



## A new COLLOIDAL cybernetic system towards 2030

### LET'S MEET THE PROJECT PARTNERS!


COgITOR is a project funded under the topic H2020-FETOPEN-2018-2020 / H2020-FETOPEN-2018-2019-2020-01 programme, aiming at developing a liquid state cybernetic system prototype. Holonomic memory and computing, pressure sensing, and energy harvesting from thermal gradients will be achieved using colloids. The prototype will be tested in extreme environments for potential space applications.

COORDINATOR

**FONDAZIONE ISTITUTO ITALIANO DI TECNOLOGIA**

Fondazione Istituto Italiano di Tecnologia (IIT – Italian Institute of Technology,) is a scientific research center established by law in 2003 by Italian Ministry of Education, University and Research and Ministry of Economy and Finance, in order to promote excellence in both basic and applied research and to facilitate the economic development at national level. IIT scientific activities started in 2006, they are multidisciplinary and with a very strong approach to technology transfer.

IIT staff is of more than 1600 people, the majority of which (about 81%) is dedicated to research, with a gender distribution of 42% women and 58% men and an average age of 35 years. About half of the researchers (47%) come from abroad: 33% are scientists from more than 50 foreign countries and 14% are Italian researchers who have come back to Italy after a professional experience abroad. IIT has a vast experience in managing and supervising research projects with a portfolio of more than 364 external funded research projects, 180 of which financed by EU funding programs as FP7 and H2020 – 25 are funded by European Research Council (ERC). IIT has produced more than 11270 publications and 245 inventions resulting in more than 690 active patents. Its research activity led to the creation of 18 spin-offs, with additional 30 under due diligence. Research is carried out in the Central Research laboratory in Genoa (IIT headquarters), in 11 research satellite centers across Italy and in 2 outstations in US. IIT scientific vision is interdisciplinary, based on the concept of “translating evolution into technology”, that is mimicking natural solutions to develop new technologies in the fields of robotics, materials science, and life science. Currently IIT is conducting its new scientific plan (2018–2023) developing four strategic research domains: Robotics, Nanomaterials, Technologies for Life Science, and Computational Sciences. The main goal is to produce technologies that will have a positive impact on some important societal challenges, such as sustainability and the environment, healthcare and aging society, also reflecting the priorities of EU framework programs. This approach promotes the creation of joint-labs and research agreements with industrial partners, universities, and international research centers. Role in the project IIT team IIT will coordinate COgITOR (WP1); will provide experimental support for the fabrication of self-healing skin, procurement and connection of  $\mu$ PV modules and take care of sensing technology (WP2), will provide the custom chips for tomographic MIS (WP3); will take care of the sensing lab test bench and sensing CCS characterization (WP2); will provide the thermomagnetic energy harvesting technology (WP4), will integrate all subsystems and take care of the integrated testing and the realization of final EE characterizations (WP5), will participate to communication, dissemination and exploitation activities (WP6). Basically, both sensing and harvesting liquid technologies are already among IIT’s assets; nevertheless to tackle integration in WP5, IIT is involved heavily in the proposal, with slightly less than 40% of the PMs (of which, 34% are on WP5).

 <http://www.iit.it> Italy



## UNIVERSITY OF THE WEST OF ENGLAND, BRISTOL

Group of Unconventional Computing (UCG) at UWE BRISTOL. UCG is a large academic unit which brings together the disciplines of Information Systems, Computing, Electrical and Electronic Engineering, Mechanical and Manufacturing Engineering and Mathematics. UCG is amongst the most innovative and ground-breaking research centres in UWE BRISTOL, Bristol.

It is based at the Faculty of Environment and Technology. The Faculty has a commitment to interdisciplinary approaches to both research and teaching. The Faculty employs some 300 people, and funds a number of full-time research studentships. The Faculty's vision is to invent the future by: defining a new vision for education in computing, engineering and mathematical sciences; becoming a showcase for emerging technology; developing novel ways of using technology; demonstrating excellence in research linked to excellence in teaching and learning; enabling new models of partnership with industry and the community. The UCG is an interdisciplinary cooperation spanning theoretical and experimental studies of novel principles of information processing in physical, chemical and neuronal-based systems. Discovered principles are being applied to the design of experimental massively parallel unconventional computers which exploit the phenomena of non-linear dynamics. Role in the project UWE BRISTOL team will contribute their experience in unconventional computation (leading WP4, plus tasks T6.2, WP6), of theoretical and experimental laboratory studies of large-scale chemical, physical and living media, electronics with organic and inorganic substrates based on principles of waves interaction, design of spatially extended computing systems, theory of computation, artificial intelligence and collective robotics; and world leading expertise in using machine learning techniques with non-linear and living substrates. Furthermore, UWE BRISTOL will participate to all other WPs, in particular giving strong support to WP2 for interfacing with inner radial nerves and the floating custom chip performing the tomographic MIS, that will be used to interrogate the CCS, WP5 for integrated testing and WP6 for the communication of science through arts.

 <https://uncomp.uwe.ac.uk>

 United Kingdom



# Empa

Materials Science and Technology

## EIDGENOSSISCHE MATERIALPRUFUNGS- UND FORSCHUNGSANSTALT (EMPA)

Empa is the Swiss Federal Laboratories for Materials Science and Technology, a part of the Swiss Federation's ETH Council with ties to ETH in Zürich, EPFL in Lausanne, and the Paul Scherrer Institute (PSI) in Villigen. Empa is headed in Dübendorf and has two stations in Thun and St. Gallen, with an overall 1,000 staff and students.

Empa is an interdisciplinary research and services institution for material sciences and technology development. Empa's research and development activities are oriented to meeting the requirements of industry and the needs of society, and link together applications-oriented research and the practical implementation of new ideas, science and industry, and science and society. EMPA's research is structured in five Research Focus Areas (RFA): Nanostructured Materials, Sustainable Built Environment, Health and Performance, Natural Resources and Pollutants, and Energy. The Laboratory for High Performance Ceramics works in structural and functional ceramic materials and components. Test facilities for the electrical and electrochemical characterisation of materials, and optical and photoelectrochemical instruments are available. Empa provides a wide range of additional instrumentation for chemical and structural analysis for micro and nanostructures, spectroscopy and nondestructive testing (ultrasonic / computer tomography), and a mechanical workshop with skilled and experienced engineers and technicians. Role in the project Empa is leading the WP4, with a specific activity regarding the functionalization of colloidal complexes for the implementation of sensing, information storage and energy harvesting. Empa will also participate in the coordination of WP1 and dissemination, exploitation and communication WP6. Contributions to all other WPs are confirmed as per proposal plan.

 <https://www.empa.ch>

 Switzerland



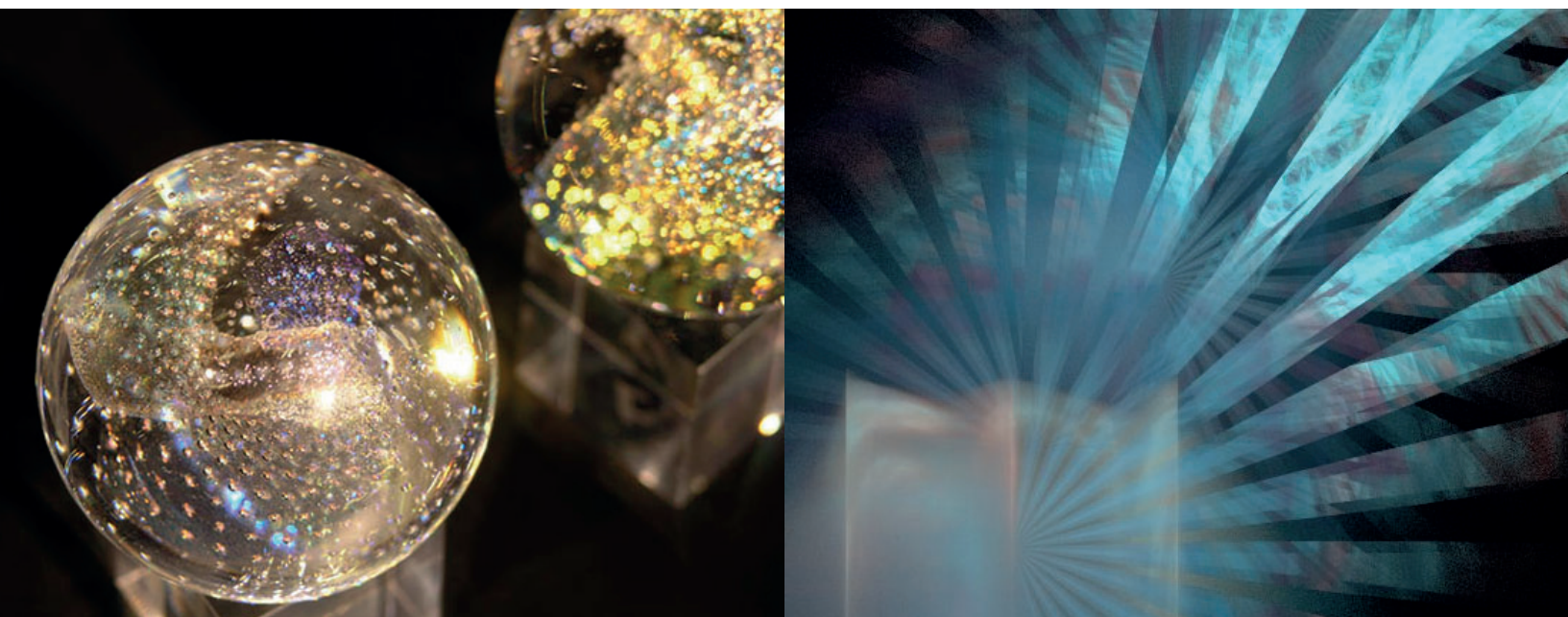
## PLASMACHEM PRODUKTIONS- UND HANDEL GMBH

PLASMACHEM GmbH is a German SME dedicated to the development, production and sales of nanomaterials like nano metals, nano oxides, quantum dots, nano diamonds and other carbon based materials etc.

PLASMACHEM was founded in 1993 in Mainz and moved to Berlin-Adlershof, Germany's leading science and Technology Park in 2005. We currently have 4 permanent full-time employees. The main know-how of the company is related to nanomaterials, detonation-, vacuum-, plasma- and ultra-thin film technologies and biomedical and technical applications. After the unforeseen and early death of PLASMACHEM's founder, Dr. A. Kalachev, the company will shift its main technologies away from plasma-related processes, where Dr. Kalachev was an unique expert, to more chemical approaches on developments and modifications of nanomaterials for various R&D and technical applications in the future. Role in the project The role in the project will be mainly the development and synthesis of ferromagnetic nanoparticles as well as tri- and tetra-antennary tectomers as basic tools for information storage through pH or electrically induced variations of the crystallinity degree (WP2). Furthermore coordination (WP1) and dissemination and communication tasks (WP6) will be backed.

 <https://www.plasmachem.com>

 Germany





## CIAOTECH SRL

CTECH is the Italian branch of PNO Innovation B.V., the Europe's largest independent public funding and innovation consultancy firm with 30 years of hands-on expertise and more than 500 funding programmes in most EU countries, annually raising approximately 1 Billion Euro for its clients. Created in 1985, PNO Group is a high-growth knowledge-intensive company, supporting over 2,000 clients throughout Europe, annually developing over 250 European consortia.

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 <https://www.pnoconsultants.com/it>

 Italy

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