THE CYPRUS INSTITUTE news
www.cyi.ac.cy • Autumn 2013 • Issue 6
ISSN 1986-4019

Building a Strategy for Solar Research

The Cyprus Institute, recognizing the importance of solar power as one of the most promising paths towards sustainable development for EU, Cyprus and the region, participates as a major partner in two critical EU research projects. The 'Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy' (STAGE-STE) project, with European funding of €9,500,000 and the EU-Solaris initiative, with funding of €4,500,000, aim to coordinate actions and enhance collaboration between institutions, creating in essence a pan-European strategy for solar research.

Photo from csp-world.com.

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Energy Research at CyI

The world today relies mostly on fossil fuels for satisfying the ever-growing energy needs of organized societies. This serious dependence on an exhaustible source has initiated an effort to identify and develop alternative energy solutions which would be both dependable and abundant. Recently, climate change, which is closely linked to CO_2 emissions from fossil fuels, has made this effort even more imperative directing it towards the development of Renewable Energy Sources. Amongst them, Solar Energy is especially suitable for the Mediterranean region and Cyprus. CyI has since 2008 launched a research division in this fast-growing field, which seeks technological solutions for the exploitation of Solar Energy tailored-made for the Cypriot and regional environment.

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Unmanned Airplanes: A New Tool in Environmental Observations and Monitoring in Cyprus

The Cyprus Institute's Unmanned Airplanes take off for their first scientific mission, in cooperation with the University of Tel-Aviv and the Max Planck Society (MPG), measuring atmospheric dust concentrations. This unique facility opens up new and exciting prospects for environmental research in Cyprus. page 3

Computational Power for Cyprus

Cy-Tera High Performance Computing Facility is celebrating its first year of successful operation. Currently being the largest available computational resource for academic research in the Eastern Mediterranean, this demonstrates Cyprus' regional leadership role in the field. page 4

International Conference Series on Energy Water and Climate Change

The Energy, Water and Climate Change – Building Bridges between Europe and MENA International Conference organized by CyI brought together scientists, policy and decision makers who discussed a broad spectrum of topics related to climate change, energy technologies and the collaboration in science and technology between countries from Europe, Middle East and North Africa . page 5

Cyl's collaboration with ENEA on Solar Energy

From left to right: Prof. Costas Papanicolas - President of Cyl, Dr. Fabrizio Fabrizi - Head of the ENEA Thermodynamic Solar Laboratory and H.E. Mr. Alfredo Bastianelli - Former Ambassador of Italy at the Signing Ceremony.

The collaboration between The Cyprus Institute and the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) has been pivotal towards the development of Cyl's Energy program in its early stages, while currently it has evolved into a strong partnership examining the huge potential and wide applicability of solar energy in the Eastern Mediterranean and Middle East.

In June 2012, Cyl and ENEA signed a Memorandum of Understanding formalizing the long standing collaboration between the two institutions which participate together in four EU funded projects, including the project OPtimization of a Thermal energy Storage system with integrated Steam Generator (OPTS), an innovative initiative of ENEA for a thermal energy storage system incorporating a steam generator.

ENEA was formally established in 2009, as an umbrella agency incorporating numerous research agencies and laboratories whose existence dates back to 1952, when the National Committee for Nuclear Research was founded. The organisation expanded into Alternative and Renewable Energy Sources, as well as other related fields of research. Today, ENEA is organised as a public undertaking conducting research in the fields of energy efficiency, renewable energy sources, nuclear energy, climate and the environment, safety and human health and new technologies.

ENEA is comprised of nine Research Centers, five research laboratories and a number of administrative units located across Italy. Nearly half of ENEA's approximately 3200 employees are researchers and engineers. Additionally, ENEA is providing consultant services for firms in its areas of expertise, support to Public Administration, and advice on matters of Cultural Heritage Preservation amongst others. ENEA is a leader in solar thermal research worldwide and has been instrumental in the advancement of the field, with breakthroughs such as the solar receiver tubes and the thermal storage systems, particularly in the field of high temperature molten salt energy storage.

www.cyi.ac.cy/rd/mouenea.html

Building a Strategy for Solar Research

The importance of Solar Thermal Energy (STE) research is highlighted by the fact that in recent years the EU has been steadily increasing the funding of projects with the potential of advancing this field and bringing solar energy one step closer to large scale industrial deployment. The Cyprus Institute (Cyl) recognized early on the importance of solar thermal power as one of the most promising paths towards sustainable development, and has developed programs in this thematic sector.

This rapidly expanding scientific field, however, could face the danger of fragmentation and research duplication which could impede its advancement unless appropriate coordination is put in place. To this end, the EU has funded two critical projects which aim to coordinate actions and enhance collaboration between institutions, creating in essence a pan-European strategy for solar thermal research.

The first project is the 'Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy' (STAGE-STE). This four-year project with European funding of €9,500,000 aims to create a reference organization for STE research in Europe, which will enhance collaboration between relevant EU and international institutions, align the different national research programs and accelerate knowledge transfer to industry. The project is coordinated by the Spanish Research Center for Energy, Environment and Technology (CIEMAT).

The second project is the EU-Solaris initiative, with an EU budget of €4,500,000 whose purpose is to create and coordinate a network of the major European research infrastructures for STE, aiming at the improvement of state-of-the-art technologies in the field of concentrated solar thermal energy. The project is coordinated by the Advanced Technological Centre for Renewable Energies (CTAER). The initiative is integrated in the framework of the European Strategy Forum on Research Infrastructures (ESFRI) of the European Commission.

Cyl participates in both projects as a major partner, securing an EU funding in excess of €750,000. Other partners in addition to CIEMAT and CTAER include some of the most prominent institutions in Europe, such as the Institute for Solar Research of the German Aerospace Agency (DLR), the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), the French National Center for Scientific Research (CNRS-PROMES) and many others.

www.cyi.ac.cy/rd/stagesolaris.html

Photo by Alejandro Flores.

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Unmanned Airplanes: A New Tool in Environmental Observations and Monitoring in Cyprus

Unmanned airplanes (AUVs), also known as 'drones', play an increasing role in linking individual, on-the-ground measurements and large-scale satellite observations. The Cyprus Institute is one of the few Institutions worldwide that has the capability of using AUVs for Scientific purposes, actually unique to the region and Europe. The inaugural scientific mission of The Cyprus Institute's unmanned research airplanes took place recently, in a project that is jointly undertaken by the University of Frankfurt - Germany, the Tel Aviv University - Israel, the Weizmann Institute - Israel and CyI's Energy, Environment and Water Research Center (EEWRC). The core objective of this project is to gain a better understanding of atmospheric dust concentrations, a common, though usually unwanted phenomenon in Cyprus, and the role it plays in interactions with clouds that may ultimately result in rain. The mission not only provides valuable information on the vertical size distribution of the dust particles, but has also resulted in extensive sampling of these particles at various altitudes by employing a highly sophisticated sampling device, which was developed by scientists at the University of Frankfurt.

This mission also marked the inauguration of The Cyprus Institute's Unmanned Airplane Facility, which is largely being developed in the framework of the 'Autonomous Flying Platforms for Atmospheric and Earth Surface Observation' project (APAESO). APAESO aims at sophisticated atmospheric measurements, but is also intended to address changes in climate-related changes in vegetation cover, oceanic biological activities or contamination of water reservoirs, to name but a few of the possible remote-sensing applications. To pursue these ambitious goals, this unique infrastructure comprises four research airplanes, a mobile ground control station and a host of scientific instruments. The major advantages of unmanned airplanes lie in the versatility and flexibility of their employment, the wide variety of research issues they allow to be pursued, the relative cost effectiveness of utilizing them, and their ability to carry out missions that would hardly be possible with piloted airplanes. In the near future, the Facility will be made available to the Cypriot and International research community and will open up new and exciting prospects for environmental research in Cyprus.

The APAESO project is co-financed by the European Development Fund and the Republic of Cyprus through the Cyprus Research Promotion Foundation: ΝΕΑ ΥΠΟΔΟΜΗ/ΝΕΚΥΠ/0308/09

www.cyi.ac.cy/rd/apaeso.html

ICACH presents RTI results on El Greco Paintings

Following the application of RTI (Reflectance Transformation Imaging) photography on three paintings by the famous Cretan artist El Greco (Domenikos Theotokopoulos) in Nicosia in January 2013, STARC's Nikolas Bakirtzis and Ropertos Georgiou were invited to present the project's results in Athens. The project was made possible in the framework of the collaboration between the Leventis Municipal Museum and CyI. The opportunity arose as a result of the El Greco exhibition organised by the Leventis Museum in Nicosia in cooperation with the Metropolis of Syros / 2nd Ephorate of Byzantine Antiquities, the Benaki Museum and the Historical Museum of Crete, being the holders of the three paintings: the 'Dormition of the Virgin' (1565-66), 'The Adoration of the Magi' (1565-67), and the 'Baptism of Christ' (1567) respectively. RTI photography is developed by CyI's Imaging Center for Archaeology and Cultural Heritage (ICACH), a joint CaSToRC and STARC venture.

In Athens, two workshops organized by the Benaki Museum and the 2nd Ephorate of Byzantine Antiquities in March 2013, featured ICACH's work with the participation of curators, archaeologists, photographers, conservators and art historians. Participants recognized the critical value of RTI images and urged the documentation of other early El Greco paintings (dated before his 1577 arrival in Spain). Images offered analytical views of the paintings permitting the analysis of the artist's technique, brushstroke, colour use, later interventions, deteriorations and other details. This advanced technology provides an interactive experience to the user who can control the lighting angle to virtually illuminate, in high analysis, every detail on the surface of the photographed object. The further study of these results in 2014, designated as international 'El Greco Year', will contribute to new knowledge on the work of the seminal artist.

Applying RTI photography on Greco's Dormition of the Virgin (dated ca. 1565-66).

www.cyi.ac.cy/rd/cch.html

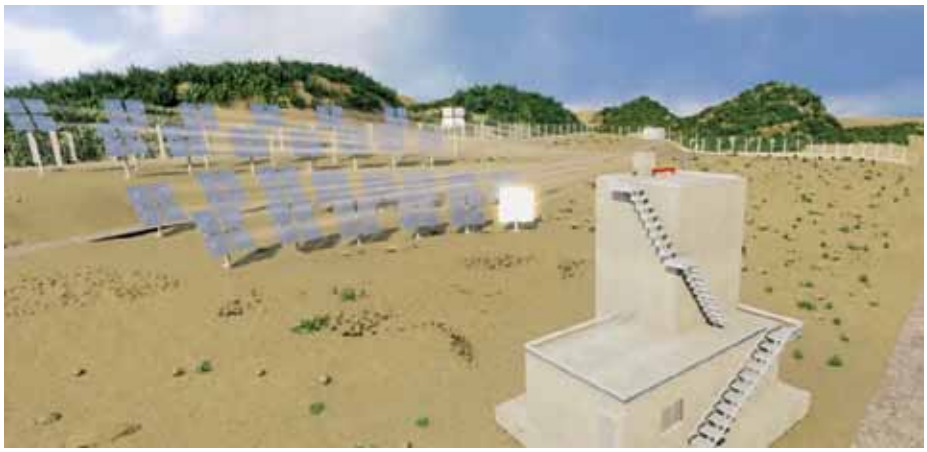
Energy Research at CyI

Almost 150 years since the drilling of the first commercial oil well, the world today continues to rely heavily on fossil fuels for covering its ever-growing energy needs. In recent years a global effort has been made to identify and develop alternative energy solutions. Additionally, realization that climate change is closely linked to CO_2 emissions from fossil fuels, has made this effort even more imperative. Solar energy, an unlimited source, is generally recognized as the most promising of Renewable Energy Sources (RES), especially for the Mediterranean region. Its ability to be coupled with thermal energy storage systems for uninterrupted operation presents a unique advantage, critical to the development and large-scale adaptation of RES.

The Cyprus Institute recognizes not only the benefits but also the suitability of solar energy for Cyprus, an island-country, which depends almost completely on oil for energy. To this end, the CyI developed a dedicated research division, which not only conducts research in this fast-growing field, but also examines its adaptation to the Cypriot and regional environment.

Today, CyI's energy research portfolio spans many a variety of fields, largely supported by strategic competitive-funded projects and collaborations with leading institutions worldwide. CyI's Energy portfolio is developed following the identified niche for solar energy requirements and peculiarities of the Mediterranean islands and isolated communities.

The energy programme was inaugurated in 2008 with a techno-economic feasibility study commissioned by the Cyprus government, for an innovative solar thermal pilot plant, capable of producing electricity and desalinating water simultaneously. The solar thermal co-generation scheme has become the main research platform and has spawned a number of projects in various areas of solar thermal and desalination research. It is now recognized as a concept of tremendous validity and it is pursued in addition to CyI by many institutions worldwide.



Artist's rendering of the heliostat field at Pentakomo, concentrating solar irradiation on a receiver placed atop a central tower. The receiver converts the concentrated light into heat, which is eventually used for generation of electricity and desalinated seawater.

A key initiative is the EU-funded Solar Thermal Production of Electricity and Water (STEP-EW), a project, which aims to construct a small experimental unit, which will validate the co-generation concept and identify problems with systems deployed in coastal and hilly environments. The unit will employ a new innovative receiver, which was developed and patented by CyI, and a thermal energy storage system. The small system will be placed in Pentakomo, where CyI is developing a field laboratory for experiments on solar energy and advanced desalination methods. The project is realized through the INTERREG III Greece – Cyprus 2007-2013 programme and is co-financed by 80% from the European Union (ERDF) and 20% by national funds of Greece and Cyprus.

Energy storage is considered one of the greatest challenges of the 21st century. Efficient and cost-effective thermal energy storage holds the promise for upgrading solar energy and other intermittent renewable energy sources into a dependable, heavy-load energy source for commercial deployment. CyI is participating in a large consortium of European institutions and industrial partners for the EU-funded project OPtimization of a Thermal energy Storage system with integrated Steam Generator (OPTS). The project aims to examine and further refine an innovative storage system which used molten salts to store energy, and which incorporates a steam generator for direct steam production to be used for electricity production.

Electricity production and Desalination are not the only applications for solar thermal energy. CyI participates in an international consortium within the EU-funded project Small scale thermal solar district

Cy-Tera: Computational Power for Cyprus

The Cy-Tera supercomputer at The Cyprus Institute is the first national supercomputer facility open to all scientists in Cyprus, being in operation since May 2012. It operates following the model of other established European supercomputing centers and was funded through the infrastructure call of the Cyprus Research Promotion Foundation. Its operations are supported through the EU project LinkSCEEM-2, coordinated by The Cyprus Institute. The facility is of regional relevance, as it is currently the largest available computational resource for academic research in the Eastern Mediterranean (EM). This demonstrates Cyprus' leadership role in the region and its potential for becoming an educational and research bridge between Eastern Meditteranean and EU.

Cy-Tera is celebrating its first year of successful operation. Within the first 12-month period, around 80 research projects were pursued on Cy-Tera. This gave 117 scientists access to this large-scale computational facility. So far, the projects consumed 8 million core hours of computational time. A similar amount of computation could be achieved by a standard laptop over 456 years of continuous operation. The scientific simulations that were performed on Cy-Tera produced around 70TB of data. The same amount

of storage could hold the entire human genome 100,000 times (size of human genome is approx. 700 MB).

Cy-Tera was established relying on the collaboration and expertise of world leading computa-

units for Mediterranean (STS-MED) which aims to develop four small demonstration units of varied applications in Sicily, Cyprus, Egypt and Jordan, verifying the suitability of solar energy for a variety of applications suitable to the Mediterranean region.
The relevance and appropriateness of CyI's research agenda is further affirmed by its participation as a major partner in the two leading EU projects for Solar Thermal Energy, the EU-SOLAR-IS and the recently awarded 'Scientific and Technological Alliance for Guaranteeing the European Excellence in Concentrating Solar Thermal Energy' (STAGE- STE). Both aim to shape, develop and coordinate European research infrastructures and research programmes respectively on solar thermal energy, in order to expedite the maturity and adoption of Solar Energy worldwide.
Along with the tremendous promise that solar energy holds for Cyprus in the future, the discovery of natural gas resources in the deep water off the southern coast of Cyprus has created opportunities for natural gas exports and a major transformation of the country's energy system. The future monetisation pathways and its impact on Cyprus is the main objective of CyI's and MIT Energy Initiative's study, Natural Gas Monetization Pathways for Cyprus, which aims to investigate the economic implications of key technology and policy options for natural gas development in Cyprus. The study seeks to provide an independent and transparent analysis of options for Cyprus natural gas resource development and exports. Along with Solar Energy, Natural Gas can become the primary components of Cyprus' energy mix in the near future, reducing dramatically its dependency on oil.

www.cyi.ac.cy/rd/ercyi.html

tional centers such as NCSA in the USA and the Juelich Supercomputing Centre in Germany.
Cy-Tera (ΝΕΑ ΥΠΟΔΟΜΗ/ΣΤΡΑΤΗ/0308/31) is co-financed by the European Regional Development Fund and the Republic of Cyprus through the Research Promotion Foundation and the EU infrastructure project LinkSCEEM-2 (under Grant agreement no: 261600), which is led by CyI. Access to the machine is free to all scientists in Cyprus and the Eastern Mediterranean region based on merit, facilitated through a peer review process and an international panel of evaluators.
www.cyi.ac.cy/rd/cytera.html

International Conference on Energy, Water and Climate Change

In December 2012, 140 participants from 25 different countries from Europe and the Middle East/North Africa (MENA) met for the, **Energy Water and Climate Change - Building Bridges Conference (EWACC2012-BB)** in Nicosia. Participants including eminent scientists, policy and decision makers from the private sector came together to discuss a broad spectrum of topics ranging from climate change and its impact, water and food security, energy technology, as well as renewable energies and the collaboration between Europe and the MENA countries in science, technology, education and training, in the context of an evolving common EU-MENA knowledge area.
The MENA region, with a population of approximately 380 million inhabitants, is characterized by strong environmental gradients, climate extremes and diverse economic, social and cultural identities. From a global perspective, the region is a climate change 'hot spot'. Adverse impacts of climate change throughout the 21st century are expected, and major challenges in energy and food security, threats to environmental integrity, as well as decreasing availability of fresh water are therefore anticipated.
Science and technology are key determinants for economic growth and societal well-being. In addressing the many and growing challenges for humanity, scientific research is crucial to contribute to identify sustainable solutions in a region with limited resources. A true European-MENA partnership in science and technology is needed and should be developed through co-operations between international research and educational institutions.
Cyprus, at the cross roads between Europe, the Middle East and North Africa, can play a major role in advancing the dialogue between European countries and the MENA region on these issues. This has already been pursued during the first International Conference on Energy, Water & Climate Change in the Mediterranean & the Middle East (EWACC2010), which took place in January 2010. Joining forces with the German research center **DESY (Deutsches Elektronen-Synchrotron)**, significantly enhanced the potential to initiate true European-MENA partnerships in science and technology. The major topics which were discussed during the conference included climate change, weather extremes, air pollution and human health, water availability, food security, hydro-conflicts and human security, energy supply and demand, renewable energy and energy conservation, opportunities and challenges of EU-MENA scientific cooperation and the future of a common EU-MENA knowledge area.
The conference was preceded by a workshop for young scientists particularly from MENA countries. The 'Young Scholars Forum' comprised lectures by distinguished academics on advanced topics including energy, water and climate change. The Forum brought together 32 young researchers in discussions on global questions and major scientific and technological challenges.
The main conclusions of the EWACC2012-BB conference have been summarized in the Cyprus Declaration 2012.
Building on our positive experiences with EWACC2012, a follow-on, the EWACC2014-Building Bridges conference is planned to take place in November 2014. In addition to some of the issues that were central to EWACC2012, the next conference will expand to address two additional foci. The first relates to food security in the MENA region in light of anticipated climatic changes. This will also include considerations related to the repercussion of climate change on water security as well as the need to restructure the agricultural sectors. Secondly, we will discuss implications of the recently discovered off-shore hydrocarbon deposits in the Eastern Mediterranean. This may encourage MENA countries to forge new partnerships between their energy sectors. Moreover, innovative combinations between natural gas and renewable energy sources may offer opportunities to advance low-carbon economies in the Eastern Mediterranean. More information will be announced on our EWACC website soon.
http://ewacc2012.cyi.ac.cy/

2012 - 2013 Hubert Curien Memorial Lecture

The Hubert Curien Memorial Lectures are annual public lectures honoring Prof. Hubert Curien, Founding Chair of CyI's Board of Trustees. This year the lecture entitled 'Who needs the Higgs boson?' was presented by Prof. Edouard Brézin and Prof. Herwig Schopper.

The discovery of the Higgs boson comprises the last piece of the puzzle, validating the most comprehensive theory in Physics, the so called 'Standard Model of Particle Physics'. It is thought to be responsible for endowing mass to the fundamental particles, which constitute the building blocks of the universe. The lecture explained the 'hunt' for this elusive particle from two perspectives: theory (Prof. Brézin) and experiment (Prof. Schopper). Although radioactivity was discovered more than a century ago, its precise understanding went through a long series of experimental and theoretical puzzles. Prof. Brézin gave a brief survey of this history ending with the "Higgs mechanism". Prof. Schopper continued and explained the painstaking and long hunt for the Higgs particle and discussed the consequences of this discovery for the understanding of the micro and macro cosmos and the relations between science and society.

Prof. Edouard Brézin is the former President of the French Academy of Sciences and Chair of CyI's Board of Trustees. Prof. Herwig Schopper is the former Director General of the European Organization for Nuclear Research (CERN), a founding member of the Board (now Honorary Trustee) and Chair of CyI's Scientific Advisory Council.

Professors Brézin and Schopper have been awarded in 2012 the Grand Cross of the Order of Merit of the Republic of Cyprus for their contribution in science, technology and education in Cyprus and the wider region. The Grand Cross of the Order of Merit is one of the highest distinctions of the state.

www.cyi.ac.cy/rd/merit.html
www.cyi.ac.cy/rd/hcl.html

CyI Public Lectures

Every year The Cyprus Institute organises a number of public lectures on a wide variety of scientific topics, aiming to educate the public and promote knowledge. The lectures are given by prominent experts in their field and are prepared for a general audience. This year the Institute organised, amongst others, two major lectures.

The first, entitled 'Ideological and Systemic Alterations: the Critical Endangerments of the Economic Crisis', was organised in collaboration with The Cyprus Employers and Industrialists Federation with **Prof. Tassos Giannitsis** as the guest speaker.

During the lecture, Prof. Giannitsis discussed the questions raised by the economic crisis arguing that it highlights an ideological dimension that exceeds deficits, debts, incomes and banks. In his talk he discussed how the path for each country is determined by national choices and Europe's policies and that experience shows that the crisis will be overcome. When and how countries will overcome it, he said, comprises the main challenge of politics. Tassos Giannitsis is a Trustee of CyI's Board. He served as Minister of Interior in Greece and is Professor Emeritus of the University of Athens. He also served as Chief Economic Advisor to the Prime Minister, Minister of Labour and Social Affairs, Alternate Foreign Minister, Foreign Minister and Chairman of the Hellenic Petroleum Co. S.A.

The second lecture was entitled 'Survival of the Euro: Views of a Sympathetic Outsider' and the guest speaker was **Prof. Richard N. Cooper**, Maurits C. Boas Professor of International Economics at Harvard University, USA and member of CyI's Board of Trustees. Prof. Cooper commented on the implications of a common currency and in particular the adjustment mechanism, the structural weaknesses of the Maastricht Treaty, the current discussion needed for institutional changes in the EU and the Eurozone to address the weaknesses, and the prospect of solving the current problems through the austerity policies pursued throughout the Eurozone. Prof. Cooper served on several occasions in the US Government, as chairman of the National Intelligence Council, Under-Secretary of State for Economic Affairs, Deputy Assistant Secretary of State for International Monetary Affairs and senior staff economist at the Council of Economic Advisers. He was also chairman of the Federal Reserve Bank of Boston, Vice-Chairman of the Global Development Network and Provost at Yale University.

Prof. Richard N. Cooper.

www.cyi.ac.cy/rd/glecture.html
www.cyi.ac.cy/rd/cooperlecture.html

The digits of the Holy - 3D scanning of the Last Supper Room


CyI Researcher Giancarlo Iannone scanning the Last Supper Room.

The City of Jerusalem hosted a team of experts from the Science and Technology in Archaeology Research Center (STARC). CyI researchers were invited by the Israel Antiquities Authority in the context of their collaboration concerning the adoption of innovative 3D technologies for the documentation of built heritage. The Israeli team was led by Dr. Hamudi Khalaily, Deputy Director of excavations and survey and Dr. Gideon Avni, Head of the Archaeology Unit, while the Cypriot team was led by Asst. Prof. Sorin Hermon, leader in Digital Heritage Research at CyI, Marina Faka, Surveyor and Giancarlo Iannone, 3D documentation technician. The team documented, using 3D technologies, some remarkable and unique heritage sites in Jerusalem, including the tomb of King David, the room of the Last Supper (Cenacle), a mansion of the Last Supper (Cenacle) and a mansion of the Late Roman period, presumably the palace of Queen Helen the Saint. This work will enable scientists to understand the complexity of the architectural history of the building, prepare a thorough conservation and restoration plan and disseminate the results to the scientific community and the wider public.

President Obama appoints CyI's Honorary Trustee to be his next Energy Secretary

President Obama alongside Ernest Moniz, new US Energy Secretary and Gina McCarthy, Administrator of the US Environmental Protection Agency

Earlier this year, President Barack Obama nominated Prof. Ernest Moniz, Former Director of the MIT's Energy Initiative and Honorary Trustee of The Cyprus Institute, to be the next Energy Secretary of the US Department of Energy, one of the most important Ministries of the US Government. In May 2013 the US Senate unanimously confirmed Prof. Moniz as Energy Secretary.

Prof. Moniz is one of the Architects of The Cyprus Institute, CyI's founding Trustee and was actively involved in the 2001 convocation for the original planning of the Institute. He was particularly instrumental in the creation and establishment of the Energy, Environment and Water Research Center (EEWRC). He was also a principal architect of the Agreement of Cooperation between the Massachusetts Institute of Technology, the Cyprus Research Promotion Foundation and The Cyprus Institute. He was a member of CyI's Board of Trustees from 2004 to 2012 and is now an Honorary Trustee. Until his departure from MIT, he was leading a major project under the MIT-CyI- RPF agreement on the monetization options of the recently discovered natural gas in Cyprus.

In 2008 he was awarded the Grand Cross of the Order of Makarios III by the President of the Republic of Cyprus, Mr. Tassos Papadopoulos, for his contribution to the development of research and education in Cyprus and the wider region and especially for the development of The Cyprus Institute.

www.cyi.ac.cy/rd/emonizus.html

New Board Member

The Board of Trustees of CyI admitted in its ranks a new distinguished member, Prof. Ioli Kalavrezou. Prof. Kalavrezou is a Dumbarton Oaks Professor of Early Christian and Byzantine Art History at the Harvard University. She has held professorships at UCLA and the University of Munich. Her research and publications focus on the arts of the empire of Byzantium with a special interest on such topics as ivory and steatite carvings, imperial art and self-presentation, manuscript illumination, and the use of symbols and relics in the hands of the empire. Several of her studies concern the cult of the Virgin Mary and the everyday world of the Byzantines, especially women.

New CyI Laboratory in operation

The new CyI Laboratory building has become fully operational as of May 2013, signalling a new beginning for the research capabilities and potential of The Cyprus Institute. It provides 2300m^2 of mainly laboratory space. This state-of-the-art building demonstrates CyI's ambition to remain at the forefront of scientific endeavor. At this stage, the new building will house research activities of primarily the Energy, Environment and Water Research Center (EEWRC), including the work of the research groups of Solar Power and Desalination, Environmental and Atmospheric Monitoring, Environmental Chemistry and Marine Biology.

OUTREACH ACTIVITIES

Science Outreach

The Institute works closely with schools throughout Cyprus, to encourage students to pursue studies in science, technology and engineering in higher education. Gaining an insight into life as a scientist can help students understand what they could gain from further or higher education in the sciences. To this end, over the past year The Cyprus Institute has organized a range of outreach activities that involve campus tours and school visits, to numerous schools across the island. We are offering schools, colleges and universities tours of our facilities. For more information contact the Communications Department on 22208753 or email communications@cyi.ac.cy.

Solar Car Challenge 2013

Now in its fourth year, The Cyprus Institute Solar Car Challenge has become a popular annual summer event. Co-organized by Neapolis University and the Pafos and Geroskipou municipalities, this year's event took place on Sunday, 30 June. The aim of the event is to generate interest in science, technology and engineering amongst students and to raise awareness of environmentally friendly renewable energy and alternative transport methods. Participants designed and built a vehicle that was powered using energy, collected from photovoltaics. The vehicles began the race at Neapolis University with a fully charged battery; they then drove along a designated route on the public roads of Geroskipou and Pafos, before heading to Pafos castle for the award ceremony. The teams that participated this year were Philadelphia University - Jordan, Pascal English School – Nicosia, Technical School of Avgorou, Ammochostos with two vehicles, Technical School Ayiou Lazarou – Larnaca, Sun-der - Nicosia (private individuals). This year's winners were the Technical School of Avgorou.

http://www.cyi.ac.cy/solar-car-challenge.html

Personalized Medicine

By Mr. Philippe Busquin former EU Commissioner for Research and Member of The Cyprus Institute Board of Trustees

The sustainability of European healthcare systems is under threat - the ageing of the European population, the prevalence of chronic disease and the need to focus on wellness and preventative health management, in parallel with treatment of diseases, pose significant social and economic challenges. The current economic situation has made these issues even more acute. In addition, many healthcare-related industries have reduced their Research & Development (R&D) bases in Europe and intellectual property generated within the European Union (EU) is frequently commercialized elsewhere. Yet, Europe still has significant strengths in healthcare - a strong academic base and industrial leadership in areas such as pharmaceuticals, medical devices, mobile technologies and diagnostics as well as a strong public healthcare ethic. Initiatives in Open Innovation, such as the Innovative Medicines Initiative and the recently launched European Alliance for Personalized Medicine (EAPM), have shown that Europe can capture and capitalize on collaborations between industry, Small Medium Enterprises (SMEs), academia and other stakeholders in the healthcare system, to create an intellectual and economic impact.

«Europe is now uniquely placed to build on these competitive advantages and to create an Open Innovation ecosystem for healthcare»

Europe is now uniquely placed to build on these competitive advantages and to create an Open Innovation ecosystem for healthcare, which would promote economic growth, increase employment, improve citizen-centric health and wellness, and reduce healthcare costs.

The INNOVAHEALTH strategy, launched during the 2012 Cypriot EU Presidency, provides an Open Innovation roadmap to create an integrated and interdependent environment (ecosystem), where companies, scientists, policymakers, governments, patients and other organizations can interact productively to promote radical change and innovation in healthcare, supported by new developments in information and communication technologies (ICT).

Increased investment and collaboration between European research centers is vital to provide long-term funding and sustainability for the innovative and cost-effective infrastructures needed to exploit personalized medicine. Significant investment is required in radical new technologies for drug discovery and development. To reflect new knowledge about human biology, diseases need to be classified in a more detailed manner on the basis of clinical features and biomarkers, to allow for different treatment approaches. New technologies for defining and diagnosing diseases and directing treatment should be deployed. Standardization of tissue collection or biobanks will be needed to match the emergence of new technologies.

Strategic co-ordination of health research led by the scientific community but also involving other stakeholders, including patient organizations, is essential within the next EU Research Framework Programme, the Horizon 2020 framework, to avoid overlaps and maximize use of resources.

The EU should encourage new forms of collaboration between academia and industry to discover and validate pre-treatment predictive biomarkers for the stratification of patients for treatment, and to use computer models for simulation of treatment options. There is an increased role for bioinformatics and systems biology, along with a technological infrastructure in clinical research, targeting the identification and validation of predictive biomarkers, as well as for the development of new tools such as "virtual persons". Advanced databases of biological, clinical and environmental data are required together with clinical databases for research outcomes. Exchange of knowledge and best practice is necessary to harmonize protocols and integrate interoperable data and technologies.

The Cyprus Institute's CaSToRC and Cy-Tera projects are well adapted to participate in this objective. The example of the Biophysics group at the University of Cyprus, which, together with collaborators, used additional computer resources at CaSToRC to perform molecular dynamics simulations to uncover a new structure that may lead to the design of a new generation of drugs with novel properties against Age-Related Macular Degeneration, is a first illustration in this context.