advantages for Italy, an operation of this kind enables Argentina to enjoy a high profile in South America, since today it

is the most advanced country in terms of space industry, thanks in particular to the relationships set up with us over recent years”. Obviously, the presence of Italian space technology within an international setting is always the result of teamwork, in which the essential institutional contribution is combined with that of private operators. “Diplomacy therefore means extensive work at an Embassy level, which has been carried on fruitfully since the 1990s. But Italian industry is already at work in Argentina, thanks to a joint venture with local companies: this is a relevant sign, because it extends

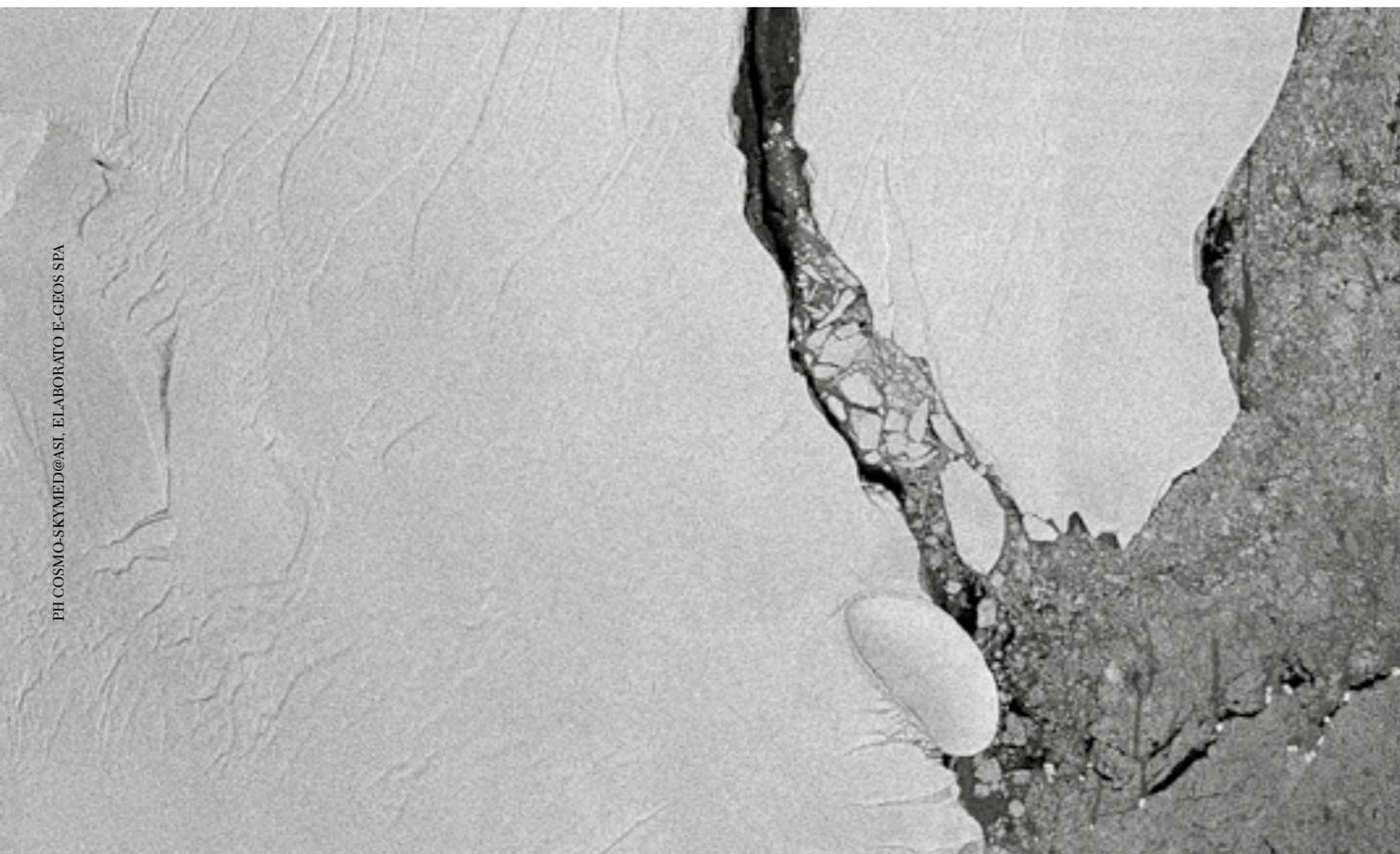
the network of international ties to this Country as well, with Italy enjoying a significant presence for some time. “Downstream”, i.e. the transformation of satellite data into economic value, is now the watchword of space economy: it represents a sector employing thousands of people, and we are very proud to be one of the leading countries in this field”. Starting from these premises, the Buenos Aires Forum - to which all Latin American Countries, from Mexico down, have been invited, and that will also be attended by the major European members of the Esa - opens with excellent prospects. “And so, quite frankly, it should be said that the almost simultaneous occurrence of the first SAOCOM launch was a stroke of good fortune: because when a new satellite is put into orbit, it is not always easy to set certain dates far in advance, whereas the date for the Forum was set long time ago. Having said this, the Forum provides each participant with a range of interesting opportunities. In terms of space investments, developing countries have problems of political coherence, because there is no equivalent of Esa in Africa or Latin America. Therefore, their choice to meet around the table is highly appreciated, to talk about technological opportunities as well as training. Thanks to events like these, developing countries may begin to take part in a process of high-level training, which is very different from being subject to the influence of more advanced countries, or simply acquiring technologies. On the other hand, we, who represent countries with greater space expertise, can provide significant stimuli for developing countries, and achieve important results in terms of diplomacy”. 



### About Roberto Battiston

*Roberto Battiston was appointed President of the Italian Space Agency in May 2014, by the Education, University, and Research Minister, Stefania Giannini. He was born in Trento, graduated with honours at the Normale University in Pisa, was Dean of Experimental Physics at Trento University, and President of the INFN's Commission II for Astroparticle Physics. He is a member of the Trento Institute for Fundamental Physics and Application, the new INFN National Centre.*

*“For 35 years I was strictly a researcher in the particle physics sector - says the President - and then I turned to space, especially dealing with questions related to matter and anti-matter. Two crucial questions remain close to my heart: on the one hand, the role of research as a tool for growth and development, and on the other, the relationship between space and the business world”.*



THE LARSEN GLACIER

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by Gaetano Ferretti*

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# A space economy study centre

## Andrea Sommariva



On 4 June, the SEE Lab was officially presented at Milan's SDA Bocconi. It is a new platform that aims at becoming a reference point worldwide regarding studies and research on space economy topics.

The SEE Lab was established with the technical and scientific support and co-operation of organisations such as the Italian Space Agency (ASI), the National Institute of Astrophysics (INAF), the European Space Agency (ESA) as part of its ESA\_Lab@ initiative, and the Committee for Space Research (COSPAR). It is headed by Andrea Sommariva and its efforts will be focusing on the two research areas that hallmark space economy.

The first area deals with the economy related to the exploitation of the Low Earth Orbit, where satellites responsible for observing the planet orbit, and the geosynchronous orbit (37,000 km altitude), where telecommunication and broadcasting satellites are located.

On the other hand, the second area is concerned with the most innovative frontiers of space economy, such as the extraction of critical minerals and space tourism.

"The idea of a SEE Lab was developed together with the late Giovanni Bignami, one of the great Italian

### Italy among space leaders

Over the past few years, Italy has been one of the world leaders on the space scene: it is the third contributor of the European Space Agency (ESA), which coordinates the projects of 22 Member States, while it ranks sixth in terms of production of scientific articles most quoted in the space science field. It also boasts excellent results in obtaining research funds provided by the EU. In the 2014-2017 term (medium-term data of the 2014-2020 planning of the Horizon Programme), Italy scored an excess return of € 276 million. Considering that Italy's contribution to the EU plan budget was 12%, Italy's space system received back 16% (i.e., +4%). Looking at figures, space economy in Italy is worth, as a whole, € 1.6 billion, boasting a supply chain that ranges from the ability to build satellites to their in-orbit deployment, the transmission of data to Earth and the use of such data for a variety of industrial applications and innovative technologies for the market. According to a survey carried out by ASI, 80% of the industry consists of small and medium-sized enterprises (in three years, they rose from 476 to 578), with jobs and turnover mainly generated within large companies. The industry also experienced a constant growth as employment increased by 3% in three years, with almost 6300 skilled workers being employed.



astrophysics", recalls Sommariva. "The purpose was to create a centre dedicated to space economy analysis. Our business management background provides us with the necessary skills to analyse the

economic part but not the technical and scientific part. This is why we created this platform where the support extended by ASI through its President, Roberto Battiston, is crucial. Then we looked for part-



ners for the aerospace part, including both industries and service companies, considering that a large portion of the turnover of companies engaging in this sector comes from services, i.e. the sale of the output of the data sourced from satellites, i.e. the downstream part." The overall turnover of this growing industry has already reached significant levels, with estimates in the region of \$ 350 billion in 2017, underscoring the increasingly important role played by private companies after an initial start-up phase where the public sector acted as a forerunner.

The International Academy of Aeronautics envisages a future in which space economy might be worth thousands of billions. "Space economy is a strategic economy due to the economic and political benefits arising from it—concludes Sommariva.

"In the short term, space exploration would undoubtedly contribute to economic and employment growth. In the medium term, the main effects would be coming from technological innovation and its impact on the rest of the economy and on the expansion of the basic supply of some rare or crucial metals which are key drivers for our industrial civilisation." 



# The Capital of Geodesy

## *Giuseppe Bianco*

metry data worldwide”, explains eagerly Matera-born director Giuseppe Bianco. “The Centre was set up in Matera because of the need to find a location in the central Mediterranean area and because Basilicata was the region most actively seeking to play host to this futuristic facility, turning it into a truly success story for our country’s research endeavours. One interesting aspect is that all the existing space geodesy techniques coexist at the Centre, where the entire data lifecycle takes place, from acquisition of ‘raw data’ to quality control, processing, and final publication.”



“The Centre has taken a global leading role and combines solutions of data from all over the world”, points out the director who is also chairman of the International Laser Ranging Service. “However, it should be noted that there are two levels of data: as far as geodesy is concerned, we cover the full data lifecycle; with regard to the data we acquire through remote sensing, we reach a certain point and then the end users—including academic institutions or private entities, as appropriate—step in to buy these data and use them within their respective reference environments.” Further focus areas include optical tracking of space debris and satellite quantum telecommunications: “We are also upgrading our equipment meanwhile, building



a new, smaller and more resilient station”, underscores Bianco. In other words, Matera is sending out a strong signal about Italy’s contribution to space research, as those who will be visiting the city next year will most likely realise. “We will work with the Capital of Culture by building a space citadel, including a planetarium and a public astronomical observatory”, concludes happily the director. And with good reason, too, for the future is already here. 🇮🇹

Matera’s renown in Italy and worldwide rests essentially on its artistic charm, the awesomeness of The Sassi. A renown that is likely to increase significantly in 2019, when it becomes the European Capital of Culture. However, Mate-

ra has already taken centre stage nationally and internationally in a less known but equally important area: studying earth using satellite instruments. It is the place where the Space Geodesy Centre was first established in 1983, currently run by the Italian Space Agen-

cy (ASI): it started off under a co-operation scheme between the CNR and NASA with an initial satellite laser telemetry station, and it has since grown into a small giant. Its growth is not just related to size—the Centre employs 150 people including researchers and operating

staff—or later technologies installed, but, more importantly, to the key role it plays in some crucial geodesy sectors. “Today, our Centre is one of the very few core stations of the world’s geodetic network and since 2004 it has been responsible for combining satellite laser tele-

# Aircraft noise: an emerging environmental issue



These projects are funded by the European Union



*The European Union is investing in interesting integrated projects*

The noise produced by civil aircraft can cause big problems to citizens, because these noise emissions feature complex spectrum-related characteristics, which make it hard for us to get used to them. People living close to airports (which are currently experiencing a local boom, owing to the commercial strategy of low-cost flights) perceive these noises as a real nuisance and the number of people suffering from different types of problems caused by aircraft noise is on the rise.

The European Union is addressing the issue with an integrated programme of measures that involves considerable investments in scientific and technological research, which is arousing great interest around the world. The Aeronautical Engineering research group at the Engineering Department of Roma Tre university actively takes part in the programme, participating in many research projects. It is partner, among others, of three projects funded under the Horizon 2020 research and innovation programme that deal with the aircraft noise problem from different, but complementary, standpoints: ANIMA (Aviation Noise Impact Management through Novel Approaches, no. 769627), ARTEM (Aircraft noise Reduction

Technologies and related Environmental iMPact, no. 769350) and AERIALIST (AdvancEd ai-cRaft-noIse-ALLeviation devIceS using meTamaterials, no. 723367). "ANIMA is the one that aims at improving the quality of life of communities living in proximity of airports by mitigating the impact of perceived noise in psycho-acoustic terms, while ARTEM focuses on the integration of highly innovative technologies on aircraft, to be implemented from now to 2050. AERIALIST is a fundamental research project and focuses on the use of metamaterials for the development of highly innovative technologies that can reduce noise radiation," says Professor Umberto Iemma, responsible of the projects for Roma Tre. "We act as liaising agents between the field of project design/technological development and the field that assesses the impact on citizens and devises sustainable air transport solutions. ANIMA includes an ambitious project: creating planning tools that take into account the perceptible aspects of the individual ci-



FROM LEFT LORENZO BURGHIGNOLI, FRANCESCO CENTRACCHIO, GIORGIO PALMA, UMBERTO IEMMA, MONICA ROSSETTI, ILARIA CIOFFI

tizen, which may also be used by non specialists. It is therefore necessary to consider the entire stakeholder chain, involving politicians, land planning authorities, airports' management and airlines. The first two projects both feature a broad partnership: 22 partners for ANIMA and 24 for ARTEM, for a budget of € 7.5 million each. A smaller group, coordinated by Roma Tre, is working on AERIALIST. It is a fundamental research project that attempts to adapt a concept that is relatively consolidated in environmental acoustics to the sphere of aeronautics. It comprises all the validation activities a researcher could possibly want: from theoretical development to the actual manufacturing of the materials and the final tests in the wind tunnel." 

# The future of industrial security



*Cybersecurity expertise within critical infrastructures*

The future of cybersecurity in the industrial arena is somewhat dependent on the design of devices that can intercept and block cyber attacks against control systems. This can be achieved by relying on appropriate methods that can identify the accuracy of the inputs given to the systems from both a syntax and semantic perspective. "These systems have not yet become widespread among industrial environments, but they surely will in the next few years. In fact, this is an area we have been addressing for quite a few years..." Professor Stefano Panzieri is the head of the MCIP Lab (Models for Critical Infrastructure Protection)

of the faculty of Engineering of Roma Tre University. Leading a pool of about ten experts, he has been dealing with critical infrastructure security for some time, including as part of major European projects. For example, the device mentioned earlier is one of the goals of a project named Atena, an H2020 € 6 million worth endeavour that is reaching completion, with the experimental phase pending finalisation at the Israel Electrical Corporation. The project is coordinated by Leonardo - Finmeccanica, and technically by Professor Panzieri. "Atena will act as a trailblazer for this type of devices. Some manufacturers have started to come up with proposals, al-

beit only feebly, even though the market is not yet demanding such an approach. But it will soon have to, for this is the future of industrial cybersecurity..." In addition to Atena, operations (including European operations) at the Roma Tre laboratory are proceeding at a fast pace, one project after the other. "We are part of a very new project related to critical infrastructures, except that, this time round, it involves telecommunications", explains Panzieri. "In particular, it relates to the security of telecommunications providers. At the same time, however, we are also involved in areas such as smart buildings, all industrial IoT-related matters, energy diagnosis..." 



THE MCIP LAB TEAM

# THE ITALIAN SPACE AGENCY

Founded in 1988, ASI is a government agency supervised by the Ministry of Education, University and Research; it also works in cooperation with other ministries. In less than two decades, ASI has become one of the leading players in the world scene of space science and satellite technologies; it has also contributed significantly to the development of systems aimed at reaching and exploring the universe. Nowadays, ASI is playing a key role both at European level, where Italy is the third cooperating country of the European Space Agency, and worldwide, representing the sixth

space authority. From the fundamental questions about our understanding of the universe and the origins of life up to space exploration and testing of new technologies, now, more than ever, space appears to be the place from which to extend our cultural boundaries and ensure a better future on Earth. Nowadays, however, space is no longer just a vast field of research; it is also an excellent economic opportunity. Since the new space economy is constantly expanding, ASI's goal is to enable Italy to respond to these new challenges.

## ITALY'S CONTRIBUTION TO THE ISS

Thanks to the Italian Space Agency, Italy has greatly collaborated in the construction of the International Space Station (ISS). Following an agreement with NASA, Italy has supplied three MPLM logistic modules, known as Leonardo, Raffaello and Donatello, earning, consequently, the access to six flight opportunities for ESA Italian astronauts, namely, 3 short-term missions and 3 long-term ones. The Leonardo module, modified to become a permanent module, the PMM, along with the European modules (Node 2 and Node 3), the Cupola and part of the Columbus laboratory, all

built in Italy by Thales Alenia Space-Italy and financed by the Italian Space Agency, make up 50% of the ISS habitable volume. Five Italian astronauts have been aboard the ISS. Umberto Guidoni has been the first European astronaut to visit the ISS, then Roberto Vittori (three missions), Paolo Nespoli (three missions), Luca Parmitano and Samantha Cristoforetti (1 mission each one). Italy has carried out about one hundred scientific experiments on board of the ISS and has two ground centers, namely, ALTEC in Turin and Kayser Institute in Livorno, for scientific support.



An electronic infrastructure for managing the life cycle of research on Earth sciences: namely, a virtual environment that supports researchers from the very beginning of their research to the final publication. That's the underlying purpose of the EVEREST platform, part of the H2020 project bearing the same name, devised by a European pool that works under ESA coordination (European Space Agency). The basic idea of the project is that of putting scientists at the centre of the project, helping them narrow all sorts of technological gaps. EVEREST provides the stakeholders with all the services necessary to fulfil their research activities and to preserve and share both scientific data and processes. The user interface, its services for data detection, cloud access and processing are the result of almost 15 years of research and development in the field of Earth sciences: electronic research services are now integrated with latest-generation technology to manage the life-cycle of research, pursuant to the FAIR data principles (to make data findable, accessible, interoperable, reusable) of the European Open Science Cloud (EOSC). "The project will end in September, but the platform is already



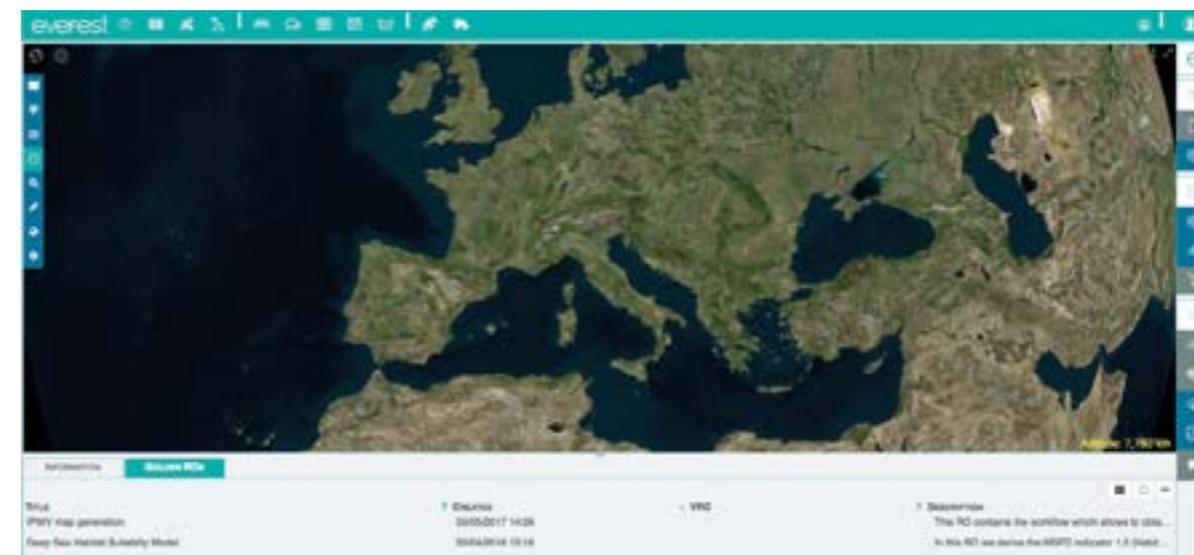
## An open and reproducible science

*A virtual infrastructure that constantly supports researchers in every moment*



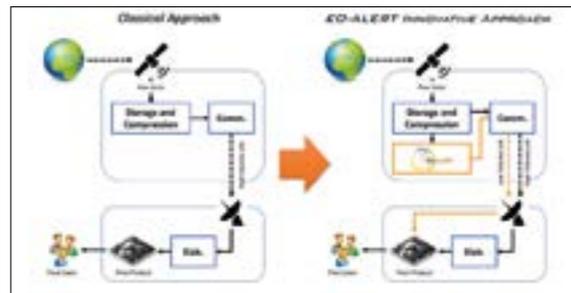
operative and being used," says Dr. Mirko Albani of ESA/Esrin, coordinator of the project. "Now, however, once we have fruitfully achieved the project goal, we have another target to pursue: to ensure that the platform will keep on running and be available even after the EU ceases to fund the project." Dr. Albani and his team are therefore working on a business model that is to become su-

tainable, with new partnerships with external stakeholders also playing a role: "throughout the project we have worked with four specific user communities. We are now trying to get more communities involved, including from sectors that are not related to Earth sciences, because the platform can be used for several purposes in a number of fields...". EVEREST platform: [ever-est.eu](http://ever-est.eu)



## The satellite processor *Working on data directly on board*

Earth-observation satellites produce huge amounts of data, which then of course need to be processed. This usually happens on the ground, but what if this operation were carried out directly on board the satellite itself? Results would be more immediate, thus more useful. To be able to do this, we need to come up with an



LEFT: TRADITIONAL APPROACH  
RIGHT: INNOVATIVE EO-ALERT APPROACH

architecture of small-scale hardware and software solutions for the powerful on-board processing of data. This is the subject of the EO-ALERT project, an H2020 initiative that got under way in January of this year thanks to global funding of 4.7m euro. The project is coordinated by Spain's DEIMOS Space, and involves the partners DEIMOS Imaging, DLR (Germany's Aerospace Research Centre), the Technical University of Graz, Turin Polytechnic and OHB Italia Spa. "We deal with the hardware part, designing the system", explains Riccardo Freddi of OHB Italia, "other partners do the rest: software, algorithms (radar and optical), on-board communication, and so on". The various partners will work in groups for two of the three years of the project, before pooling their efforts and creating a prototype. "We are still not at a technological level such as be able to create a product that is market-ready: the aim is to reach a point at which we will have a sound base for developing a marketable product, requiring as few changes as possible...".



## The aircraft of the future

*AGILE: new-generation collaborative aircraft design*

Modern transport aircraft are now designed through collaborative and multidisciplinary processes. The challenge is to effectively put together the various skills supplied by specialist teams coming from different subject areas and often located in different nations. The EU-funded AGILE project ([www.agile-project.eu](http://www.agile-project.eu)) is developing a new generation of processes to improve aircraft design, seeking to cut development costs and the time taken to enter the market of innovative and sustainable products. Coordinated by DLR of Hamburg and involving 19 partners, including corporations, universities and research centres from Europe, Canada and Russia, the project seeks to speed up the collaborative de-



velopment of aeronautical products, with the target of a 40% reduction in time needed to develop complex, multidisciplinary systems. Italian partners - the University of Naples Federico II and Turin Polytechnic - are providing their experience in aircraft design, alongside the company Leonardo. "The results of the project will help to optimise the supply chain of the whole aeronautical industry, offering lower operating costs", explain Pier Davide Ciampa (DLR, Institute of System Architectures in Aeronautics, Hamburg), Fabrizio Nicolosi (Naples University) and Marco Fioriti (Turin Polytechnic). AGILE is winner of the "ICAS Award for Innovation in Aeronautics" 2018.

DANIELE VIOLATO (PROJECT OFFICER INEA) AND PROJECT COORDINATOR PIER DAVIDE CIAMPA (DLR)

## Italian excellence for the space industry

*MEC: integrated circuits and modules for space technology*

The region of Emilia may be said to be the brains behind "Atos", a Horizon 2020 project that kicked off a few months ago and that has the goal of creating a new-generation module for earth-observation radars. The most advanced technological part of the project - seeking to integrate a number of functions in a single chip, the heart of the transponder on board the satellite - is being handled by MEC (Microwave Electronics for Communication Srl), a Bologna company founded in 2004 as a spin-off of the Universities of Bologna and Ferrara, supplying the know-how from university research centres

in the sphere of microelectronics for the telecommunications sector. "This new generation of radars is ambitious in terms of image resolution and quality, thanks to the new technology being used that we have developed and mastered", explains Giorgio Mariani, managing director of MEC. Why has his company joined a project like this (coordinated by Thales-Alenia Space, which also sees the University of L'Aquila involved as a partner)? "We are an unusual firm in Italy", says Mariani, who was head of Thales space division for southern Europe before

going on to establish MEC: "We design and develop highly integrated microwave integrated circuits for use in the space sector. Normally this activity is performed by the same foundries that possess production technologies. We are therefore a unique centre of excellence that is recognised as a leading company in the sector in Europe. Production is entrusted to UMS, a Franco-German foundry, of which MEC is the official design house. Space is MEC's core business, however the experience and know-how acquired in that sector enables us to branch out into other areas that require the same skills, such as military and civilian telecommunications". Having these technological capabilities, in recent years the firm has taken part in around twenty European projects, and has often been a partner of ESA ("ESA sees us as a key partner for space projects", Mariani stresses) as well as Finmeccanica in the radar sector.



GIORGIO MARIANI

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# The global market, the new frontier

*Viasat's watchword is 'diversification' in the pursuit of new businesses and new distribution channels*

“I found the company I was expecting to find: innovation-minded, in the forefront, driven by ambitious growth objectives. I found the conditions required to lead the Group towards globalisation.” This is how Valerio Gridelli, CEO at Viasat S.p.A., a company of the Viasat Group, briefly commented on the last two years spent with the Italian leading company engaging in the telematics industry. Viasat has been operating in the LBS (Location Based Services) market for thirty years, during which it has managed to strengthen its innovation drive, with the widespread distribution and support network across the national territory also playing a role to this end. Numbers at the Viasat Group show an increasingly international focus: more than 2,100 installation centres, 1,500 of which are Viasat Assistance centres, 11 offices deployed in Europe and South America, 6 company-owned operations centres, 2 in Italy (Turin and Rome) employing 150 operators, 1 in Romania, 1 in Poland, 1 in Belgium, 1 in Bulgaria and 30 outsourced across Europe, Africa and the Middle East. A vibrant growth that Gridelli relates to one single watchword: diversification. “Historically, Viasat has been experimenting new distribution networks and searching new businesses”, says Gridelli. For example, one of the most recent agreements reached is the one entered into with TIM. “We look to the future, but we are ready to reposition ourselves on the retail segment if the market so demands. During the past few weeks, this partnership has enabled us to distribute our products in the 220 4G retail stores located in as many shopping malls across the country”. Another market in which the Company has gained market share is waste management, where has been operating for the past few years through Datamove, a Viasat Group company. During the past few weeks, Anthea, a Latina-based company also joined the Group building the first environmental ERP.” This has allowed us to develop a unique solution addressing all the needs of the companies supplying urban hygiene and waste collection services.” Group-wide, connected vehicles total about 700,000, including fleet, insurance and car connect, while revenues in 2017 stood in the region of € 70 million. Can things get better? “Absolutely”, states reassuringly Gridelli. “Each ye-



VALERIO GRIDELLI

ar, we invest more than € 2 million in development and innovation. We are one of the rare examples of Italian excellence as rather than give in to foreign competitors, we win them over by exporting our history and our best practices.” At present, the Viasat Group delivers its solutions to more than 50 countries. How does it fare against competition? “What sets us apart from competition”, states proudly the CEO, “is our ability to stand by our customers from start to end. We are the only company that designs, produces and markets its own solutions, delivers services and provides support through its operations centres around the clock.” However, the new frontier under Gridelli’s stewardship implies targeting a global dimension. “After taking a leadership position in Europe, we aim at becoming a key player on the global scene. History tells us we are innovators. Together with our chairman, we are devising a strategy to reach this goal in the shortest time possible.” After all, as the Group’s founder loves to say, “A dream will remain a dream, until you decide to make it happen.”



THE WORK TEAM

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SOFTWARE



## Lots of space for software

*Products for modelling, simulating and validating satellite systems*

After nearly fifteen years’ experience and an innovative product (the software “SaVoir”) sold to space agencies all over the world, at the end of last year Rome-based company Taitus obtained funding for a project forming part of the H2020 “EIC (European Innovation Council) pilot” programme, of which it is the sole beneficiary. “Hermes” (High Efficiency Real-time Multithreading Engine for Space applications) is the name of the project, whose aim is to bring up to a new technological and commercial level a software that has been developed by the company over about ten years, concerning the modelling, simulation and validation of satellite systems. “This is a very important recognition for us, bearing out the validity of what we have been doing, and specifically of our product”. Felipe Martin Crespo is understandably pleased: after years collaborating with ESA (European Space

Agency), in 2004 he founded Taitus, and since then has worked with the company’s staff on cutting-edge software in the space sector. “It is an important moment in time”, Crespo stresses: “space technology is going through a boom period, attracting a lot of investments also from the private sector, in every corner of the globe, from Silicon Valley to China. The various companies involved need

to create their own infrastructures, and they need software to do simulations or perform other services. And for them it is very convenient to come across people like us, who can already provide them with such software, with no fuss. This enables us to offer extremely interesting solutions to an ever broader client range, who may be space agencies, corporations building satellites or working on satellites already in orbit, even companies acquiring satellite data”. “Hermes” will help further in this direction, helping to finance not only technological enhancements to the product, but also the communication and marketing activities needed to promote it, and the creation of a sales division that can market it all over the world, through trade fairs, direct contacts with clients and sundry events.

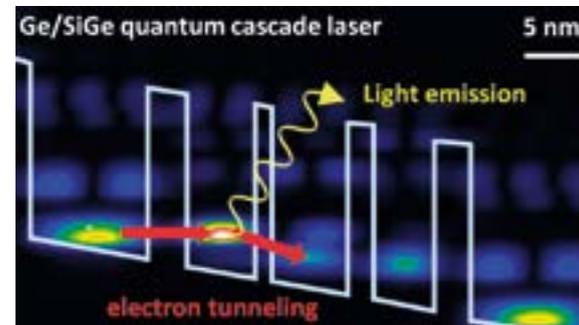


## Light from silicon

*A multipurpose laser equipped with innovative features*



The recently launched FLASH project is aimed at creating a new type of silicon-based laser. The project is funded by the EU with a FET-OPEN H2020 grant (G.A. 76619), is coordinated by the Roma Tre University and relies on the support of major European par-



The working principle of the FLASH laser, consisting of about 100 repetitions of the structure reproduced here: about 100 photons are generated from a single electron

tners that have gained extensive experience in basic as well as applied and industrial research. FLASH sets out to build a prototype of a laser with far infrared emission by exploiting the quantum properties of electrons confined in hundreds of very thin nanometric layers made of silicon and germanium that produce wells and barriers for the electrons. Silicon is the basic material used in most electronic devices currently available on the market; integrating this new device into the well-established microelectronic technology is one of FLASH's innovation challenges. This technology will allow the laser developed by the FLASH consortium to be compact, low-priced and usable at room temperature, the latter being a key driver for large-scale use. "We are endeavouring to build a prototype that can be applied to different fields, from security, i.e. detecting weapons and explosives, to medical diagnosis, especially in relation to skin cancer", explains project coordinator Professor Monica De Seta.

## Self-powered automotive sensors

*Transforming vibrations into electricity with innovative technology*



Miniature wireless sensors - powered by energy harvesters - linked to cars help to recover "waste" energy and recycle it into electricity within a vehicle's life cycle. Instrumentation able to run on mechanical energy (the kind released from vibration, for example) but also on pyro- and photoelectric, or hybrid systems. A detailed H2020 project called "Enhance" (www.itn-enhance.com) has set itself this objective, and a number of European academies are working together to make it happen. Lead partner is the University of Franche-Comté, coordinated by professor Ausrine Bartaszyte, and numerous other partner organisations. End user will be Peugeot, who has the job of testing the sensors in three years' time. Another project partner is INSTM (Italian inter-university consortium for material science and technology), working from the local unit at the University of Catania. "Given our long-lasting experience in the field, we are dealing with the chemical and material science aspects of

the project," explained professor Graziella Malandrino, who is coordinating the local team, with the assistance of her colleague Guglielmo G. Condorelli. "In particular, our activity is focused on the preparation of precursor compounds and the subsequent deposition of lead-free films which will be the active materials in these innovative sensors."



INSTM-UNICT TEAM

# A new infrastructure to understand the dynamics of planet Earth



*A European consortium is being created in Italy to manage and make available Earth science data and products*

In order to deal with the natural events that characterise the dynamics of planet Earth - earthquakes, volcanoes, tsunamis, and so on - the scientific community must be able to share high-quality data and products from observation systems located in different countries - monitoring networks, laboratories, observatories, satellites. This appears to be a straightforward consideration, yet the process involved is complex, as it requires the involvement of different scientific communities from different nations, which over the years have developed different standards and ways of curing and sharing data. The challenge of integrating data has fallen to EPOS, a long-term EU initiative coordinated by Italy through INGV, with the participation of 25 countries. EPOS, funded through two successive European projects, is building



a new research infrastructure in order to better understand the dynamics of planet Earth. "The first goal is to make available the data produced by observation systems and the services needed to manage them, for scientists and other stakeholders", says Massimo Cocco of INGV, the project leader. "Observation systems have been in place for a number of years in different countries, but data have not always been accessible, or they have not been fully

integrated. EPOS, working in synergy with scientific communities, has created a multidisciplinary ICT platform allowing open access to data and services generated by observatories located in different nations. This will allow many scientists from different fields to develop new scientific products". The second goal is to create a legal entity: a consortium to be called EPOS-ERIC, based in Italy at the INGV, which will coordinate the infrastructure's activities. The consortium will become operational in 2019, and in 2020 data and services will be opened up to users. Italy is also contributing to the initiative through a Joint Research Unit involving public research bodies and Universities. "This is a great challenge", Cocco concludes, "namely having to guarantee access to high quality data and their mindful use on the part of a broad user community".



# Nanotechnology interdisciplinarity

*An association has been active over the past few years to foster the dialogue among different stakeholders*



The development of nanotechnologies implies considerable interdisciplinarity among different systems, something that may not be always available in the academic and industrial world. In an effort to promote the dialogue between the different industry stakeholders, in 2015 a group of experts consisting of university teachers, researchers and scientists founded the NanoItaly Association. Undoubtedly, the most impressive result attained by the Association is the 'NanoInnovation' conference, the third edition of which will be staged in Rome in September following an agreement reached with the Italian Industrial Research As-

sociation. "Now we need to look ahead", explains Marco Vittori Antisari, former research executive at ENEA and chairman of the Association since its inception. "We are considering expanding the Association reach to include training events, since we are aware of the skills available across the country and we are able to assess the requests coming from the production system, considering, among other things, that this sector may also have a significant impact on employment. During these initial years, the Rome conference has kept us fully busy, but we hope we will also be able to engage in training events starting from 2019."



## NANOTECHNOLOGIES ARE HERE TO STAY

**From 11 to 14 September,  
Rome will host the third edition  
of NanoInnovation**

*Dates which are surely worth adding to one's calendar. From 11 to 14 September, the Sangallo Renaissance Cloister of "La Sapienza" University in Rome will play host to the third edition of NanoInnovation - Conference and Exhibition, organised by Airi and the NanoItaly Association. Following the outstanding outcome of the past two editions, the event has now become the key initiative nation-wide for the increasing number of stakeholders who engage in research applied to nanotechnologies. Industries and universities, research agencies and governmental institutions: the relations and contributions arising from the conference (where national and international leading personalities are expected to turn out) will most certainly provide some crucial insights to all of them. "The goal is to take stock of the state of the art of applied research and innovation as related to nanotechnologies - underscores professor Marco Rossi of La Sapienza University as well as NanoItaly Deputy Chairman and member of the organising committee - and help the debate among the different areas of application, promoting exchanges between the research and industrial environments." The detailed schedule of the event is available on [nanoinnovation.eu](http://nanoinnovation.eu) website.*



# Silicon carbide powering sustainable mobility

*The challenge of a European project promoting the "value chain" between component manufacturers, research bodies and end users*



The objective of the "WInSiC4AP" project is to develop innovative and reliable technological instruments based on silicon carbide to create efficient, lowcost applications. Silicon carbide technology (SiC) has characteristics that make it preferable, in perspective, to the current silicon or gallium nitride technology. SiC, for example, can work efficiently and with piloting capabilities at temperatures up to 200°C, meaning lower weight and higher performing components: a significant contribution to driving a potential revolution in the key sectors targeted by the project (applications for electric vehicles, train, aerospace and defence systems.) Several challenges remain to be overcome regarding key issues like the driver gate, packaging, design and auxiliary

devices. The WInSiC4AP project is one of the first examples of the technical and scientific integration of two financial mechanisms, one is European (funds from the ECSEL JU programme) and the other all-Italian FESR funds from the Italian Ministry of Education and Universities: this characteristic explains how the project can count on such important funding - to cover part of the about 30 million euro of the research costs - , and the many projects partners involved - (twenty in total covering four different Countries, and coordinated by the Sicilian Micro and Nano Systems Technological District). "After the first year, which was devoted to defining requirements (voltages, currents, weight, dimensions and other characteristics of the new components to be pro-

totyped) we are now commencing the second part," explained project coordinator, Leoluca Liggio. "The key innovative technological components will be packaging, PCB production methods, and discrete passive and active components based on silicon carbide which will underpin the development of applications for the targeted project sectors." The approach taken to the project is also innovative: "First and foremost, the emphasis on the value chain, at the European level, through the close collaboration that we encouraged in the project between manufacturers, end users, laboratories and research bodies. Then there's the synergy, within a single project, between two programmes which come together in the end results and outcomes: the first programme funded by ECSEL JU and the other entirely by the Italian Ministry of Education and Universities, which made it possible to practically double the resources available." Ten of the project partners are Italian and considering that some are consortiums of universities and organisations, the impact on the country, through the research bodies and small and medium enterprises involved, is significant.



## The future of graphene

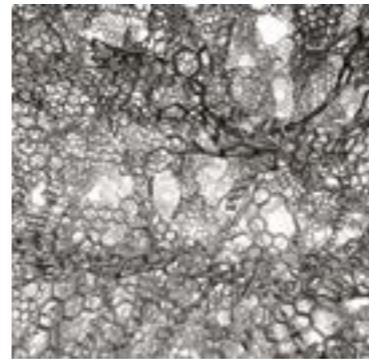
*A complex research project opens up new horizons for applications in the energy sphere*

How can graphene be used within the framework of new technologies? The answer is: in a host of ways. Researchers have been engaged for years in “Graphene Flagship”, one of the ongoing projects of the FET call for emerging technologies. It is one of the most significant European initiatives in terms of budget, with an investment of roughly 1 billion euros, and the number of persons involved (150 research groups from 23 countries). Of these, the CNR’s Istituto Nanoscienze (NANO) has been present from the very outset, involved in studies on the use of graphene in the fields of optoelectronics

and renewable energy. “Our research has been conducted over a number of phases. As often happens, applications emerge during the course of studies that differ from what we initially expect”, explains Valentina Tozzini, local head of the energy applications sector. Research focusing initially on materials for the storage of hydrogen indicated that the potential of graphene in this field is still relatively far from the construction of a prototype. The work going on at NANO has however received further funding, with studies now aimed at designing graphene sponges having controlled porosity, a property that is useful



for other applications in the energy sector, in particular for batteries and super-capacitors. 



COMPUTER MODEL OF NANOPOROUS GRAPHENE



## Concrete eco friendly

*Projects to find materials that have less impact on the environment*

The European Commission is deploying funds through the Horizon 2020 programme to test new construction materials - cement and coatings that are more environmentally friendly.

One recent project, which started in January 2018, is called “EnDurCrete”, Grant Agreement 760639. It is coordinated by the German corporation HeidelbergCement and includes Nuova Tesi System S.r.l., a Grigolin SpA company, as one of the partners focusing on industrial and commercial prefabricated structures.

“The main objective of the project,” Marco Nucci, coordinator for Nuova Tesi, explained, “is to develop a new low-clinker cement with lower CO<sub>2</sub> emissions and incorporating industrial by-products, including nano-particles with anti-corrosion properties. The underlying idea is to develop solutions able to with-



stand aggressive environments; as a result, current testing is looking at applications in special environments, such as an oil&gas platform, a tunnel, a dock, the piers of a bridge.”

This is not the Venetian company’s first experience of this kind. “We are working on three EU projects at the moment ([www.veep-project.eu](http://www.veep-project.eu), [www.ecobinder-project.eu](http://www.ecobinder-project.eu), [www.endurcrete.eu](http://www.endurcrete.eu)); these are important opportunities for us, both to learn about different contexts from our own and to anticipate developments in the prefabricated market. Moreover, these are high-value environmental projects: it is only right that operators in this sector, like ourselves, try to improve the environment...” 

# Experts of materials used under extreme conditions

*A European network will provide services to those who work with these particular materials*



Since the last years the European Union is seriously addressing the issue of raw materials considered critical due to economic and geopolitical reasons. Such materials include also many materials that operate under conditions defined as “extreme”: namely, materials that are subject to particularly challenging conditions, owing to a number of reasons (temperature, wear, loading, friction, corrosion...). These conditions are commonly reached in several technological and productive sectors, ranging from transport to machining, from construction to energy. The “EXTREME” project, funded by the European organisation EIT Raw Materials, is coordinated by the ENEA Research Centre in Brindisi and includes nine European partners, aiming at creating a network of bodies with great expertise in this field, capable of supporting enterprises, industries, universities or research agencies operating in the considered technological areas. “The network originates on materials classified as critical for the EU, but expertise and the advanced facilities provided by the partners go beyond, creating a network supporting the efficient use of materials more broadly in the sectors of interest”, says Daniele Valerini, the project coordinator. The network is already operative, providing an array of services that may be even tailored to the customers’ needs: support in the design, development and production of materials and components, their characterization and functional testing, the recovery and recycling of the materials, just to mention a few examples. During its first three years of operation, the project has been promoted at European level, also organizing specific events and initiatives. “In December 2018, the funding period of the project will come to an end,” Dr. Valerini adds, “but the EXTREME network partners’ goal is to carry on providing support and offering advanced high-level services by relying on their expertise and cutting-edge infrastructure”.

Further information and contacts are available at: [www.network-extreme.eu](http://www.network-extreme.eu), [daniele.valerini@enea.it](mailto:daniele.valerini@enea.it). 



DANIELE VALERINI



# We need to foster research

## *Giorgio Parisi*

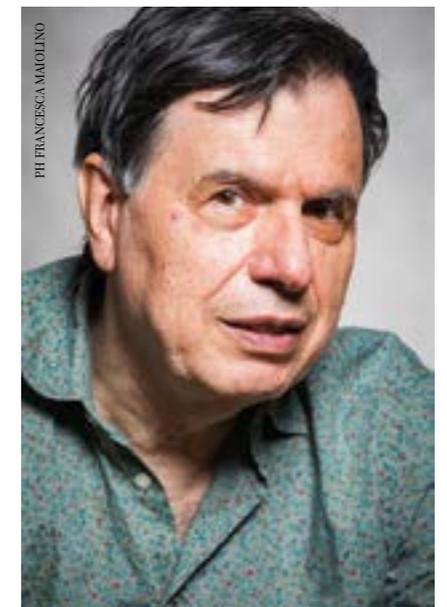
How is Italian research doing, particularly on a scientific level? What is the current state of the art? The following pages will tell you about projects and professionals who are holding high the banner of our research, often coordinating – or, at least, participating in – major European projects. Yet there is always someone ready to highlight the weaknesses of our system. Among them is Professor Giorgio Parisi, one of the most esteemed scientists in the world, professor at La Sapienza university in Rome and for years the only Italian physicist (together with Carlo Rubbia) appointed as a member of the United States National Academy of Sciences and currently coordinator of an important H2020 project called LoT-GlasSy, which studies the properties of low temperature glassy systems. He has never been one to mince his words.

“Let’s start from the foundations, namely, the things that are actually working well,” Professor Parisi says, “some very good research is being carried out in our universities, we often take part in major projects and we train competent PhD graduates. And that’s where the big problem, inevitably associated with money, shows up: considering the renowned shortage of funds, many of our young brilliant scholars are forced to look for jobs abroad”. Hence,

the well-known ‘brain drain’ issue is by no means a fantasy... “I can give you a few emblematic examples. A couple of months ago, a prestigious institute in London published an international call for tenders for six researchers. Hundreds of young scholars from all over the world applied. Well, the top six were all Italian... Let’s move from the UK to France. Let me point out that at the CNRS (the French equivalent of our CNR, centre for national research), 37% of researchers are Italian, who actually outnumber the French themselves.”

We clearly need to reverse the trend... “Following the law of 2008, which cut university funds by 20%, no measure has been introduced to turn things around, as a result of which the situation has virtually remained unchanged. It’s probably a cultural problem, especially if you consider that very few of our government officials and MPs have a scientific background”. How can we change this state of affairs? “The entire research sector should raise its voice, and not only the academic sector, but also the industrial one, the one that crucially relies on innovation. Research features a huge amount of small and large agencies and bodies, scattered throughout the regions.

We should try to sort them out and reorganise everything in an orderly way, setting up common proce-



dures. The institution of a national agency for research was suggested some time ago: that would be a way to fund research with no waste. But then again, it would need reliable funding.”

## Recovering languages

*A new digital tool to preserve the Walser dialect*

Languages die out if they are not spoken. This obvious statement was the starting point of an original PRIN (national interest research project) developed at the University of Turin - Department of Humanistic Studies. The project is called "ArchiWals" and it entailed setting up a website and a digital platform that allow everyone to look up a dictionary—featuring terms and pronunciations—of the dialect spoken by the Walser community, which is very common in the area between Piedmont and Val d'Aosta. "This tool is extremely important for research, but it is also useful for the younger local generations as it allows them to retrieve forgotten words. In turn, this can help spark a virtuous circle for the recovery of tradition", says Professor Livio Gaeta, coordinator of the project. His team's work actually goes even further: the creation of a European universities network for issues that are common to linguistic minorities in the Alps will be discussed at the upcoming SLE Congress, to be held in Tallinn in late Au-



FROM LEFT MARCO BELLANTE (RESEARCH ASSOCIATE), RAFFAELE CIOFFI (RESEARCH ASSOCIATE) AND LIVIO GAETA

gust. "Combining this basic research with the most advanced computational linguistic tools can lead to great results," Prof. Gaeta added, "it is not by chance that, starting from the platform we created, a start-up company was set up as a spin-off of the project, and it has already received funds from a Milanese incubator...".



## New synergies between human and the environment

*How using our hands shapes brain and behavior*

Hands allow to act and use instruments to alter the environment or create new shapes. Considering that hand usage shapes brain and behavior, what would happen if rather than using our hands we could be directly connected to the tool and operate through it? "Robotic surgery currently relies on a complex technology that allows to transfer the natural movement of the hand to the instrumen-



VIVIANA BETTI

ts and perform robotic-assisted maneuvers with extreme accuracy and control", explains Dr. Viviana Betti from the Department of Psychology, Sapienza University of Rome, PI of 'HANDmade' project funded by ERC. "Our goal is to apply this principle to everyday tasks using virtual reality", continues Dr. Betti, "and investigate how replace our hands with instruments contributes to modify the topography and



dynamics of connections between brain neurons by means of functional neuroimaging studies. The same studies will be also performed with amputees." Dr. Betti is also director of BrainTrends, an Italian company specialized in applied neurosciences and technologies created by the visionary insight of Dr. Enea F. Pavone, who recently passed away. BrainTrends is leader in the creation of new technological solutions for the industry and research and in building own-brand products marketed in Italy, Europe and even the United States.



## Jurists and the Roman Law

*A "revolutionary" collection bringing to modern readers the texts of individual jurists included in the Justinian "Digesta"*



European Research Council  
Funded by the European Commission



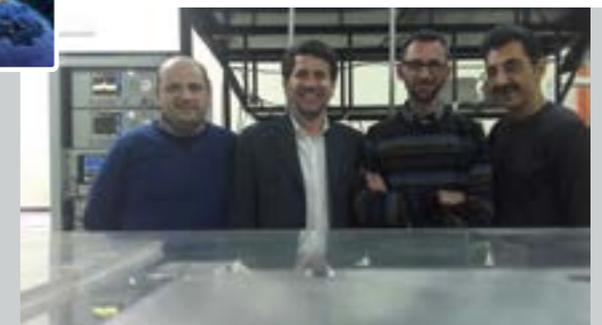
Roman law is based chiefly on the Digesta, or Pandects: a part of Justinian's Corpus iuris civilis (6th century A.D.), which contains, in code form, a broad collection of texts written by Roman jurists that lived in previous centuries. Yet in the history of law, no one has ever studied these individual works. This shortcoming is about to be remedied with the results of the project "SIR - Scriptorum iuris Romani", an ERC Advanced Grant project, hosted by the 'Dipartimento di Scienza Giuridiche', University La Sapienza, coordinated by professor Aldo Schiavone (author of "The invention of law in the West", Einaudi, 2017, and "Pontius Pilate. Deciphering a memory", Einaudi 2016), who has coordinated the activities of a group of around thirty Italian and European colleagues in order to create an unprecedented collection of works, translated, with comments and extensive introductions, of the first Roman jurists, ordered by author and by work. "Before the time of late antiquity, law had been a creation of the jurists, not of the State" Schiavone reminds us, "and the political-juridical form of a global empire was built on their writings". The collection begins with a look at Quintus Mucius Scaevola, a 1st century A.D. jurist of the republican era credited with overseeing the creation of juridical thought as a science. The collection, published by L'Erma di Bretschneider, has the goal of publishing around 20 volumes. It is also hoped that a pool of universities will be able to take up the reins when the EU funding will run out.



## The new mercury thermometer

*A novel method to implement the new kelvin*

By the end of next November, the 26th congress of CGPM – the international weights and measures body – will give a new definition for four of the seven basic units of measurement (kilogram, ampere, mole and kelvin), based on recent determinations of the key physics constants. The research group of the University of Campania "Luigi Vanvitelli", coordinated by professor Livio Gianfrani, has been studying the question for years. Today he is in charge of a PRIN project (with the participation of Turin-based INRIM and CNR's Florence-based National Institute of Optics), which seeks to develop an experimental method for implementing the new kelvin, the fundamental unit of thermodynamics. "The new definition is based on



LEFT TO RIGHT, ANTONIO CASTRILLO, LIVIO GIANFRANI, LUIGI MORETTI, EUGENIO FASCI



the Boltzmann constant", Gianfrani explains: "We shall observe a spectral line in a monoatomic gas, mercury. We are the world-leading group in the development of the primary thermometric method based on Doppler broadening of a spectral line. The great novelty is the UV observation of the effect. We will retrieve the thermal energy from the shape of this line. Thus the project is innovative not only in terms of metrology, but also on account of the observation of the spectrum of mercury vapours".



The GPPbest Life project is coming to an end. It started in 2015, coordinated by the Basilicata Region in Italy, with another two Italian regions as partners (Sardinia and Lazio) along with the Romanian Environmental Region and technical partner, Rome Ecosystems Foundation. The aim is to promote the sharing of “green procurement” (aka GPP, Green Public Procurement) experiences, regulated in Italy (the first country in Europe) by a specific action plan, dated 2008. Instruments are made available to local governments to change consumption habits and bring real change to the market - for example, by choosing organic produce for communal dining halls, paper from certified forests, or energy from sustainable sources. As a partner of the project, Basilicata offered to act as coordinator because, with respect to the other two regions involved, it was the one with the most ground to make up in terms of planning green procurement (Sardinia was one of the first European regions to address the issue): the Region’s aim was to construct and approve a green procurement plan, which

# Green procurement, experiences and objectives

*The Basilicata region recently led a Life project which is currently winding up*

was achieved thanks to the special approach taken. “In Basilicata, the project was coordinated by the Planning and Finance Department rather than the Environmental Department, as happens in other regions, and it worked hand-in-hand with the Single Tendering Station in Basilicata as part of the broader eco-reconversion of the local authority,” underlined Elio Manti, general manager of the same programming depart-

ment. “and this allowed us greater integration of procedures between sectors.” Worthy of note is the strong relationship with the territory, and in this regard the last official action in the project was a public conference held on 25 May in Matera, European City of Culture in 2019. Before an audience of 100 guests, the conversation turned to how green procurement would be organized, in view of this important international event. 🇮🇹

# From Calabria to Europe

*APRE rewards the best Italy info-desk*



Europe calls, Calabria responds by proposing innovative products that meet the societal unmet needs.

It happened inside the SME Instrument call for proposal, launched as part of Horizon 2020, that support companies from the feasibility study of an innovative idea to the internationalization of the products.

The Fincalabro help desk, called APRE Calabria, aims to increase the quality of proposal submitted in H2020. APRE Calabria is a section of CalabriaInnova project financed by Calabria Region with ROP-ESFR 2014-2020 funds. The work conducted in the year 2017 was awarded as “Best APRE Help Desk” for the “the dedicated commitment to a weak region like Calabria, where tangible results were achieved to support innovative processes able to improve regional growth and opportunities”.

“The results obtained reflect the



FROM LEFT VERA TOMAINO, MARCO FALZETTI, ANTONIO MAZZEI, MONICA FILICE

work carried out over the years to make Calabria more competitive, and where regional development funds are made available to citizens and companies,” Regional President Mario Oliverio said.

“The APRE Calabria help desk is just one example; in fact Calabria Region has launched several actions to support regional development”. Established in 2013, the APRE Calabria help desk aims to enhance SMEs competitiveness and to facilitate the technology transfer from research to business. The multi-disciplinary team

offers advisory and coaching services to submit a successful proposal for H2020. Several activities are offered to all potential users (researchers, entrepreneurs, inventors, citizens): match with call, proposal screening, partner search, check the eligibility.

Within CalabriaInnova project, the results of APRE Calabria actions

are identified in several SMEs awarded by European Commission with the grants of SME Instrument phase 1. They are innovative start-up or research spin-off that work from ICT solutions to biomedical device to improve citizens’ quality of life.

“This is for us a very significant award, primarily because we are a young help desk. - Antonio Mazzei, Operations Director for Fincalabro Spa, concluded - It has been merit of two key factors: a strong institutional support, and the necessary professional and human skills.” 🇮🇹

## Sharing the blue economy

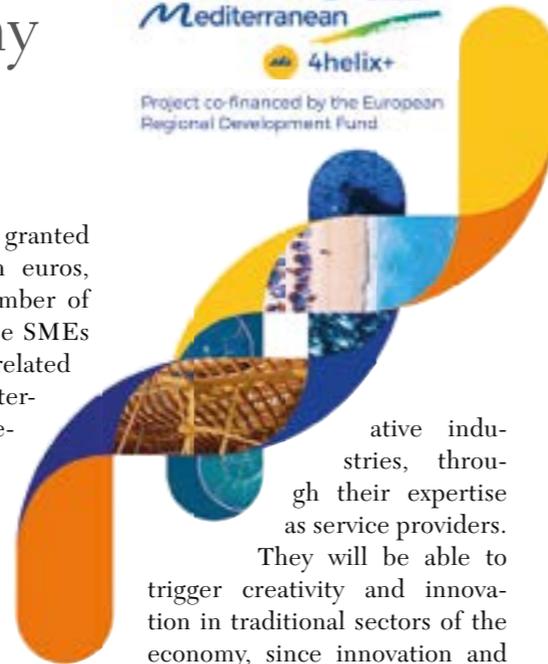
*A Mediterranean cluster to encourage business creativity*

The primary aim of the “4helix+” project, an Interreg MED initiative involving ten partners from the Mediterranean area (university institutes, chambers of commerce, development agencies, business incubators from Italy, Croatia, France, Greece, Portugal, Spain and Albania) is to stimulate the transnational activity of innovative regional clusters in order to develop smart and sustainable growth in the Mediterranean region.

Project coordinator is SVIM, the Marche Region’s Regional Development Agency. Launched

last February and granted funding over 2 million euros, the project offers a number of opportunities to all those SMEs working in maritime-related activities in the Mediterranean area that are seeking to revolutionise their processes, products or services and enhance their competitive strategies by sharing knowledge and innovation. This will be fostered in part by using “innovation vouchers”.

A key role in this process will be played by cultural and cre-



ative industries, through their expertise as service providers.

They will be able to trigger creativity and innovation in traditional sectors of the economy, since innovation and a creative culture are in fact viewed as being important drivers for economic development and job growth in local areas.



## Projects for the swine sector

*Genetics, veterinary aspects, product quality*



CAROLINA PUGLIESE

two of these projects: “Treasure”, now concluding, and “Swinostics”, which has just launched. “The first project relates to European native breeds, involving mainly partners from the Mediterranean area”, explains Professor Carolina Pugliese, “we are focusing mainly on the ‘cinta senese’ breed”.

Treasure deals with genetic aspects, feedstuff techniques, product quality (in Florence for instance tests are being performed to replace nitrites and nitra-

tes with natural antioxidants for the ageing of products) and socioeconomic aspects.

“Swinostics” is based on efforts to create a new-generation diagnostic tool serving to detect the main swine viruses directly on the farm. “This would be an extremely important result” Pugliese concludes. “It is our job to test the tool in the field and to make suitable tests on results, working in concert with the Zoo-prophylactic Institutes of Latium and Tuscany”.



# High performance with a low energy impact

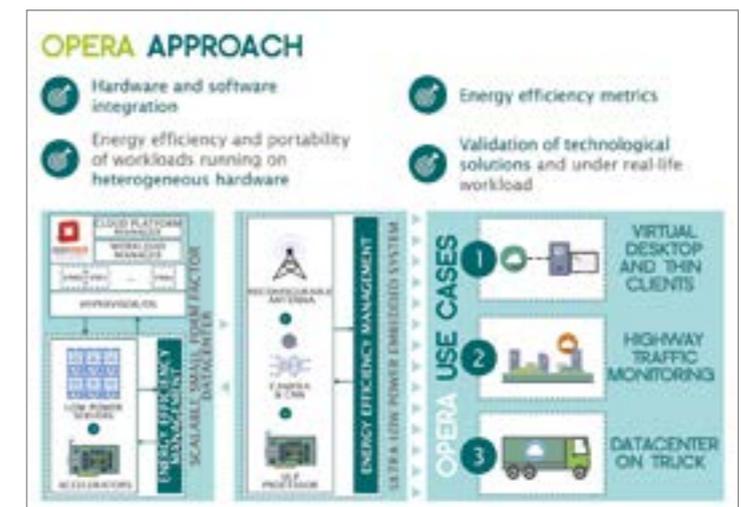


*This is the challenge that new industrial servers and connected objects (IoT) will need to meet*



Looking ahead, industrial servers will have to meet two key requirements: be low power and ensure high performance at the same time. To this end, new IT architectures need to be built and specific devices ensuring excellent results with equivalent energy efficiency need to be designed. This is the core objective of the “OPERA” project, an H2020 endeavour reaching completion whose leading partner is the Italian-French company STMicroelectronics, while the scientific technical coordination is entrusted to the Mario Boella Higher Institute of Turin, an excellence centre among Piedmont’s research facilities. “The project, due to be completed in November, has reached all of its goals”, underscore project coordinators engineers Giulio Urli of ST and Olivier Terzo of ISMB. “Besides In addition to this, we have provided conclusive proof of the different industrial and academic partners’ ability to plan together.” The second major milestone covered ultra low power architecture. “We designed a very innovative IoT prototype featuring consumption rates in the region of milliwatts for both computing and communication tasks, integrating

a reconfigurable antenna. We managed to reach an energy efficiency level yet unseen on the market, while retaining very high computing power capabilities coupled with artificial intelligence and deep learning functions”, added Stefano Serra, project partner and CEO of TESEO CLEMESSEY Italia. And then there is the third OPERA milestone. “The project aims at providing a contribution to computing continuum, i.e. a continuous interconnection from the object to the server hosted in a datacenter so that the system may decide from time to time whether computing tasks are to be entrusted to the IoT object or to the server. An operation that is carried out using offloading techniques, a very important aspect we are focusing on with a view to reaching a concrete implementation that may be used by real users, as is the case with the Department de LI-sere, a French public entity responsible for the operation of the road network within the Grenoble area.” “As far as STMicroelectronics and ISMB are concerned, it has been a very challenging 36-month period, a meaningful experience from both a scientific and technical perspective, which was further enhanced by the contribution of the major industrial groups we have been working with.”



## The economy of the future is circular

*This is the idea uniting partners of CIRCE2020 project by ARPA Veneto*

The Circular Economy has become a very topical concept, especially in light of the recent approval of provisions contained in the so-called "Circular Economy Package", presented in December 2015 by the European Commission. ARPA Veneto has been studying the question for a number of years, and is the coordinator of an Interreg Central Europe project in which Austrian, Croatian, Hungarian and Polish organisations are participating alongside the Veneto multiutility Etra. The aim of the initiative is to promote

this new economic model in the districts involved. After a year of activities a standing advisory forum has been set up among stakeholders of the territories involved (trade, professional, craft associations, etc.). "The next step is to choose pilot cases to work on over the next two years", explain Lorena Franz and Lucio Bergamin, respectively project manager and technical manager of the project for ARPAV. "The aim is to introduce a new economic model: we are convinced that taking a different approach to the economy can have

positive effects not only on waste management but also on the efficient use of raw materials and reductions in energy and water consumption".



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[www.interreg-central.eu/Content.Node/CIRCE2020.html](http://www.interreg-central.eu/Content.Node/CIRCE2020.html)

## Common fishing

*Technology can help fishermen reduce discards*

Fishers - on pulling up their nets up - have often thrown back into the sea the fish they know they can't sell. A regulation will take effect in Europe from 1 January 2019 banning such discards: previously discarded species, will be obligatory landed and then forwarded to other markets, from cosmetics to animal feed. This is somewhat "revolutionary" and difficult to digest for some, especially fishermen working in the Mediterranean. For this reason, the EU has funded the "Minouw" project to find a way to use technology to make selective fishing possible (for example, by changing nets structure)

and helping fishers to select what fish to land. "The key characteristic of the project, - Marco Costantini from WWF, a project partner, explained - is the bottom-up approach." We sat down with fishers and stakeholders to find a solution together, even organizing interesting exchange trips to various countries to find the better solutions" The results were encouraging: "Working together, we came up with several solutions, which now have to be rolled out in practice. In this project, it was important for fishers to be treated as peers with the researchers and other stakeholders."



PH: WWF/CLAUDIA AMICO



# Borderless technologies and innovation

*European projects, events and opportunities for the young designed by IDM Alto Adige*



THE 3DCENTRAL PROJECT PARTNERS

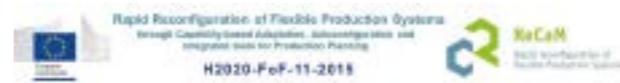
This is a particularly initiative-intense period for IDM Südtirol - Alto Adige, a regional business development agency of the region of South Tyrol established three years ago by the Provincial Authority and the Chamber of Commerce of Bolzano. To start with, the company is a leading partner of an Interreg Central Europe project called 3DCENTRAL, whose goal is to compare the innovative experiences of a number of different entities (technology parks, universities, public partners, businesses, research institutes, enterprise networks) from different Central

European countries. "We have identified 11 priority technological topics", explains Johannes Brunner, project lead and head of IDM Digital Innovation Hub. "Each partner deals with one of them (we have been tasked with 3D design), gathering excellences across the territory and then showing them to the other partners through a number of events staged in different local areas. After two years of efforts, we are very pleased with our work: we have reached important goals, training nearly 300 people and with hundreds of stakeholders turning out at the events we have staged." However,

IDM's endeavours extend further. In conjunction with the European project, a dual educational programme organised by the Free University Bolzano is being launched in Bolzano with the support of a group of automotive companies. "It is a perfect learning-work combination, an enabler for innovation. Automotive companies have joined forces for common activities agreeing that the educational program is a good opportunity to train and recruit qualified personnel. The first year of activities is due to start in September, and students can still enrol." On 19<sup>th</sup> and 20<sup>th</sup> September, Bolzano will also play host to the 12th edition of the International Mechatronics Forum, to be staged in Italy for the first time. "It will be held in the new technology parks called NOI Techpark which was inaugurated a year ago. We focus on Industry 4.0 and artificial intelligence as we aim at creating a bridge between the economic and scientific world of the German area and Italian area, with special emphasis on Italy's north-eastern cluster", concludes Brunner.



# The flexibility of productive processes



*One single reconfigurable workstation for different types of assembling*

One single, semi-automatic workstation consisting of specific and replicable modules, allowing the operator to swiftly carry out the entire assembling process. A workstation that is also flexible and reconfigurable so that it may be used for different types of assembling. It might sound like the most simple and ob-

vious solution, but it's actually an innovative and articulate project, based on the structured integration (which is the real added value) of software and hardware tools: modelling of products and resources, planning and optimisation, control and quick reconfiguration in flexible productive processes.

That is exactly why the EU has funded an H2020 project called "ReCaM", which features industrial giant Bosch as the leading partner. Among the other partners of the project we find Cosberg, a Bergamo-based company that has been engaging in the automation industry for over thirty years. "We have reached the final stage of the project. We are currently building a prototype to be used for assembling hydraulic valves. This can be the starting point for future dissemination and strategic exploitation actions. Indeed, the goal is to engineer solutions and make them vertical so as to meet market demands", says Mauro Viscardi, head of projects and innovation at Cosberg.

The complexity of the work carried out by the nine partners (which include two more Italian bodies: the Milan Polytechnic and EnginSoft) lies in the integrated development between the different working modules. "The real novelty is the holistic approach in designing a global process solution. Creating such a system required the combination of complementary solutions, mechanical and management tools, specifically-designed software, and concretely implementing all of them in a semi-automatic workstation consisting of mechatronic modules. Cosberg has actually created the physical prototype: for us it has been an intense and enriching experience, which we will put to good use in our automatic assembling machines".



THE WORKING GROUP

# Production with no defects

*How to improve the quality of multi stage production processes*



Production lines represent the operational foundations of most businesses: their functioning must obviously be constantly monitored and, possibly, improved. That's the focus of the "GOODMAN" H2020 project, coordinated by Loccioni, an Italian company based in the Marche region that has been working for 50 years in the quality control field. "The goal is to reach zero defects in a production line, where controls are distributed along the line itself, using intelligent measurement systems and Data and Knowledge Management techniques," says Cristina Cristalli, head of re-

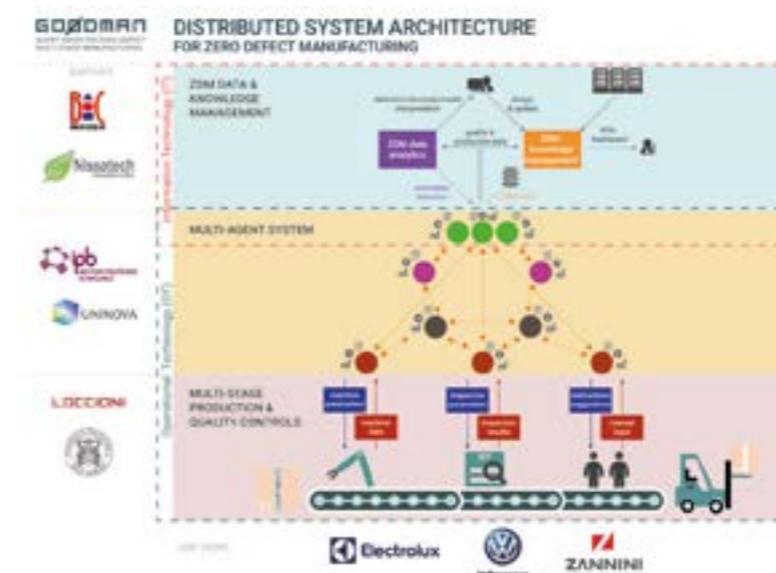
search and innovation at Loccioni, "this allows to increase the flexibility of production, the quality of products and of the production process, while reducing waste and production costs". The project involves nine partners from several European countries, operating in different sectors, including some big industries (Volkswagen Autoeuropa, Electrolux Profesional, Zannini) as end users of the technologies to be developed, technological partners with a specific know-how (BOC, Nissatech) and universities, for the development of a new field of expertise (Polytechnic University of Marche, Istitu-



PORTABLE LASER SCANNER FOR ALIGNING ADJACENT PARTS

to Politecnico de Braganca, UNI-NOVA). The project is half-way and has already achieved concrete results. "Two patent applications have been submitted, by the Polytechnic University of Marche, for two very interesting measurement systems. One is a portable laser scanner for the alignment of adjacent parts, the other is a telecentric lens for the detection of defects in high-precision machinery components". There is reason to believe that significant goals can be achieved in the manufacturing sector by managing the data generated by the sensors distributed along the production line, following the paradigms of Industry 4.0. "This was the first time Loccioni has coordinated such an important European project, although we have taken part in others. Our core business has been always based on innovation, measurements and data: that's why we accepted to be the lead partner and the integrator of the project. A challenging and enriching task that allows us to grow while contributing to the creation of an increasingly sustainable and efficient industry".

\*GOODMAN is an Innovation Action project partially financed by the Horizon 2020 programme of the European Union in the call FOF-03-2016 (Grant Agreement No. 723764)



GOODMAN PROJECT ARCHITECTURE FOR DISTRIBUTED QUALITY CONTROLS

# Research goes “pink”

*Paolo Veronesi*



**Fondazione Umberto Veronesi**  
– per il progresso delle scienze

The common notion is that Italy has top-notch researchers, but lacks the due public funds (which are below the EU average). Those who can, address the problem by directly promoting research themselves. That's the case of Fondazione Veronesi, founded in 2003 by the renowned oncologist Umberto Veronesi. Since he passed away, two years ago, the foundation has been chaired by his son, Paolo, and it continues to promote prevention and research, while raising public awareness in the medical and scientific fields. “In our own right, we try to counter the so-called brain drain,” the chairman says, “allowing researchers to work – more than 1,400 since inception – paying them a good wage and pursuing several types of projects, which they can contribute to.” Such as the ones on tumours affecting women (breast cancer and cancer of the female reproductive system).

The project Pink is good has been al-



locating resources over the past five years to fund medical research and to promote, among women, healthy lifestyles and adequate prevention. “From a medical and scientific standpoint, we are making huge progress,” Dr. Veronesi says, “both in terms of prevention and surgery/mastectomy. Today, chemotherapy – while remaining necessary – is much less invasive than it used to be, and its side effects can be kept under control more easily. However, it is just as important to promote prevention among women. In the regions of northern Italy, prevention is already quite widespread, while the situation isn't as good in central and southern

Italy. If women do not screen, detecting tumours in their early stage is almost impossible...”. Among the several prevention initiatives promoted by Fondazione Veronesi, it is worth mentioning the ‘Running Team Pink is good’: a group of women who underwent breast surgery and participate in the world's foremost marathons (including the New York marathon), showing that it is possible to live life to the fullest even after undergoing this kind of surgery. The Fondazione's activities in favour of women extend beyond national borders. The international project called Science for Peace, which was established by Umberto Veronesi

himself during the last decade, features a number of initiatives supporting oncology and women, including health and educational programs against Breast and Cervical Cancers in Palestine, Jerusalem, Congo, Guinea, Haiti... “In Afghanistan too we have set up an outpatient surgery facility where mammographies and biopsies can be performed, with the radiology and lab staff being trained in Italy - Dr. Veronesi tells us -, today the facility performs 1,200 mammographies per year. In poor or underdeveloped areas, such as the ones I mentioned, minor interventions can save the lives of thousands of women...”.



FRANCESCA PISTOLLATO

## The alternatives to animal testing

*The EU has been investing in alternatives to animal testing for over twenty years*

Testing on animals such as mice, rats, rabbits and fish is still widespread in Europe in a number of fields. Yet for more than twenty years the European Union has been investing in research to come up with alternatives to animal testing. The results have been encouraging: in 2013 this sort of testing was banned in Europe in the cosmetics sector (unfortunately it is still allowed in many parts of the world). In the toxicology sector research work has steered testing towards alternative methods. “In many cases it is possible to avoid in vivo testing on animals and move towards new in vitro cellular models, for instance through the use

of human stem cells consisting of different cell types and in silico computer modelling. Using alternative approaches it is possible to gain a better understanding of modulated molecular and cellular mechanisms following exposure to a given chemical substance, unlike animal testing, in which the “guinea pig” is exposed to a substance to observe the effects, but without understanding why”. Francesca Pistollato implements such models based on the use of human cells in the EU reference laboratory for alternatives to animal testing (EURL ECVAM) hosted by the European Commission’s Joint Research Centre (JRC). “This is a vital centre for



us: here we are really able to take the best bits of research, coordinate and validate alternative methods, increase the predictivity of testing and foster dialogue with our stakeholders”.

The battle has not yet been won however. “Although findings from researches confirm the validity of new models, there is still a widespread mindset, particularly in the biomedical research sector, that continues to focus on animal testing when studying human pathologies and creating new drugs, even though results are unsatisfactory”.

It appears to be a question of culture: “In the near future we have to abandon the animal testing model and adopt more relevant methods for human beings”, Pistollato concludes. “This is what our projects are aimed at”. 

## A research that meets the needs of society

*The EU encourages the adoption of the RRI principles*



THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME UNDER GRANT AGREEMENT NO. 706517

RRI (Responsible Research and Innovation) is a political strategy that aims at increasing the intensity and quality of interaction between scientific research and society. Indeed, for the European Commission this is one of the transversal basic topics of the Horizon 2020 programme: the goal is for research and innovation to optimally meet the needs, values and expectations of society. The goal of RRI is to change the status quo by directly acting on research institutions, activating framework processes so as to deeply modify their culture, values, rules and procedures with reference to five fundamental issues: public commitment, gender equality, educational paths, free access to data and ethical standards. That's what the “STARBIOS2” project,

coordinated by the Biology Department of Rome’s Tor Vergata university, is about: its goal is to implement action plans aimed at achieving structural change (pursuant to RRI standards) in six European institutions working in the field of biosciences. The experience gathered will be used to draft guidelines and develop a structural change model in the RRI sphere in Europe and elsewhere, with the project also benefitting from the participation of partners operating in the U.S., South Africa and Brazil. In particular, one of the main risks for European research is its inadequate link with society. In order to tackle this problem, research must be more in line with the needs and values of society, which means – from the RRI standpoint – a greater invol-

vement of the stakeholders, on all levels of research and innovation. “The project is half way through,” says the coordinator, Prof. Vittorio Colizzi. “During the initial phase, following meetings with businesses, private citizens, students and researchers from several fields, the Tor Vergata team identified, among other things, environment, diet/nutrition and gender differences as some of the biological and social factors that mostly require the attention of the scientific world, particularly biosciences. Environment and nutrition are factors (human exposome) that contribute to a balanced human well-being or, vice-versa, can trigger diseases...” 

FIRST MEETING OF ALL STARBIOS2 PARTNERS, JUNE 2016



## At the heart of the brain

*Controlling and monitoring brain activity using new low-invasive instruments*

The mechanisms of communication between cells inside the brain are hybrid, meaning that they are based on both chemical and electrical signals. Optogenetics is a recent science combining optical and genetic techniques to control and monitor neural activity by means of light pulses. In this framework, and to gain a better understanding of the mechanisms underlying central nervous system disorders, it is important to develop low-invasive technologies that can record and monitor these signals across several brain regions at the same time. This is the goal being pursued by the 'MODEM' (GA 677683) project funded by the European Research Council as part of the H2020 research and innovation programme of the European Union, whose beneficiary is the Italian Institute of Technology, which is based in Lecce at the Biomolecular Nanotechnology Centre (CBN) and enjoys collaborations in Genoa, Rovereto and with the Harvard Medical School. "The project will last five years and we have been working on it for a little more than one year and a half", explain staff at the Lecce-based CBN. "The real innovation consists of designing multifunctional devices able to control and detect simultaneously both electrical and chemical signaling, something we are experimenting on animal models. The project will also provide neuroscientists with new instruments to study how the brain works." 



AN EXAMPLE OF A TAPERED AND LOW-INVASIVE DEVICE USED TO ILLUMINATE DIFFERENT REGIONS OF THE BRAIN. SCALE BAR REPRESENTS 400 MICROMETERS



WORKING GROUP

## Nanotechnologies for cell therapy

*Two European projects foster the application of stem cells for therapeutic uses*



Regenerative medicine and therapies using stem cells offer unique opportunity for the treatment of a wide range of pathologies. However, the mechanisms involved in the healing processes induced by stem cells are still far to be totally understood, making the approval of stem cells-based therapies difficult. The H2020 AUTOSTEM project

seeks to develop an automated platform for the controlled, large-scale production of stem cells to be used in clinic setting. According to Chiara Gentili and Maddalena Mastrogiamco, two researchers from the Department of Experimental Medicine of the University of Genoa, "The goal is to generate new methods of selection and expansion to cultivate stem cells using an innovative bioreactor". The interest of these two researchers in the distribution of stem cells in vivo have led them to win a second H2020 project, STARSTEM. The

two projects involve multidisciplinary research groups, including engineers, physicians, biologists as well as high-biotechnologies companies, from five different countries. The goal of these projects is; the development of a certified automated production of stem cells to be used in therapy and the development of nanoparticles able to target the stem cells produced, allowing them to be followed in the patient through innovative imaging systems. For more information: [www.autostem2020.eu](http://www.autostem2020.eu); [www.starstem.eu](http://www.starstem.eu) 



FROM LEFT PROFESSOR ORAZIO SCHILLACI AND DOCTOR AGOSTINO CHIARAVALLOTTI

## Monitoring patients at home



*A shared platform to boost home monitoring*

It is known as 'home monitoring' and it may well soon become the future of medical monitoring. Patients take their own measurements from home using specific instruments (wrist bracelets, scales, blood pressure cuffs) and share the data immediately through a specific platform using a simple tablet. This will allow the doctor to access all the information independently and gain a full picture before visiting the patient, with the same information also being available to any other specialist involved. The platform is called 'Picaso'- just like the Horizon 2020 project coordinated by the prestigious Fraunhofer Institute of Sankt Augustin, Bonn - and is made up of eight European partners, including the Department of Biomedicine and Prevention of the University

of Tor Vergata in Rome. "We follow up a sample of patients affected by Parkinson's disease", explain Orazio Schillaci, Department Head of the Faculty of Medicine and Surgery, and Agostino Chiaravallotti, researcher and Project Head for the Rome-based University. The benefits accruing to the patients from these new procedures are manifold, as they feel they are followed up more closely, their medical records are always up to date and can be accessed by the doctor at any time, while family members are trained in order to provide their contribution. From an operational perspective, the research conducted by the Rome-based pool enjoys the support of the Santa Lucia Foundation, where examinations take place. Advanced medical imaging examinations such

as PET and SPECT with new specific radiotracers are performed at Tor Vergata Hospital instead. The project is expected to be completed by Summer 2019.

"The ultimate goal is to use this sharing system on a large scale", conclude Schillaci and Chiaravallotti. "The benefit we expect to see is a multifaceted one, i.e. improving the quality of work, streamlining timeframes for diagnoses or treatment adjustments. Moreover, if applied on a large scale home monitoring could have an impact on the frequency of the patients' visits for each type of disorder, adjusting them based on the different health conditions and reducing the need to go to the hospital carrying a huge amount of medical documents on each visit..." 

## The fight against diabetes

*A number of European projects are seeking to act on beta cells*



PIERO MARCHETTI

According to recent figures released by the International Diabetes Federation, 425 million people around the world have diabetes: forecasts point to a rise to 629 million by 2045. In Italy the fig-

ure is around three and a half million. This disease is the cause of around 20,000 deaths each year. How can we tackle these trends? Of ongoing researches, three H2020 projects are worthy of mention (respectively “Innodia”, “T2DSYSTEMS” and “Rhapsody”), in which the University of Pisa- Pisa University Hospital is a partner: one on type 1 diabetes (an autoimmune disease, which affects mainly youngsters) and two on type 2 diabetes (more common among adults and elderly persons). “The key point is the central role played by beta cells: diabetes rears its head when they stop working and die. So our main goal is to seek strategies that can prevent or reduce the damage suffered by these cells”, explains Professor Piero Marchetti, head of projects for the Pisa centre, which is also very much engaged in pancreas transplants. “Important scientific and clinic results can be achieved if we operate in interdisciplinary working groups, which include a number of pharmaceutical companies”.



## Holding ageing at bay

*A research stemming from the study of mitochondria*

What makes us age? One of the causes involves mitochondria, organelles found in animal and plant cells. Each mitochondrion contains its own DNA: mitochondria have evolved from cells that had previously invaded larger cells, initially forming a symbiosis with them and then becoming one.

Their most renowned function is that of generating energy via a process called cellular respiration, which also produces highly reactive molecules called free radicals. An excess quantity of free radicals contributes to the deterioration of mito-



LILIANA MILANI

chondrial DNA and membranes, triggering a malfunction in the entire organism. One of the macroscopic consequences is, indeed, ageing. The MINGLE project studies aspects of mitochondrial biology linked to ageing. “The mitochondria that must be best preserved are those of specific cells, the gametes,” says Dr. Liliana Milani, principal investigator at the University of Bologna, “they must contain undamaged mitochondria in order for healthy offspring to be generated at fertilisation”.

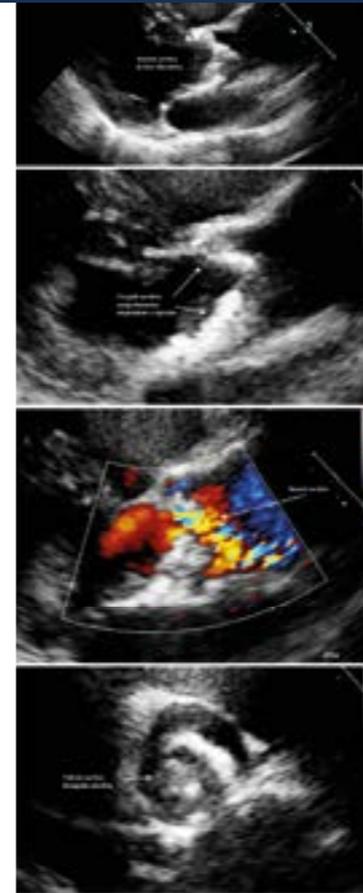
Some features of such mitochondria allow them to stay ‘healthy’ longer.

“The goal of the research is to understand how functional mitochondria can be passed from one generation to another...”, concludes the researcher.



## Aim at the heart

*The search for unlimited duration ‘regenerating’ aortic valves*



Genoma (which is immunogenic and triggers rejection, making such valves perishable), we could obtain optimal valve substitutes, with a potentially unlimited duration. This research underlies the ‘ARISE’ project, led by the Cardiovascular Surgery Centre of the University of Hannover, Germany.

The only Italian partner in the project is the Pediatric and Congenital Cardiovascular Surgery Unit at the University Hospital of Padua. Over the past years, the project ‘ESPOIR’ proved the feasibility of this operation with the pulmonary valve. “ARISE is about the aortic valve, which is far more complex”, says Massimo Padalino, in charge of the

project for the University of Padua, Italy, together with Giovanni Stellin. Now that the knotty authorisation phase is over, in Padua too everything is set for the final stage: the implantation of the valves in patients. “We are telling them there is no certainty about the unlimited duration of the valve, yet we are optimistic, because the clinical results obtained in Germany have proved that these valves are much better than the traditional prostheses”. A positive outcome would be a miracle cure, especially for children and young patients, who would no longer require subsequent surgery throughout their lives. “However, it will take more than ten years to reach a final clinical outcome”.

In Europe, some 65,000 aortic valves are replaced every year. The current prosthetic valves present limitations related to necessity for chronic (for mechanical valves), or short time (for “biological” valves) anticoagulation therapy. Neither of the current prostheses allows for individual regeneration. Homograft valves have been used for several years now: these human cardiac valves come from donors, they are physiological and do not require anticoagulation treatment. However, their duration is limited, hence the patients need to undergo further surgery throughout their lives. If it were possible to extract the DNA from these valves, depriving them of the



ARISE VALVE

Founded in 1951 to foster dialogue between scientists around the world and support international cooperation in all space-related activities, the IAF continues to connect space people worldwide.

The Federation is the world's leading space advocacy body with over 340 members, including all key space agencies, companies, societies, associations and institutes across 68 countries.

Over 40 administrative and technical committees support the Federation in its mission to advance knowledge about space and to foster the development of space assets by facilitating global cooperation.

At its annual International Astronautical Congress (IAC) and other thematic conferences, the IAF brings its multidisciplinary and international network to life.



# INTERNATIONAL ASTRONAUTICAL FEDERATION

