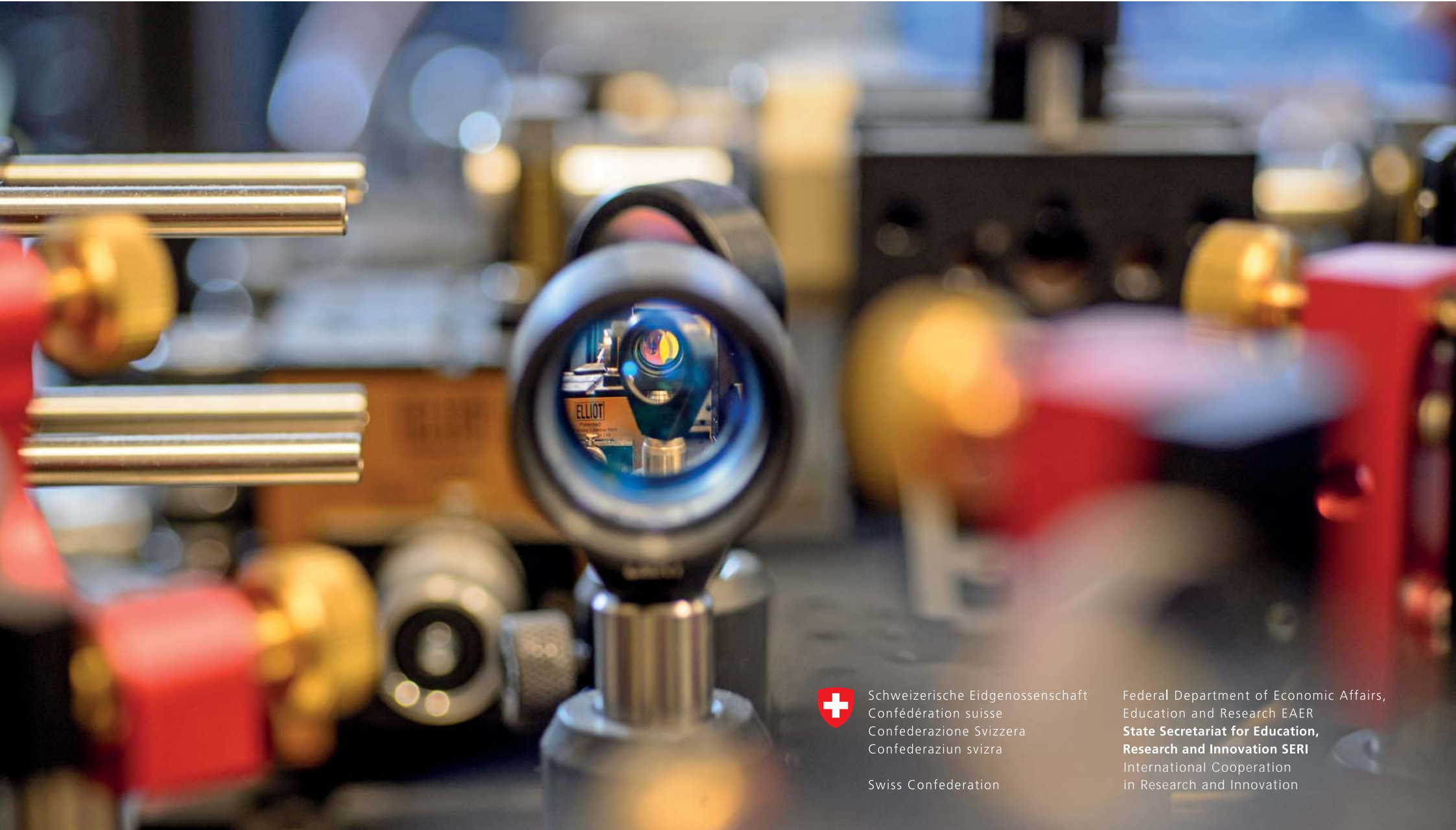


European Cooperation in Science and Technology COST

COST Success Stories in Switzerland



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs,
Education and Research EAER
**State Secretariat for Education,
Research and Innovation SERI**
International Cooperation
in Research and Innovation

List of Contents

Introduction	3
European Cooperation in Science and Technology COST	4
Swiss Researchers Participating in COST Actions.	5
COST Success Stories	6
Career Take off with COST	6
Advancing Science and Speeding up Developments in Fields of Cutting-edge Technology.	8
Networking for Better Cooperation in Europe across Disciplinary and Academic Boundaries	10
Using an Efficient and Fruitful Tool for a Prosperous Future	12
Enabling Mobility and Exchange in the Scientific Community	14
Bringing Together Visionaries of Science and Industry	16
Connecting National and European Research Projects and Networks.	18

Indication of Source:
The success stories and biographies stem from the persons themselves and usually date back to 2015. The story of Prof. Thomas Michael Bohnert originates from the following source: "News from the COST Office; Issue No. 7; December 2007". The personal success story of Salvador Pané i Vidal is an abridged version of an interview with him, realised by the COST Association (2015-04-29). It can be found at the full length with the following URL www.cost.eu/media/cost_stories/networking_nanorobotics). The interview has been adapted minimally for the purpose of a better comprehensibility.

Parts of the facts and figures on page 5 have been provided by the COST Association www.cost.eu

Cover:
Experimental arrangement in the laboratory of Prof. Nicolas Gisin, University of Geneva (see page 8/9). Photo by Béatrice Devènes.



Dear reader

The fact that today many scientifically and socially relevant issues can be solved only through international cooperation, is known. Less well known is that European researchers have the opportunity to form networks according to their needs, in which they can integrate their research projects to forward the research progress together with their colleagues and to train young researchers in an international environment.

Switzerland realised early on that the formation of such research networks is relevant to researchers and therefore acted also as a founding member of COST (European Cooperation in Science and Technology). The transfer of knowledge from the COST networks into the Swiss research landscape and to the users of the research results is of scientific and social relevance. The benefit resulting from participation in a COST network is not only limited to the actual cooperation during a research project, but also creates contacts, trust and springboards for successful projects in other programmes and further career steps. All in all COST constitutes a small but important contribution to strengthening research and innovation in Switzerland and to facilitating the start to a successful career for young researchers.

In this sense, I am pleased to recommend this brochure. COST was founded over 40 years ago and Switzerland has taken part in an increasing number of COST research networks over the entire period. This international networking has contributed to Switzerland's excellent positioning in the European research landscape.

A handwritten signature in black ink, appearing to read 'Mauro Dell'Ambrogio'. The signature is fluid and cursive.

Mauro Dell'Ambrogio
State Secretary for Education, Research and Innovation SERI

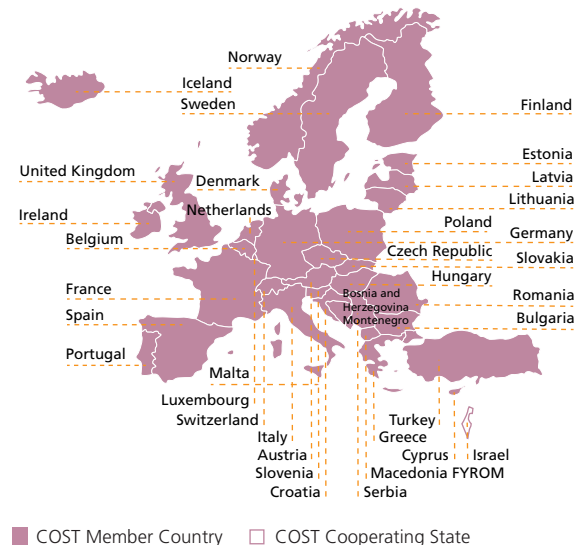
European Cooperation in Science and Technology COST

COST is the longest-running European framework supporting transnational cooperation among researchers, engineers and scholars across Europe.

COST is an intergovernmental and pan-European networking initiative for the coordination of research activities established in 1971. Based in Brussels, this initiative encourages the networking of nationally funded research activities. COST allows researchers, engineers and scholars to jointly develop their own ideas and take new initiatives across all fields of science and technology, while promoting multi- and interdisciplinary approaches. COST also aims at fostering a better integration of less research intensive countries to the knowledge hubs in Europe and thereby contributes greatly to the European Research Area (ERA).

Today, COST has 36 member countries (28 EU member states plus Bosnia-Herzegovina, Iceland, Norway, Macedonia (FYROM), Montenegro, Serbia, Switzerland and Turkey) and one cooperating state (Israel). Since 1989, research institutes of non-member countries may take part in COST networks.

36 COST Member Countries and 1 COST Cooperating State



Coordination of Research in COST

COST funds pan-European, bottom-up networks of researchers across all science and technology fields. These networks, called 'COST Actions', promote international coordination of nationally-funded research.

COST fosters the coordination of research activities; it does not impose research topics in a top-down manner and it refrains from establishing any concerted research policies. The bottom-up approach leaves ample room for the choice of research themes.

COST activities are carried out in COST Actions, which are essentially coordinated research undertakings, carried out by researchers of at least five different COST member countries. A management committee comprised of representatives of participating countries coordinates each COST Action. A COST Action lasts for four years and facilitates coordination and cooperation by various means like working groups, conferences, workshops, short-term scientific exchanges (STSM), training schools and joint publications. COST is characterised by a great variety of Actions in a wide range of different scientific disciplines. Actions are open to researchers from universities, public and private research institutions, as well as to NGOs, industry and SMEs.

Facts and Figures

€ 300 M	COST Budget from Horizon 2020 over a 7-year period (2014–2020)
CHF 4.9 M	Allocated by SERI in 2015 for national projects participating in COST Actions
Ca. 45.000	European researchers were involved in running COST Actions in 2015
769	Swiss participants took part in COST Actions in 2015
342	Ongoing COST Actions by the beginning of 2016
40	New COST Actions approved in 2015
22	Countries participate on average in a COST Action, of which 5 are needed to launch a Action

Sources: COST Association, SERI.

Swiss Researchers Participating in COST Actions

As a founding member, Switzerland has contributed to the success of COST from the very beginning, but also continues to develop its involvement steadily.

By the end of 2015, Switzerland was involved in 289 of the 342 ongoing COST Actions. Not only the success of COST is growing steadily since 1971 but also the number of COST Actions with Swiss participation.

Why COST?

By joining a COST Action, especially young researchers can expose themselves to their peers and experienced colleagues, extend their knowledge in working groups, conferences or training schools. They can also develop their skills further in other European

research institutions by taking part in a short term scientific exchange. Participants in a COST Action gain access to a multidisciplinary Europe-wide research network.

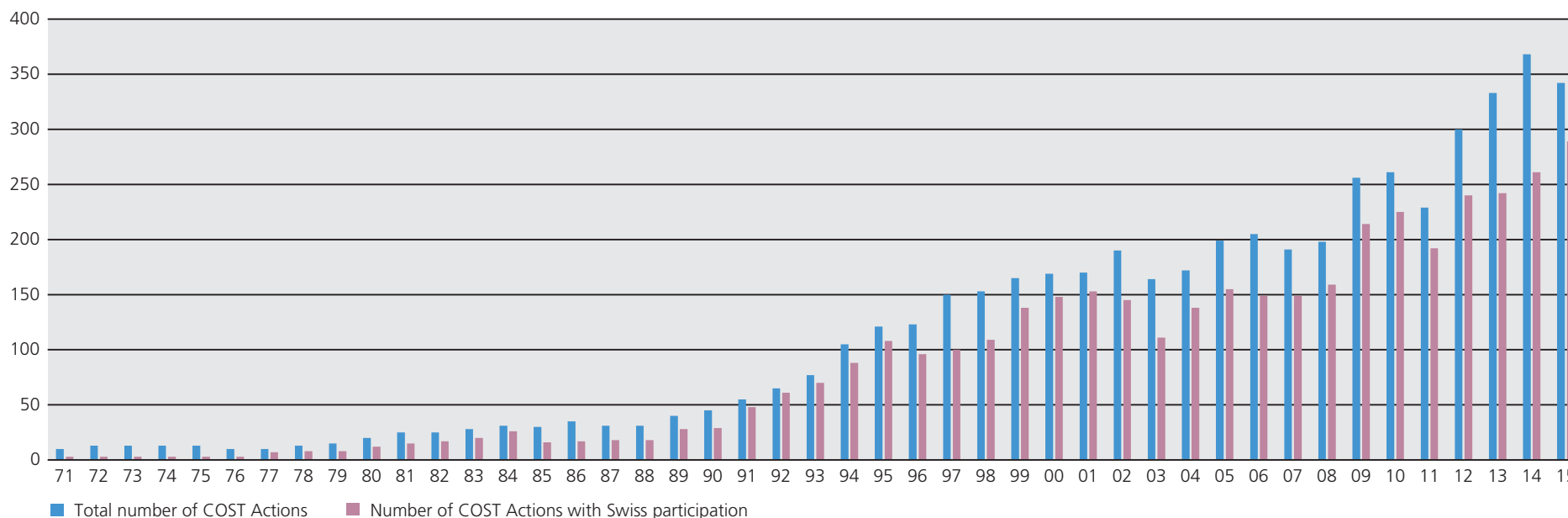
COST allows more and more European researchers to develop their own scientific ideas and projects through its bottom-up approach. This fosters urgently needed innovation and progress in the whole of Europe and allows fruitful cooperation across the continent in science and industry. COST is not just about overcoming political frontiers. It enables researchers to open up new perspectives through COST's possibilities of exchange and mobility.

More information about COST can be found on the following websites:

www.cost.eu

www.sbf.admin.ch/cost-e (Guidelines for participation)

Number of running COST Actions since 1971 (reference date January 1st)



Career Take off with COST



Thomas Michael Bohnert, now Professor at the Zurich University of Applied Sciences (ZHAW)

“It’s a matter of fact that without COST my career would not have taken off that way. In addition, COST was not only an accelerator in the past but still is and will remain an important scheme for our academic engagement.”

At the beginning of his career, back in 2007, Thomas Michael Bohnert described his personal experiences with COST in an interview with the “News from the COST Office”, shown in the following shortened version. At that time, he was still a PhD student at the University of Coimbra (Portugal).

I got involved [in COST] thanks to the foresight of my supervisor Dr. E. Monteiro. He once asked me to officially substitute for him as Management Committee Member (MCM), and to attend one of the COST Action 290 MCM meetings. Since then, I have gradually established myself in the community and I have attended nearly all subsequent meetings. I introduced a Special Interest Group (SIG), the WiMAX SIG on Worldwide Interoperability for Microwave Access, for which I could provide enough evidence to the community and to the present COST representatives. Consequently, and also thanks to the Action Chairs’ support, my proposal was accepted and since then I have chaired this SIG. This means that I hold an official post in COST Action 290. It’s safe to say that COST Action 290 provided me with a unique and essential framework for my career. I gained invaluable insight into scientific cooperation as a whole and when I established the WiMAX SIG my expertise, activities and enthusiasm in the context of Broadband Wireless Networks became visible to a large community.

The idea to set up the WiMAX SIG originated during a short-term scientific exchange (STSM), the COST Action research exchange instrument, at the Action chair’s research group in Tampere, Finland. I did some joint research with his group also in the context of the European research project (IST FP6 WiMAX Extensions for Isolated Research and Data Networks WEIRD). During one of many discussions the idea came up and thanks to the Action Chair’s open attitude towards this idea, the WiMAX SIG was launched.

Being chair of the WiMAX SIG was and still is very supportive to my career. For instance, I was given the opportunity to organise a workshop for a conference chaired by Dr. K. Al-Begain from the United Kingdom, who spotted me at COST Action 290 MCM meetings. Given my PhD student status, this was a fairly exceptional offer. The consequences for my

career are manifold and range from the organisational experience to a significant rise in international visibility and credibility of my expertise.

This workshop evolved into a workshop series of high international profile which was confirmed by its acceptance as part of the IEEE CCNC 2008 in the USA and, on top of that, by IEEE ICC 2008 in China, both part of the five most important IEEE conferences worldwide. It goes without saying that organising these workshops requires numerous collaborators. Initially, I mainly counted on the COST Action 290 community but in the meantime, supporters from Asia, America and Europe have joined too. Naturally, this provides access.

Involvement in COST

COST Action IC1304 – Autonomous Control for a Reliable Internet of Services ACROSS (2013–2017)

Currently, we are witnessing a paradigm shift from the traditional information-oriented Internet into an Internet of Services (IoS). This transition opens up virtually unbounded possibilities for creating and deploying new services. Motivated by this, the aim of this Action is to create a European network of experts, from both academia and industry, aimed at developing autonomous control methods and algorithms for a reliable and quality-aware IoS.

IC0906 Wireless Networking for Moving Objects (WiNeMO)
290 Traffic and QoS Management in Wireless Multimedia Networks (WI-QOST)



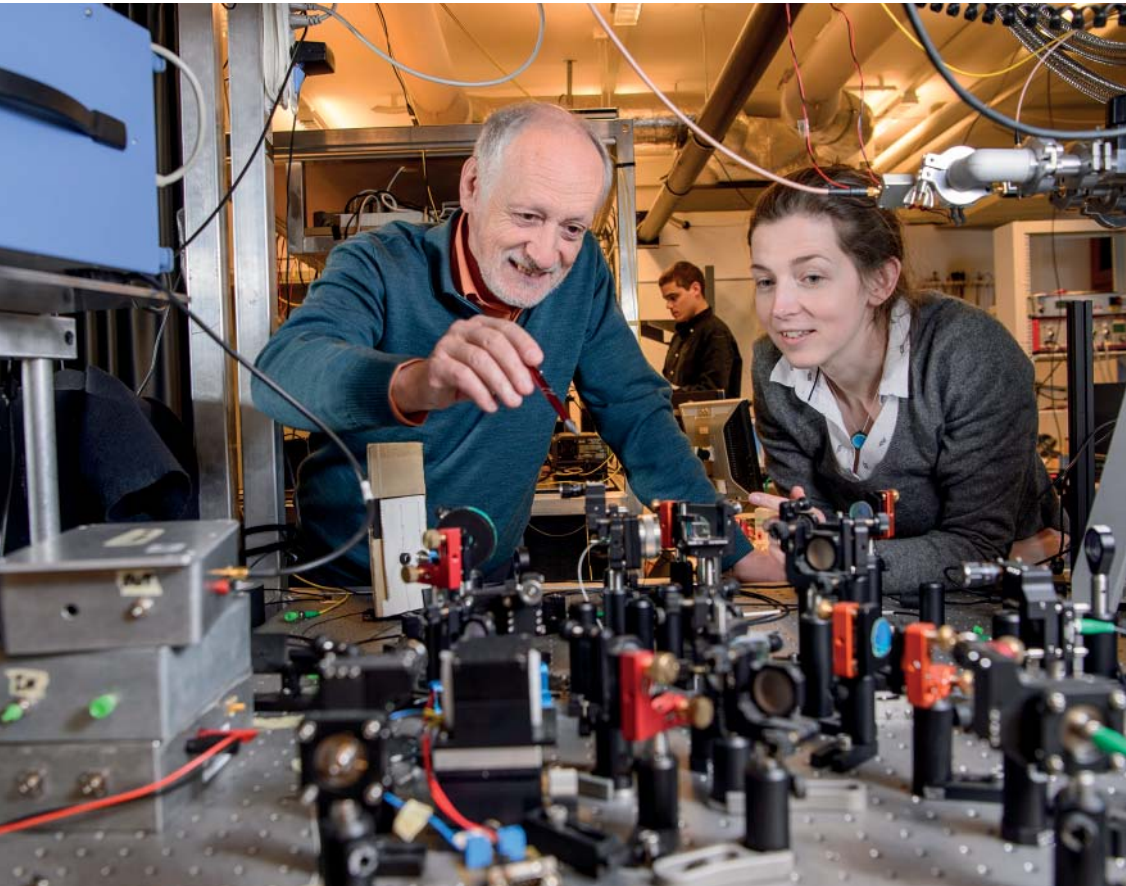
Prof. Thomas Michael Bohnert

Prof. Thomas Michael Bohnert is currently working at the School of Engineering of the Zurich University of Applied Sciences (ZHAW) as director of the Service Engineering Research Area, teaching service engineering and continuing future Internet research.

He holds a Degree in Computer Engineering (Dipl.-Ing.) from the University of Applied Sciences Mannheim, a PhD from the University of Coimbra (CISUC) in Portugal and a Professor title, awarded by Zurich University of Applied Sciences. His academic tenure originated at the Institute for Software Engineering and Communications of the University of Applied Sciences Mannheim.

He is the founder of an ICT consultancy, which he ran from 2000 to 2004 and prior to joining the Center of Informatics and Systems at the CISUC as a research scientist and PhD student. While working at the CISUC, he was a guest scholar at Tampere University of Technology in Finland, at the VTT Technical Research Centre of Finland and at the Beijing University for Post and Telecommunication. In 2008, he joined the corporate research department of SIEMENS Corporate Technology, where he was responsible for defining and driving a future Internet strategy. Subsequently, he joined the SAP Research Center Zurich, working first as senior researcher and later as technical director. In 2009, he was appointed chief future Internet strategist. He held this position until the start of 2012, when he joined Zurich University of Applied Sciences.

Advancing Science and Speeding up Developments in Fields of Cutting-edge Technology



Nicolas Gisin, Professor at the University of Geneva

"My second ERC advanced grant on macroscopic quantum effects would also have been impossible without COST."

Twenty years ago, when I was a young professor, I worked a lot on the optical fibres that would become core in the internet revolution. I participated in several COST Actions on measurement techniques to characterize optical fibres and thus got to know all the European specialists in the field, both in academia and in industry. That way I also became a specialist, in particular in polarization effects in optical fibres. This was instrumental when I started working on quantum cryptography, as it made it possible for me to demonstrate this quantum process in standard telecom fibres under Lake Geneva. This experiment had an enormous impact both within the scientific community and among the general public. A few years later I got into quantum nonlocality with the first demonstration of the violation of Bell inequalities outside the lab, again a landmark experiment that would have been impossible without the knowledge and contacts I gained from my participation in several COST Actions. This landmark experiment also helped me obtain my first ERC Advanced Grant on quantum nonlocality.

Nowadays, I am participating in a COST Action on the foundations of quantum physics, seemingly very far from the first COST Actions that helped launching my career. But I know that there is a string relating all the COST Actions I was lucky to participate in. My second ERC Advanced Grant on macroscopic quantum effects would also have been impossible without COST. Together with colleagues I am currently preparing a new COST Action and for sure, in the future, I will continue keeping an eye wide open on COST Actions as they are a very efficient way to collaborate with all kinds of interesting people.



Prof. Nicolas Gisin

Nicolas Gisin, Professor of Physics at the University of Geneva, is one of the founders and a leading scientist in the field of quantum mechanics and quantum cryptography. He has made remarkable theoretical and experimental contributions to this research area over the last 30 years and is one of the most cited scientists in the field.

In 1981, after obtaining a master in physics and a degree in mathematics, he received his PhD in Physics from the University of Geneva for his dissertation in quantum and statistical physics. After a postdoc position at the University of Rochester (USA), he joined a start-up company dedicated to fibre instrumentation for the telecommunication industry.

In 1988, he took the opportunity to join the Group of Applied Physics at the University of Geneva as head of the optics section. At the time, the optics section was entirely devoted to supporting the Swiss telecom operator PTT (now Swisscom). In order to get a critical mass and stability, the optics section started two new research directions under the impulse of Professor Nicolas Gisin, one in optical sensors and one in quantum optics. The work with the telecom operator and the sensing activities led to many patents and technological transfers to Swiss and international industries. Several products had and still have commercial success.

In the 1990s, Nicolas Gisin was one of the first physicists who understood how quanta could be transmitted over fibre-optic networks and who saw the enormous potential that lay in its practical application. He succeeded in transmitting a cryptographic key – the basis of cryptography – via industrial optical fibres over a distance of 23 km under the lake between Geneva and Nyon. The transmission of this key, which is secured by the laws of quantum physics and thus absolutely random and confidential, signified the entry into the real world of quantum communication. Nicolas Gisin founded a few years later a start-up company that offers solutions to encrypt highly confidential data.

An earlier experiment successfully conducted by Nicolas Gisin on quantum entanglement on the commercial telecommunication network (between Bernex and Bellevue, two villages near Geneva) is considered by the American Physical Society to be one of the most important scientific milestones of the 20th century. In 2003, the Technology Review of the

Massachusetts Institute of Technology MIT included his work on quantum cryptography among the ten most seminal inventions. In 2006, Nicolas Gisin demonstrated the transmission of quanta over distances of 10 to 100 km using Swisscom's commercial fibre-optic network. One problem with transmissions over longer distances is the need for repeaters. To remedy this, he and his research group developed so-called quantum memories.

In 2008, he was awarded one of the first keenly sought 'Advanced Grants' from the European Research Council (ERC), and later received a second ERC award. In 2009, he was the first recipient of the John Stewart Bell Prize of the University of Toronto. In 2014, Nicolas Gisin was awarded the Marcel Benoist Prize – the most important Swiss science award – for his outstanding work on the theoretical foundations and possible applications of quantum mechanics and quantum cryptography.

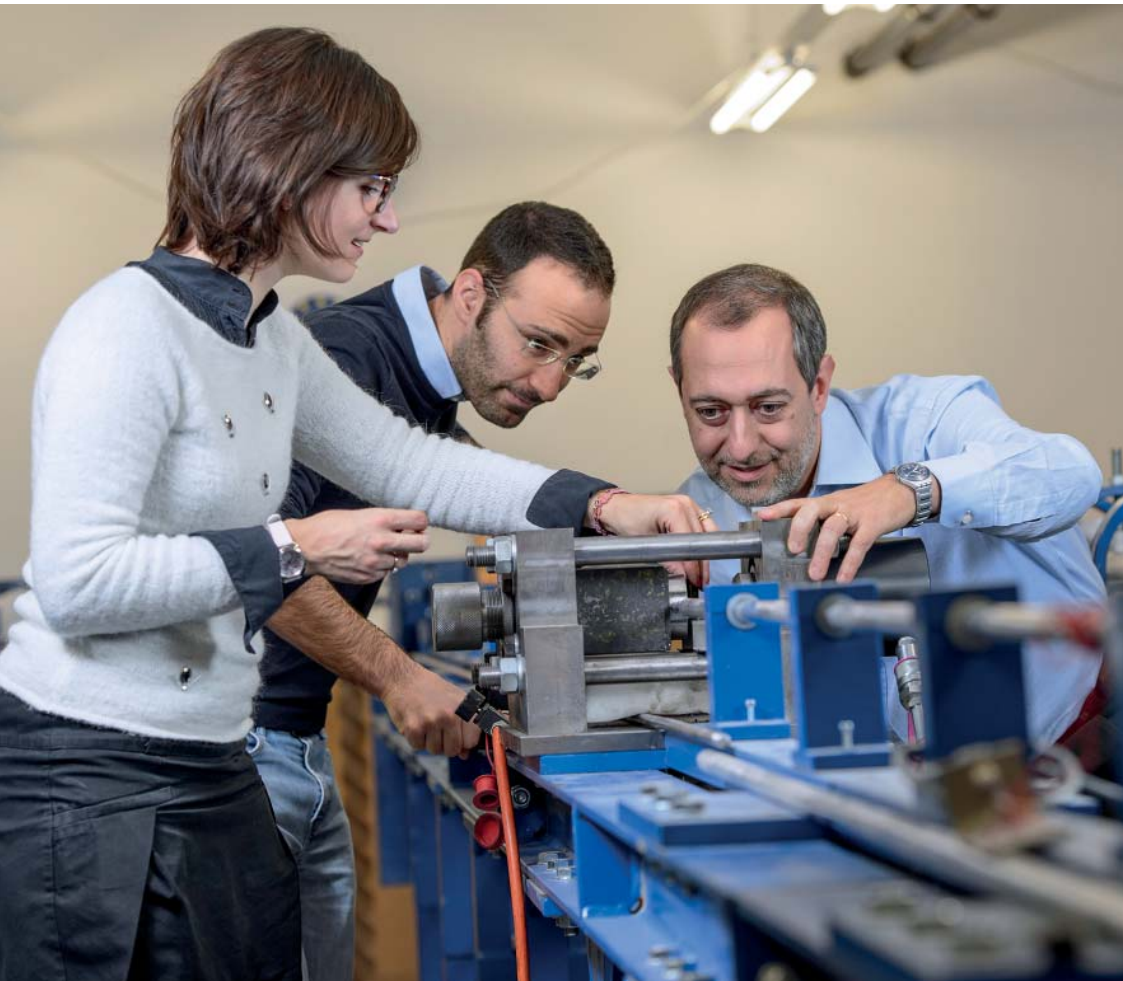
Involvement in COST

COST Action MP1006: Fundamental Problems in Quantum Physics (2011–2015)

Europe has the largest number of scientists working on the fundamental problems of quantum mechanics. They see an urgent need to create a common platform to overcome the existent fragmentation. They see the need to unify their research in a multidisciplinary and coordinated approach, to reach the goal of full understanding of the quantum world. This COST Action is the first network in the world, focused on the foundations of quantum mechanics. The Action aimed at strengthening cooperation and boosting research activity among European groups working on the foundations of quantum mechanics.

- 241 Characterization of advanced optical fibres for the photonic network
- P2 Application of non-linear optical phenomena
- 265 Measurement techniques for active and passive fibres to support future telecommunication standardisation
- 299 Optical Fibres for New Challenges Facing the Information Society

Networking for Better Cooperation in Europe across Disciplinary and Academic Boundaries



Ezio Cadoni, Professor at the University of Applied Sciences and Arts of Southern Switzerland (SUPSI)

"In fact, in terms of scientific visibility, this instrument has allowed my University of Applied Sciences to raise its profile in a way that would otherwise have been very difficult."

I am Professor at the University of Applied Sciences and Arts of Southern Switzerland (SUPSI), where I teach mechanics of materials and structural engineering. My research activities focus on the dynamic behaviour of materials. Several years ago, I set up a laboratory specialising in this field here at SUPSI. I decided to begin my research in a COST project, as I wished to work with a wider range and greater number of people. No less important was the need to compare myself with the broader scientific community working in my own field. For this reason I got Switzerland involved in a COST Action on the sustainability of structural engineering (C25), and joined the Action's management committee. I then participated in a second COST Action (C26), which was in fact launched internationally by my laboratory. This gave me the opportunity to host a prestigious international workshop in 2011.

Taking part in COST projects has allowed me to cooperate with a greater number of international partners and to develop a very interesting network of contacts among specialists in my field (materials and structures, rapid dynamics). We not only work together on research matters but also exchange notes on teaching issues. So far, I have participated actively in four COST Actions, which have allowed me to become familiar with the research situation in Europe and to exploit the results of the research I have done in recent years. Along with a group of European researchers, I have now drawn up some project ideas that will be put forward in forthcoming COST Action calls for proposals. For example, we currently have an especially productive partnership with the Università Federico II in Naples (Italy).

Thanks to a COST Action, I have also been able to acquire funding from SERI to pursue research in the field covered by the Action. This has helped strengthen links at national level, between my group and the group at the ETH Zurich operating in a field similar to ours, looking at the safety of structures subjected to fire and/or explosions. Further links at national level have been established with the EPF Lausanne, the University of Bern and other universities of applied sciences. A number of our PhD students have taken part in research projects carried out under COST, for example at the Politecnico di Torino in Italy. Both my institution and I have benefited from this experience in many ways. In fact, in terms of scientific visibility, this instrument has allowed my University of Applied Sciences

to raise its profile in a way that would otherwise have been very difficult. For myself, the main personal benefits have certainly been of a scientific nature, but I have also been able to develop partnerships with colleagues and, indeed, friendships across the continent and beyond.

Involvement in COST

COST Action TU0904: Integrated Fire Engineering and Response IFER (2010–2014)

The main objective of this Action was to break down the barrier preventing the exchange of information and experience between researchers from different disciplines, and between academia and practitioners (including firefighters). Thanks to the exchange of international experience, ideas and state-of-the-art on fire risk concepts and assessment methods, the Action helped providing concrete applications of the performance-based fire safety design methods to practitioners, and at introducing the latest research into standards for fire design.

Fire engineering researchers are specialists working in specific areas, such as fire dynamics, structural fire engineering, active/passive fire protection, environmental protection and human response. Since the background sciences of these disciplines are different at present there is little interaction between researchers. Practitioners, including fire engineers and building/fire control authorities, tend to consider fire safety as a whole, but lack in-depth awareness of recent advances in research. On the other hand, their input made researchers aware of real-world constraints, as well as current requirements for new research and for the development of European standards.

- C25 Sustainability of Constructions: Integrated Approach to Life-time Structural Engineering
- C26 Urban Habitat Constructions under Catastrophic Events
- TU0905 Structural Glass – Novel design methods and next generation products



Prof. Ezio Cadoni

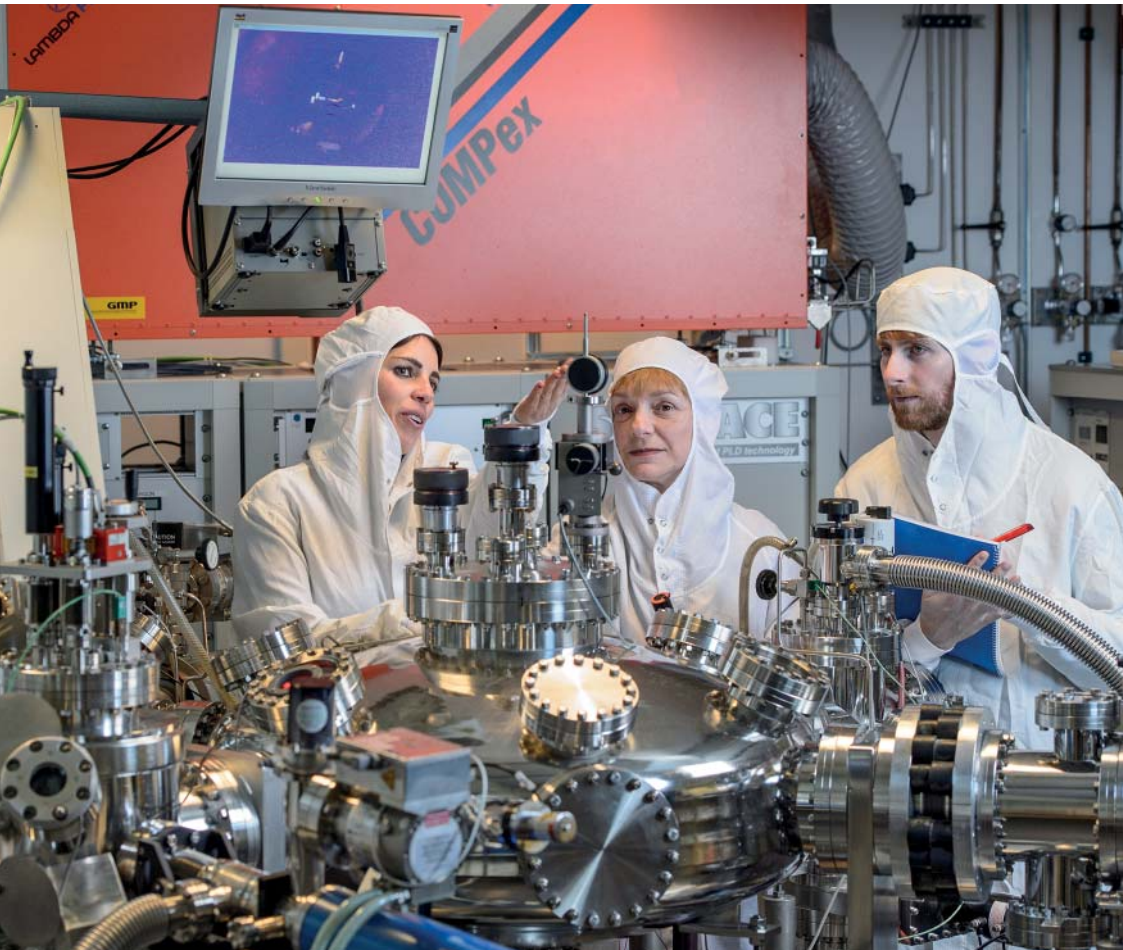
Ezio Cadoni is Professor of Mechanics of Materials and Structural Engineering at the Department of Innovative Technologies and the Department of Environment, Constructions and Design of the University of Applied Sciences and Arts of Southern Switzerland (SUPSI).

He studied civil engineering at the Faculty of Engineering of the University of Cagliari (Italy). He subsequently developed his PhD thesis at the Structural Engineering Department of the Politecnico di Torino (Italy). In 1992, he was visiting scholar at the University of Cincinnati (USA), where he studied interferometric holography applied on strain measurement of materials. In 1994, he received his PhD on structural mechanics with a thesis entitled "On the fatigue behaviour of anchors". Then, he started as a postdoc fellow at the Joint Research Centre of the European Commission and subsequently as scientific officer. At that time, he developed research on materials and structures behaviour under impact as an extensive experimental campaign on the strain-rate behaviour of concrete under the 3rd European Framework Programme, as part of a study on crash absorbers in collaboration with 17 European crash laboratories and some third party work for several industrial partners.

In 1997, he moved to Switzerland as R&D head of a consulting engineering firm and its laboratory in Lugano. He was appointed lecturer at SUPSI in 2000, and two years later he joined the university full time. He has been a professor at SUPSI since 2004, where he also chairs the Continuing Education and Research of his Department.

His teaching covers the fundamentals of structural mechanics, as statics, theory of structures, masonry, and mechanics of materials. His research concentrates on the dynamic behaviour of materials, measurement by Electronic Speckle Pattern Interferometry, anchors, durability, and impact behaviour of structures. He has been head of the interdepartmental laboratory DynaMat at SUPSI since 2006. DynaMat is a centre specialised in impacts on materials and structures at both the numerical simulation and the experimental level. Since 2015 he is President of the European association for the promotion of research into the dynamic behaviour of materials and its applications (DYMAT).

Using an Efficient and Fruitful Tool for a Prosperous Future



Nava Setter, Professor at the EPFL

"(...) in my experience COST was and still is an excellent tool, modest in budgets but extremely efficient and fruitful in connecting with European universities, research institutions and industrial laboratories."

Towards the end of 1989, I joined the Swiss Federal Institute of Technology EPFL. Having studied and worked until then mainly in Israel and the USA, my contacts with European academics and industry were limited. On the other hand, my field of research, Electroceramics requires expertise in various fields (materials, chemistry, physics, electronics and mechanics) and costly equipment, which necessitate collaborations. At that time, COST was the only programme that allowed collaboration with European researchers.

Indeed, in 1992, we initiated a group project, Piezoelectrics under extreme conditions, with the participation of French and Dutch industry and several academic labs. In 1994, we also started a new COST Action, Ferroelectric Thin Films, with the participation of major electronics industries and a very large number of academic labs. This Action also led to larger EU Framework Programmes at a time when Switzerland was not yet a regular participant in such projects. My collaborators and I formed contacts with manufacturers of electroceramics and end-users in fields as diverse as microelectronics, IT and communications, transportation, medical diagnostics, and industrial monitoring equipment, Swiss and European alike. Over the years, COST has also been our interface with East European researchers, with whom contact has been continually increasing. My PhD students and post-docs often participate in the COST annual meetings and in short-term scientific exchanges (STSM), which allow them exchanges useful for the continuation of their careers, in addition to the use of equipment not available in our lab and the benefit from expertise of other groups.

COST has been my gate to Asia too, through Japanese researchers we invited to our COST annual conferences. These contacts have been maintained for years with much exchange and collaboration with both Japanese industry and academic labs.

I am afraid my short note might seem incredulous, being overly positive and therefore I would like to emphasize that in my experience COST was and still is an excellent tool, modest in budgets but extremely efficient and fruitful in connecting with European universities, research institutions and industrial laboratories.



Prof. Nava Setter

Involvement in COST

503	Powder Metallurgy, Powder Based Materials
514	Ferroelectric ceramic thin films
523	Nano-structured materials
525	Advanced Electroceramics: Grain Boundary Engineering
528	Chemical solution deposition of thin films
539	Electroceramics from Nanopowders Produced by Innovative Methods (ELENA)
MP0904	Single- and multiphase ferroics and multiferroics with restricted geometries (SIMUFER)
MP1308	Towards Oxide-Based Electronics (TO-BE)

Nava Setter is Professor of Materials Science and Engineering at the EPFL in Lausanne and director of the Ceramics Laboratory at the School of Engineering of the EPFL. In 1980, after a master in civil engineering, she received her PhD in Solid State Science from the Pennsylvania State University (USA). After a post-doctoral position at the University of Oxford (United Kingdom) in physics and at the University of Geneva in chemistry, she started as a research engineer in a research and development institute in Haifa (Israel), where she also became head of the laboratory. In 1989, she started as director of the Ceramics Laboratory at the EPFL, where she became full Professor in 1992.

In 2010, Nava Setter received an ERC Advanced Grant and an ERC Proof of Concept Grant in 2013. Among other awards her work has been acknowledged with the IEEE-UFFC Achievement Award 2011, which is the highest distinction of the Ultrasonics, Ferroelectrics, and Frequency Control Society (of the Institute of Electrical and Electronics Engineers IEEE), for her outstanding research on the fundamentals of ferroelectric and dielectric materials, and their applications in novel devices. In the same year, she became Buessem Award Recipient. The Wilhelm R. Buessem Award is given annually by the US Center for Dielectric Studies to a member of the dielectrics community for a lifetime achievement in the field.

Enabling Mobility and Exchange in the Scientific Community

Lucio Isa, SNSF Assistant Professor at the ETH Zurich

“Financing the attendance of workshops and conferences can rarely be achieved with regular programme grants; participating in a COST Action makes travelling (...) much easier.”



I participated in COST Actions due to the significant advantages they offer. In particular, my participation in the COST Action ‘Green and Smart’ (MP1106) has enabled me to host a visiting PhD student from the University of Granada (Spain), who started a new project in our group. The visit made it possible to combine our expertise with the complementary expertise of the visiting student and has led to 3 published peer-reviewed scientific publications. Participation in the COST Action ‘Flowing Matter’ (MP1305) made it possible to send one of our postdocs to the Action’s kick-off workshop free of charge, where networking activities with other Action members took place, enabling us to extend our pool of scientific collaborations. Finally, I was asked to join the COST Action ‘Colloidal Aspects of Nanoscience for Innovative Processes and Materials’ (CM1101) with a deputy representative role. In this case, the advantages were again free participation in conferences but also the prestige that comes with taking up this role.

Participation in COST Actions is particularly advantageous for SNSF (Swiss National Science Foundation) Assistant Professors. Due to the fixed budget from the SNSF, we are often limited in how many conferences we can attend or how many visitors we can invite. Being a COST Action member loosens partly these hard boundaries. In particular, the possibility to have an exchange student staying for an extended amount of time was especially beneficial. When it comes to addressing a precise scientific question, such focused extended visits can be very productive from a scientific point of view and can also enable the student to experience a new research environment. In this respect, this instrument is additional to the Short International Visit Fellowship from the SNSF, but does not have a restriction on the number of visitors and requires less paperwork, since the funds are already allocated. Due to the aforementioned restriction, I would not have been able to host the PhD student with an SNSF travel grant. Financing the attendance of workshops and conferences can be rarely achieved with regular program grants; participating in a COST Action makes travelling (to Action meetings at least) much easier. Finally, being able to take up some representative roles at an early stage of my career was certainly beneficial to build my curriculum, in regard to future applications for tenured positions.

Involvement in COST

COST Action CM1101: Colloidal Aspects of Nanoscience for Innovative Processes and Materials (2012–2016)

Colloid chemistry is a steadily growing field of immense importance. The enormous diversity of the colloidal processes involved in novel materials and their applications in both advanced technologies and everyday life cannot be overstated. This Action coherently combines the outstanding European expertise in this field, including among other aspects: theoretical modelling and experimental formation of functional and patterned interfaces; self-assembly of molecules and colloidal particles; synthesis and up-scaling of novel nano-colloidal and bio-colloidal materials; and their applications in chemical, pharmaceutical and food industries. The main objective of the Action is to provide a platform for cooperation and coordination in the European colloid-science domain directed towards the development of innovative materials and processes, which in turn will stimulate academia-industry cooperation

COST Action MP1305: Flowing Matter (2014–2018)

Flowing matter lies in between different fields of research, affecting industrial processes, fundamental physics, engineering and earth sciences. Depending on the microscopic interactions, an assembly of molecules or mesoscopic particles can flow like a simple Newtonian fluid, deform elastically like a solid or behave in a complex manner. A fundamental understanding of flowing matter is still missing, impeding scientific progress, effective control of industrial processes and accurate predictions of natural phenomena (e.g. lava). The clearer understanding of flowing matter will influence fundamental scientific issues concerning R&D activities and industrial applications in health, energy, cosmetics, detergents, food, paint, ink, oil and gas.

MP1106 Smart and green interfaces - from single bubbles and drops to industrial, environmental and biomedical applications (SGI)



Prof. Lucio Isa

Prof. Lucio Isa has been a SNSF Assistant Professor at the ETH Zurich (financed by the SNSF) since 2013 and heads the Laboratory for Interfaces, Soft matter and Assembly (ISA) in the Department of Materials. The ISA Lab was founded in September 2013 following the SNSF Grant for Lucio Isa. The Lab operates in a number of research and teaching activities in the general area of soft matter systems, with a specific focus on understanding and harnessing the behaviour of micro- and nanoparticles at liquid interfaces, on the imaging and rheology of complex fluids and interfaces and on two-dimensional patterning and fabrication.

In 2004, Lucio Isa completed his university studies at Milan Polytechnic (Italy) in Nuclear Engineering with a Mathematics and Physics specialization. He obtained his Master's degree (with honours) with a research project on thermal diffusion of colloidal suspensions. In 2008, he obtained his PhD in Soft Matter Physics at the University of Edinburgh (United Kingdom), with a thesis on the flow and deformation of dense colloidal glasses. The thesis was awarded twice, in 2007, with the Marie Curie Early Stage Researcher Award by the European Commission and in 2008, with the Vernon Harrison Award by the British Society of Rheology for the most outstanding PhD rheology thesis in the UK. After a short postdoctoral spell in Edinburgh, he moved to the Materials Department of the ETH Zurich to work on self-assembled materials in the Laboratory for Surface Science and Technology. During this time at the ETH Zurich, he was awarded a Marie Curie Postdoctoral Fellowship by the European Commission, an SNSF travel grant for scientific visits to the University of California Santa Barbara (USA) and an SNSF Ambizione Fellowship, aiming at the study of various aspects of micro- and nanoparticle self-assembly at liquid interfaces. Lucio Isa has held his position at the ISA Lab of the ETH Zurich since 2013. He is also co-founder of Swiss Soft Days, an initiative aimed at creating a national network of scientists working on Soft Matter.

Bringing Together Visionaries of Science and Industry

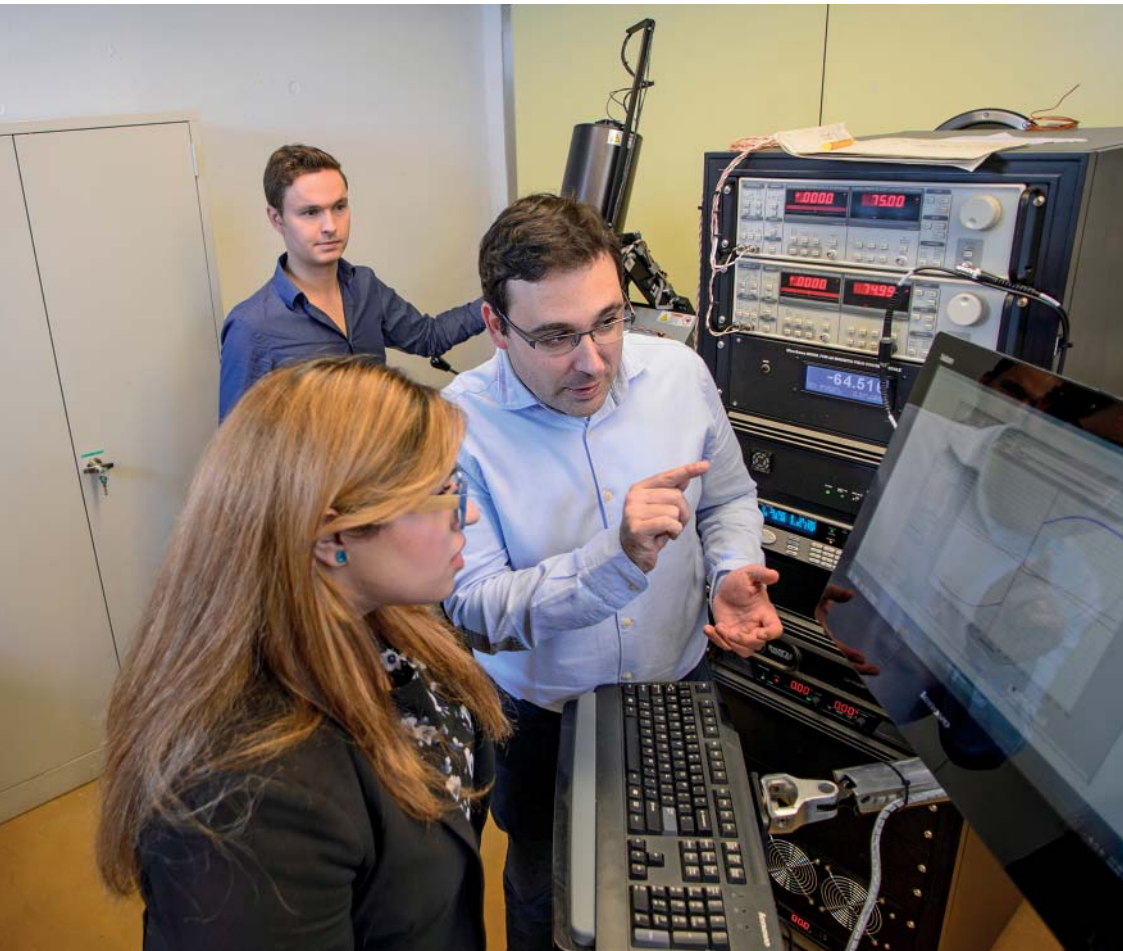
Salvador Pané i Vidal, Senior Research Scientist at the ETH Zurich

“The COST Action provides the ideal platform for meeting people and learning about their expertise, which is key to building an efficient consortium. It is quite difficult to build consortia with people you don’t know. The COST Action starts the engine of building consortia. (...) There are people whose knowledge and ideas I can benefit from. This is the big picture of the COST Action.”

A COST Action is an ideal platform, as it provides expertise sharing at EU level. The Action e-MINDS covers a lot of objectives from my research area. For instance, we are now looking into building robots that could drill bacterial biofilms. There are a lot of Action participants experienced in making composites using electrolytes. Implementing electrolytes in abrasive electrode coatings, applied to a very tiny structure, is challenging, but researchers in the network could help me implement these coatings in my micro- and nanorobots. Others specialised in biologically oriented coatings could help me with the implementation. An important issue is that every structure combines several materials in the same platform, which is dangerous because corrosion processes can occur and micro- and nanostructures can lose their functionality. The Action features experts who help me find a strategy to combine these materials while reducing corrosion effects.

I want to make special robots combining piezoelectric and magnetostrictive features, and there are already other groups in Europe working on ways to build these materials. We could share expertise and build effective magnetoelectric micro-nanostructures for example. More examples could be nanowires – there are people experienced in making nanotubes with the same electrochemical fabrication techniques, so what we could try is build a micro- or a nanotube and a solid nanowire in the same nanostructure. I think there are many ways collaboration within the community could help. It could also open new research avenues, since my field is in its infancy.

The transfer of knowledge in Europe is not as efficient as it should be. The Action will help bring researchers together, who have the necessary expertise to solve the problems. We can use EU tools or project tools – or COST tools, such as short-term scientific exchanges – to solve questions, but the network helps both scientifically and strategically. Strategically, meaning that proposals can be written out of an existing need, identified during the course of the Action. The COST Action provides the ideal platform for meeting people, learning about their expertise, which is key to build an efficient consortium. It is quite difficult to build consortia with people you don’t know. The COST Action starts the engine



of building consortia. There are people whose knowledge and ideas I can benefit from. This is the big picture of the COST Action.

Researchers in our network come from 10 different European countries. The majority come from research institutions, but we also have people from industry and SMEs. I tried to contact companies potentially interested in the Action before even setting it up. Their response was positive and I expect them to benefit from the network. They are specialised in coatings and large pieces, but they also want to expand towards micro- and nanodevices.

Europe needs to produce high added-value products. Right now, some EU companies are competitive and could take the lead in this field. Still, if we want to be leaders in the coming years, we have to take a step further. I think producing miniaturised devices and being involved in the electrochemical fabrication industry can give a huge boost to European industry. I think that knowing companies' challenges is crucial, especially if universities and research institutes have to work towards meeting these needs.

Involvement in COST

COST Action MP1407: Electrochemical processing methodologies and corrosion protection for device and systems miniaturization e-MINDS (2015–2019)

Cost-effective device miniaturization is one of the most significant challenges faced by process engineering and industry. As systems are further miniaturized, component machining and assembly become increasingly complex and manufacturing costs grow. High-throughput, economical advanced manufacturing and assembly technologies are urgently required at the industrial level. The main objective of the Action is to support and promote high-quality research in electrochemical processing technologies and corrosion towards the development of miniaturized systems and devices.

Dr. Salvador Pané i Vidal is also chairing the COST Action.



Dr. Salvador Pané i Vidal

Dr. Salvador Pané i Vidal is currently Senior Research Scientist at the Multi-Scale Robotics Lab (MSRL) at the Institute of Robotics and Intelligent Systems (IRIS) of the ETH Zurich. He has specialised in material science and particularly in electrochemical processing. His work bridges material science with the world of micro- and nanorobotics. Micro- and nanorobots are tiny, smart structures that can perform several activities or processes at small scales, as in the field of biomedical research, e.g. for drug delivery applications.

He received a bachelor's and a master's degree from the University of Barcelona (Spain), where he also did his PhD in chemistry (2008) in the field of the electrodeposition of magnetic composites and magneto-resistive alloys. He became a postdoctoral researcher at IRIS in 2008 and a research scientist in 2010. Dr. Pané is currently working on bridging chemistry and electrochemistry with robotics at small scales. In the field of micro- and nanorobotics, his major focus has been the miniaturization of magnetic materials, conductive polymers and hydrogels for targeted drug delivery. He is the head of the IRIS electrochemistry laboratory at the ETH Zurich, which he established in 2010. He has established international collaborations with several research groups and companies from around the world.

Connecting National and European Research Projects and Networks

Matthias Drilling, Professor at the University of Applied Sciences and Arts Northwestern Switzerland (FHNW)

“This participation [in COST Action meetings] offered enormous opportunities for the young researchers in the team to build up an international network and to gain important work experience.”



Today, many European cities are witnessing different conflicts of interest, as the revival of citizens' demand for allotment gardens and concurrently with this, a growing interest in land use and consumption of other urban stakeholders. The COST Action 'Urban Allotment Gardens in European Cities – Future, Challenges and Lessons Learned' (TU1201) seeks to analyse the prevailing circumstances of allotment gardens and their relevance for sustainable urban development in Europe, among other aspects. In this regard, we started to analyse the situation in four Swiss cities with a national COST project in 2014. We are studying (among other aspects) how these processes are shaped by different actors, interests, resources, values and planning logics and how these elements interplay with actual changes of dominant urban politics and planning in Swiss cities. A continuous exchange of information with the different stakeholders contributes to the research project and lays the groundwork for the workshops on future scenarios of allotment gardens and new forms of urban gardening taking place at the last stage of the project in 2016. Therefore, the Swiss COST network will jointly create concepts that enable practitioners in the field to facilitate the provision of urban allotment gardens and new forms of urban gardening.

But this process is not only taking place at a national level. The research team has participated in all the COST Action meetings (Dortmund, Poznan, Lisbon, Riga, Nicosia, Birmingham and Thessaloniki). The team has been recognised as particularly active members by the Chair of the Action. As a result, and extraordinarily, participation at the meetings for many of our young researchers has been covered in full by EU funding. This participation offered enormous opportunities for the young researchers of the team to build up an international network and gain important work experience. At the international meetings, the research project was presented which allowed for a fruitful discussion and enriched the further research process. Hence, there is a strong knowledge transfer between the national research project and the overall COST Action, in particular in relation to the Working Group 'Policies and Urban Development' and through the contribution to publications and conference sessions.

I thank COST for the comprehensive assistance. It enabled an enormous capacity building in this field of research and an excellent networking in Switzerland and across Europe.

Involvement in COST

COST Action TU1201: Urban Allotment Gardens in European Cities – Future, Challenges and Lessons Learned (2012–2016)

The main objective of the Action is to create a research platform on which Allotment Gardens (AG) and their relevance for sustainable urban development in Europe will be understood and managed, and also their impacts from social, ecological and urban design perspectives will be studied. Over the last 20 years, there has been a revival of interest in AG by urban residents, especially in large cities, and simultaneous competition from other kinds of land use. The multi-character and partly contradictory nature of the AG makes it a relevant issue to be studied within different European urban contexts. Through selected case studies and in-depth research (into the areas of policy and urban development, sociology, ecology, urban design), the initiative will showcase the state-of-the-art, challenges and opportunities. The relevance and potential of AG for urban development has not yet been studied from a European perspective. The Action will contribute to a better understanding of framing conditions for policy measurements in different European countries through different outputs such as the development of a Comparative Rating System.

TU1204 People Friendly Cities in a Data Rich World



Prof. Matthias Drilling

Prof. Dr. Matthias Drilling is Professor at the School of Social Work of the University of Applied Sciences and Arts Northwestern Switzerland (FHNW), located in Basel, where he is head of the Institute for Social Planning, Organisational Change and Urban Development. He is a social geographer and spatial planner by occupation. His field of study includes, but is not limited to, urban sustainable development research, poverty research and research management.

In 1993, he received his master's degree in Geography and Economics from the University of Freiburg (Germany). During his studies he laid the focus on Urban Social Geography, Development Economics, Property, Rights Theory and Research Design (qualitative and quantitative). From 1993 to 1995, he worked as a research assistant and lecturer at the Institute of Geography of the Friedrich Schiller University in Jena (Germany), followed by the same post at the Institute of Philosophy of the University of Basel and the Institute of Inter-Faculty Research on General Ecology of the University of Bern. In 1999, he became senior researcher, project leader and lecturer at the Institute for Social Planning and Urban Development of the FHNW, where he worked in fields of urban social development, theory of space, neighbourhood renewal programmes, quality of life, research on poverty, and poverty alleviation programmes over the course of ten years. Meanwhile he completed his doctorate and in 2004 obtained his PhD from the Faculty of Forest and Environmental Sciences at the University of Freiburg, with a thesis on young urban poor. The thesis was awarded with the Pfizer dissertation prize 2005 by the University of Freiburg and followed by a Master of Advanced Studies in Spatial Planning at the ETH Zurich.

Since 2010, Matthias Drilling has been a lecturer at the Institute of Geography of the University of Basel with courses in spatial area analysis, theories of space and urban social geography. In the same year, he also acquired his current position as the holder of a chair at the FHNW.

