

Excellence 1216								
RIF PROPOSAL NUMBER	TITLE	COORDINATOR	HOST ORGANIZATION	PARTNER ORGANIZATION	FOREIGN ORGANIZATION	PROEGET BUDGET	RIF FUNDING	PUBLISHABLE SUMMARY
Life Science EXCELLENCE/1216/0411	The Brain Injury Neurorehabilitation Project	Foti Constantinidou	University of Cyprus	PA 1: Melathron Agoriston tis EOKA PA 2: MINISTRY OF LABOUR, WELFARE AND SOCIAL INSURANCE PA 3: State Health Services Organization	FRO 1: Kings College London	256.560,00 €	249.972,00	The Brain Injury Neurorehabilitation Project (Brain-Rehab) will generate cutting edge research in brain injury neurorehabilitation. Traumatic Brain Injury (TBI) is a worldwide silent epidemic resulting in significant chronic disability, health and societal burden. Over 1 million Europeans across all ages are hospitalized every year due to TBI and about 10 million new TBI cases are estimated around the world annually. Patients are often faced with cognitive and behavioral difficulties that interfere with their ability to return to productive living thus contributing to unemployment, psychiatric problems, and low quality of life for decades post injury. The scientific objectives of Brain-Rehab will address the aforementioned challenge. First, we will determine the effectiveness of a theory-driven neurocognitive therapy program, the Categorization Program (CP) in combination with a social-communication training on an outpatient basis, during the chronic phase of the recovery process. It is hypothesized that the combination of remedial cognitive and social-communication training will yield improvement in neurobehavioral functioning with sustainable effects. Second, we will establish the first TBI surveillance system in Cyprus and implement systematic data collection from large cohorts across the severity continuum. We will integrate neuropsychological, lifestyle, injury, imaging, genetic, and biological data using state of the art computational methods and quantitatively assess the exact contribution of critical variables to brain injury recovery. The outcomes of Brain-Rehab will have significant impact in TBI rehabilitation research, can result in larger scale multi-site clinical trials and will inform health care practice and policy for allocation of resources and rehabilitation priorities. To achieve its objectives, Brain-Rehab brings together the interdisciplinary expertise from academic, clinical, and industrial partners specializing in rehabilitation medicine, psychology, neuroscience and other relevant fields.
EXCELLENCE/1216/0088	Optimizing the diagnostic value of postsurgical I-123 SPECT thyroid imaging and applying patient-specific dosimetry for radioiodine ablation of thyroid remnants	Yiannis Parpotas	Frederick Research Center	PA 1: MINISTRY OF HEALTH PA 2: Bank of Cyprus Oncology Centre PA 3: YGIA POLYCLINIC	FRO 1: Aristotle University of Thessaloniki	256.896,00 €	249.713,00 €	Differentiated thyroid cancer (DTC) treatment typically involves surgical removal of the whole or largest part of the thyroid gland and subsequent radioiodine therapy (RAIT). For RAIT, I-131 is administered to selectively irradiate thyroid remnants or metastasis. RAIT activities administered are generally empirically determined and fixed by a given institution, which means that some patients may inevitably be given larger or even lower doses from the dose to achieve the highest patient benefit. Post-surgical I-123 SPECT imaging can provide further information on the presence of thyroid remnants and/or metastasis for an accurate (re-)staging of each patient's disease following surgery, thus ensuring a more informative decision for RAIT. Remnant volume estimation can assist physicians in deciding the appropriate activity to be administered, while when dosimetry is performed, the segmented region can aid pharmacokinetics quantitation. Automated and accurate volume estimation on pre-therapeutic scans is therefore important for wider implementation of individualized post-thyroidectomy RAIT. For this purpose, an anthropomorphic neck-thyroid phantom capable of simulating variable thyroid remnant sizes and lesion-to-background activity ratios will be developed, not available in the market in this form, and acquisitions will be performed using the 3 SPECT modalities of the consortium Nuclear Medicine Departments. In this process, an open-access automated and user-friendly software will be developed and validated to (a) correct for scattering, (b) segment thyroid remnants and correct for partial volume effect, (c) calculate and visualize their volume, (d) calculate the I-131 dose for ablation. The general objective of the project is to optimize the diagnostic value of post-surgical SPECT thyroid imaging and accurately determine the I-131 activity for ablation. The proposed open-access software can be used for educational and preclinical application in the framework of promoting individualized medicine.
EXCELLENCE/1216/0417	Genetic modifiers in Alport syndrome and thin basement membrane nephropathy	Constantinos Deltas	University of Cyprus	PA 1: E.U.C. Research Centre Ltd	FRO 1: The Jackson Laboratory	249.999,20	249.999,20	This project aims to provide proof-of-principle for the role of the RICTOR gene as a genetic modifier of the disease course in Alport Syndrome, a hereditary hemorrhagic nephritis. Alport syndrome and thin basement membrane nephropathy (TBMN), a form of late onset Alport nephritis, are caused by mutations in the genes encoding the alpha chains of type IV collagen, expressed abundantly in the glomerular basement membrane. A common feature of Alport and TBMN is the wide phenotypic heterogeneity, not always accounted for by the position or the type of the inherited mutation. Especially for TBMN, we and others have shown that patients heterozygous for COL4A3 or COL4A4 mutations may remain for life with isolated microscopic hematuria or low grade proteinuria while others, even with same mutations may develop focal segmental glomerulosclerosis and progress to serious chronic kidney disease, even end-stage renal disease, in their 50s or 60s. Here we join forces with The Jackson Laboratory and the research center of the European University Cyprus to prove the modifying role of RICTOR, a distinct component of the mTORC2 complex. Working with a human cohort of TBMN patients we derived data suggesting that a variant in the RICTOR gene modulates the risk for developing ESRD, on the background of a COL4A3/4 mutation. The Jackson Laboratory, working independently with a mouse Alport syndrome model, derived data supporting that the Rictor expression level is associated with the glomerular filtration rate. Here we propose to create two novel mouse models of Alport syndrome, one X-linked and one autosomal recessive that will also be heterozygous for a Rictor knockout allele or will bear a Rictor allele with the p.Ser837Phe variant we have identified in humans. In a collaborative work with our Partners we will characterize these mice at clinical, morphological and histological level, in an effort to prove the protective or predisposing role of Rictor. This work will open opportunities for targeted therapies and precision medicine.
EXCELLENCE/1216/0236	Ciliary adhesions and their role in ciliogenesis and ciliary function	Pavle Skourides	University of Cyprus	PA 1: The Cyprus Institute of Neurology and Genetics	FRO 1: The Rockefeller University	249.680,00 €	249.680,00 €	Ciliogenesis is a multistep process that begins in the cytosol, where basal bodies are generated, and ends at the apical surface with the projection of cilia. Cilia are involved in fundamental processes during embryonic development and tissue homeostasis. Defects in the formation or function of cilia have been linked to a spectrum of diseases in humans, called ciliopathies, many of which affect the Cystic population. Uncovering the genes and mechanisms underlying ciliogenesis is crucial in order to better understand the molecular basis of these diseases and develop diagnostic tools as well as therapies. Previous work from our group led to the discovery of the ciliary adhesion (CA) complex. This complex composed of well characterized focal adhesion proteins, forms in close association with the basal bodies in an integrin independent manner and mediates complex interactions with the multiple actin networks formed in multiciliated cells. Understanding these interactions is crucial given the central role of the actin cytoskeleton in numerous processes driving ciliogenesis and ciliary function. Four proteins have so far been shown to localize at CAs: FAK, Paxillin, talin and vinculin and despite previous work on the role of FAK, the study of the complex is still in its infancy. This proposal aims in identifying all the members of the CA complex and dissecting its role in both motile and primary cilia. At the same time we plan to address a number of important questions arising, with respect to the establishment of CAs, the discrete roles of individual CA proteins and the molecular interactions between them. These will be accomplished through targeted proteomic analysis and using cutting edge loss of function approaches in combination with advanced imaging modalities including FRET and FRAP. Finally, we propose a novel Xenopus based assay and a modified ALU cell culture system which are expected to facilitate the study of the molecular basis of the cilia related diseases

EXCELLENCE/1216/0484	Non Invasive Prenatal Diagnosis of beta-Globinopathies using Targeted Next Generation Sequencing Haplotype Analysis	Thessalia Papasava	The Cyprus Institute of Neurology and Genetics	PA 1: State Health Services Organization		250.000,40 €	250.000,00 €	<p>Prenatal diagnosis is currently performed using fetal genetic material that is sampled by invasive obstetric procedures with an inherent risk for fetal loss. The discovery of cell-free fetal DNA in maternal plasma opened up new avenues in the fetal diagnostics by facilitating the option of safer testing with maternal blood.</p> <p>The aim of the project is the development of a non-invasive method for early prenatal diagnosis of fetuses at-risk for beta-globinopathies, a group of severe hereditary anaemias of global significance. The project will develop a novel high-density SNP panel (HAPLOID) for the targeted next generation sequencing (NGS) of maternal plasma. A relative variant dosage (RVD) analysis will be developed for determining both the paternal and maternal haplotypes of the fetus.</p> <p>In parallel, droplet digital PCR technology will be used to develop a direct haplotype phasing approach of the maternal and paternal allele. The approach bypasses the need for mutation specific assays and is not dependent on the availability of other family members such as grandparents or other siblings. Therefore, the approach will be universally applicable to other countries and to other monogenic disorders.</p> <p>The implementation of NGS-based SNP detection will initially provide non-invasive prenatal diagnosis (NPD) for beta-globinopathies. The overall approach will allow, for the first time, coverage of all pregnancies with exclusively non-invasive methods, with scope for IP protection and commercialisation of the HAPLOID. At the same time, the proposed project will provide a model and proof of concept for the development of NPD assays for other inheritable single-gene diseases.</p>
EXCELLENCE/1216/0085	Optimizing the diagnostic value of SPECT myocardial perfusion imaging under the influence of liver activity	Yiannis Parpotas	Frederick Research Center	PA 1: MINISTRY OF HEALTH PA 2: Bank of Cyprus Oncology Centre PA 3: E.U.C. Research Centre Ltd	FRO 1: King's College London	250.300,40 €	249.000,40 €	<p>Myocardial perfusion imaging (MPI) has been proven to be able to assess the functional significance of a coronary artery stenosis. Whereas MPI is a valuable diagnostic imaging process, it is subjected to a variety of artifacts that can limit the performance of the study. Patient-related artifacts in MPI, not originated from the heart, are mainly due to attenuation, thoracic motions, and sub-diaphragmatic activity, mainly due to liver. Physicians should be aware of these artifacts to optimize MPI. While analytic models and patient data are useful, a reproducible, compartmented, mechanical phantom is critical to optimize MPI studies under the influence of liver activity.</p> <p>For this purpose, a human-shaped moving liver in the crano-caudal direction during respiration, will be developed and implemented within the existing anthropomorphic phantom, together with the existing leading and moving left ventricle and inflatable lungs phantoms. MPI in supine and prone positions of the phantom assembly will be performed using the SPECTsingle-CT, SPECTGd-153, SPECTmultislice-CT modalities of the three consortium Nuclear Medicine Departments. MP images will be used to characterize quantitatively artifacts due to various (i) hepatic-to-cardiac activity ratios, (ii) crano-caudal cardiac-lungs-liver oscillation amplitudes during respiration, and (iii) hepatic-to-cardiac promotions. AC-SPECT images will be also corrected for the cardiac motion under the influence of the liver activity. Eventually, the impact of (i) these artifacts, and (ii) motion correction on cardiac defect detection of various sizes will be investigated.</p> <p>The general objective of this project is to optimize the diagnostic value of MPI for the early detection of mild coronary artery disease under the influence the liver activity during its crano-caudal respiratory motion in the framework of improving public and private health services in Cyprus and elsewhere.</p>
EXCELLENCE/1216/0389	Omic studies of the mechanism of activation of gamma-globin for the treatment of haemoglobinopathies	Marlos Phylactides	The Cyprus Institute of Neurology and Genetics	PA 1: State Health Services Organization	FRO 1: Biomedical Research Foundation Academy of Athens	249.997,20 €	249.997,20 €	<p>The aim of the project is to use omics technologies, to identify potential pharmacological targets for the reactivation of gamma globin for the treatment of haemoglobinopathies such as beta-thalassemia and sickle cell disease (SCD). We plan to knock-down expression of 80 shortlisted proteins using lentiviral mediated shRNA transduction in erythroid cells in order to select a single factor for further study using RNA-seq, ChIP-seq and mass spectrometry. This will identify downstream genes and associated proteins, which are likely to be implicated in the regulation of gamma-globin gene expression. These genes/proteins are potential therapeutic drug targets. An effective drug therapy for the treatment of beta-thalassemia and sickle cell disease would greatly improve the expectancy and quality of life of the patients, especially those in poorer countries who currently receive little of no medical care.</p>
EXCELLENCE/1216/0036	Functional and therapeutic implications of histone N-terminal acetyltransferase Naa40 in colorectal oncogenesis	Antonis Kimizis	University of Cyprus	PA 1: E.U.C. Research Centre Ltd	FRO 1: Radboud University	250.000,80 €	250.000,00 €	<p>Histone modifying enzymes and their mediated protein modifications constitute one of the main epigenetic mechanisms through which the cell regulates gene expression. Cancer often develops because the activity of these enzymes is misregulated leading to incorrect gene expression which subsequently promotes hallmarks of carcinogenesis. Therefore, histone modifying enzymes have drawn much interest as promising therapeutic targets and some are currently targeted by pharmacological agents. Despite these accumulating insights, the function of many histone modifying enzymes still remains poorly understood. One such epigenetic enzyme is the abundant and evolutionarily conserved N-alpha acetyltransferase 40 (Naa40) which stayed unexplored for several decades because it was thought to mediate an inert histone modification. Recent work from our laboratory, however, has demonstrated that Naa40 and its catalyzed histone N-terminal acetylation play a regulatory role in gene expression and cell growth. Consistent with this, we have also demonstrated that depletion of Naa40 in human colon cancer cells induces robust cell death. These latter findings implicate Naa40 and histone H4 N-terminal acetylation in human carcinogenesis and propose that this epigenetic enzyme should be explored further as potential therapeutic target. This quest requires complete understanding of the molecular mechanisms employed by Naa40 and its associated modification in cancer cells. Accordingly, the main objective of this project is to decipher the molecular role of Naa40 in colorectal cancer development and evaluate its efficacy as a therapeutic target. To achieve this objective we will utilize a combination of state-of-the-art genomic, proteomic, biochemical and molecular techniques. The proposed project will provide significant new scientific knowledge that will serve as paradigm for the function of other protein N-terminal modifications and, importantly, will identify a novel cancer therapeutic target.</p>
EXCELLENCE/1216/0215	Dissecting the regulatory network of protein arginine methylation using functional genomics in yeast	Antonis Kimizis	University of Cyprus		FRO 1: University of Radboud	250.000,00 €	250.000,00 €	<p>The function of a protein is frequently regulated by post-translational modifications, such as methylation, phosphorylation, acetylation, sumoylation and ubiquitination, which are deposited on the side chain of amino acids. Changes in these modifications can adversely alter the activity of targeted proteins. Arginine methylation is one such modification that is catalysed by a family of enzymes known as Protein Arginine Methyltransferases (PRMTs). PRMTs are ubiquitously expressed in eukaryotic cells and arginine methylation is found in both cytoplasmic and nuclear proteins. Thus, it is not surprising that PRMTs and arginine methylation are already implicated in the pathogenesis of a number of human diseases including cancer. Despite major progress in understanding the biological role of arginine methylation and how PRMTs function in the context of health and disease, our knowledge on the regulation of arginine methylation is limited. Additionally, enzymes that can erase this modification within cells remain elusive. Therefore, the main objective of this study is to identify regulators of arginine methylation in an unbiased manner with the potential to illuminate the highly sought arginine demethylases(s). To accomplish this objective, we will employ a state-of-the-art functional genomics approach in yeast <i>Saccharomyces cerevisiae</i>. The genomic simplicity and genetic tractability of this model system place it in an ideal position for addressing this research objective. Overall, this study will generate new fundamental scientific knowledge on the regulation of post-translational modifications and illuminate novel protein functions that will open new lines of research for understanding the causes of human disease.</p>
EXCELLENCE/1216/0279	Eco-innovation for the production of low environmental footprint wine	Menelaos Stavrinides	Cyprus University of Technology	PA 1: Nicolaides Winery LTD PA 2: Open University of Cyprus	FRO 1 : National Technical University of Athens FRO 2 : University of Aberdeen	252.954,49 €	249.923,04 €	<p>Cyprus has a history of more than 5.500 years in wine production with vineyards shaping the rural landscape of the island. However, wine imports have progressively captured two thirds of the share of the local market, valued at €75 million annually outcompeting local SMEs that seem unable to create a unique identity for their product. ECO-WINERY aims at promoting eco-innovation in vineyards and wineries to enable local SMEs differentiate their wines based on the inherently low environmental impact and significance for the cultural heritage of the island. The project brings together four respected institutions and an SME representing a diverse range of complementary expertise. The consortium will establish an EXCELLENCE HUB to determine for the first time globally the product environmental footprint of wine, in line with recent EU recommendations. ECO-WINERY will a) deliver a user-friendly freeware tool for the determination of the environmental footprint of wine in line with Cypriot consumer concerns, b) explore best practices for lowering the environmental footprint of wine and c) create a protocol for the production of eco-friendly wine. The project will deliver novel and high quality knowledge on Product Environmental Footprint determination, biodiversity conservation and carbon sequestration in vineyards, towards low footprint wine production, zero waste economy and climate change mitigation. Moreover, Eco-Winery will train more than 70 professionals-researchers (half of them early-stage) on innovative methods for grape and wine production that will enhance their career prospects. Networking activities with leading organizations and enterprises from other countries will accelerate the flow of information and will accelerate pioneering progress in the field.</p>

EXCELLENCE/1216/0477	Production of the bioactive signaling messenger nitric oxide from nitrite: Probing the nitrite reductase activity of heme globins and mitochondrial heme-copper respiratory oxidase	Efthycha Pinakoulaki	University of Cyprus	PA 1: Cyprus University of Technology		249.931,20 €	249.931,20 €	It is now well-established that mammalian heme proteins are reactive towards various nitrogen oxide species and that these reactions play significant roles in mammalian physiology. Nitrite reduction to NO and NOx-modified proteins, during physiological and pathological hypoxia appear to contribute to physiological hypoxic signaling, vasodilation, modulation of cellular respiration and the cellular response to ischemic stress. Although the interactions of heme proteins with the bioactive signaling nitric oxide (NO) molecule have been extensively examined, the chemistry involving the interactions of heme proteins with nitrite (NO <sub>2</sub> <sup>-</sup> ), their nitrite reductase function and the nitrite-NO pathway are less understood. In the current proposal we seek to investigate the interactions of nitrite with heme globins and mitochondrial heme-copper respiratory oxidase with the ultimate goal to unravel the catalytic mechanisms that are active for each protein. On this line, the reaction of nitrite with two diverse heme globins, namely myoglobin and neuroglobin, will be studied along with the reaction of nitrite with cytochrome c oxidase. Understanding the molecular mechanism of enzymatic reactions requires the isolation and identification of reaction intermediates, which are kinetically linked and very short-lived. In the current proposal the UV/Visible stopped-flow technique will be employed for kinetics measurements and time resolved resonance Raman spectroscopy for the structural characterization and identification of reaction intermediates. Overall, our research proposal aims to contribute to the understanding of fundamental biochemical reactions involving nitrite - heme globins and heme-copper respiratory oxidases, which are particularly important especially in view of the emerging key functions of the nitrite-NO pathway in mammals and therapeutic potential of nitrite.
EXCELLENCE/1216/0517	Assessment of Post-Stroke Aphasia for Rehabilitation Research	Maria Kambanaros	Cyprus University of Technology	PA 1: Metathron Agoniston tis EOKA PA 2: Gaietto LTD PA 3: Erenitiko Idyma P. L. PA 4: MINISTRY OF HEALTH PA 5: SCIO CYPRUS PA 6: CYPRUS STROKE ASSOCIATION	FRO 1: Prof. Gabriele Miceli, Center for Mind/Brain Sciences (Censtro) Interdipartimentale Mente - Cervello/oljo the University of Trento	249.645,20 €	249.645,20 €	The ASPIRE project (Assessment of Post-stroke Aphasia for Rehabilitation Research) involves interdisciplinary research aimed at improving the quality of life of patients with stroke, and addressing the huge financial burden of neurological rehabilitation. The research project will examine the effectiveness of non-invasive brain stimulation (transcranial magnetic stimulation - TMS) in clinical practice. Specifically, the project will study patients with Aphasia, who will undergo a neuropsychological evaluation, genetic and brain measurements aimed at understanding mechanisms of recovery after stroke. The ultimate goal of the study is to determine whether the TMS techniques can be integrated into a framework of formal care and neurological rehabilitation for people with communication deficits due to stroke.
EXCELLENCE/1216/0007	Biometeorological Aspect of Thermal environment and Health: impacts on public health and on special populations to improve the quality of life and tourism sustainability	Georgios Nikolopoulos	University of Cyprus	PA 1: Ministry of Agriculture, Rural Development and Environment PA 2: MINISTRY OF LABOUR, WELFARE AND SOCIAL INSURANCE	FRO 1: National and Kapodistrian University of Athens	250.000,00 €	250.000,00 €	Environmental factors substantially influence human well-being making thermal environment a very important hazard given the global climate change. This project proposes an interdisciplinary approach for improving quality of life and protecting public health by developing unified methodologies and innovative frameworks to enhance the public health system in the context of Cyprus climate, one of the warmest in the Mediterranean part of the European Union. This project aims to identify models, namely thermal indices, that best simulate the thermal sensation of the Cypriot population. Thermal indices integrate meteorological variables and some of them additionally take into account physiological and personal variables. Field, questionnaire-based surveys and microclimatic measurements will be conducted to collect the required data. The best applied index will be used for the development of an innovative methodology to quantify thermal burden in the basis of satellite remote sensing. The spatial variation of thermal conditions in Cyprus will be assessed. All these tasks have a public health orientation. Thermal environment impacts on public health and on tourists' population will be examined using health-related data from health records. An observational study will also be conducted to assess the impact of heat exposure on the vulnerable to heat population of patients with cystic fibrosis. Strategies for management, prevention and control will be evaluated and strengthened. The proposed methodology can also be applied to different scientific fields and contribute to addressing economic and social challenges including tourism, planning of cities and urban design, and energy conservation.
EXCELLENCE/1216/0472	Studying the Role of SOX2, SOX14 and SOX21 in Pre-implantation Embryo Development in Mice	Elena Panayiotou Worth	The Cyprus Institute of Neurology and Genetics	PA1: Erenitiko Idyma P.L.Limited	FRO 1: The University of Cambridge	250.000,00 €	250.000,00 €	The development of the mouse embryo begins with the fusion of the sperm and egg followed by a series of cleavage divisions to generate a population of equivalent blastomeres. Maternal gene products laid down in the oocyte determine the timing of each cell division. Normal embryo development is thus brought about by the joint action of maternal gene products and zygotic gene products. The embryo itself is programmed to generate both Embryonic (Em) and Extra-embryonic (Ee) tissue. This is the first decision an embryo has to make. The timing and molecular pathway responsible for initiating the segregation of these two alternative fates is a key question in developmental biology. This project is designed to investigate the involvement of two, closely related, members of the SOX gene family, SOX21 and SOX14 during the Em vs Ee fate tissue specification. This collaborative project sparked off as a result of recently published work by the collaborating group at Cambridge University. They argue that the transcription factor SOX21 is a key regulator of this decision in the mouse embryo. However, recent work at the Cyprus Institute of Neurology and Genetics suggests that SOX21 is likely to collaborate with the closely related factor SOX14. The major objective of this project is to study the precise role of both SOX21 and SOX14 during pre-implantation development. Our working hypothesis is that these gene products, acting downstream of another SOXB gene (SOX2), are likely to function as the key determinants of the Embryonic fate. We propose a series of experiments using an array of available transgenic lines developed at the CNIG to test our hypothesis. The project is fully aligned with the program call in that the proposal addresses a major biological question with the most innovative tools currently available. We have set up a collaboration with a world expert in the field of pre-implantation development to ensure that we gain access to tools and techniques needed for some components of the project.
EXCELLENCE/1216/0092	Personalised Gene Therapy for beta-Thalassaemia	Carsten Lederer	The Cyprus Institute of Neurology and Genetics	PA1: State Health Services Organization Center FRO 2: King's College London	FRO 1: University of Freiburg - Medical Center FRO 2: King's College London	250.000,00 €	250.000,00 €	Thalassaemia is amongst the commonest single-gene disorders worldwide, and in Cyprus 9 out of 100 persons are carriers for one particular, severe beta-thalassaemia mutation, HBB-IVS110(G>A), with a relative carrier frequency of 70% in Cyprus and >20% in many EU countries. We have developed two highly efficient mutation-specific therapies for HBB-IVS110(G>A) thalassaemia. The first is based on genome editing by DNA-free delivery of TALE and CRISPR/Cas9 nucleases for specific DNA cleavage of the intronic mutation, so as to achieve destruction of the aberrant splice site and its sequence context, and to restore normal HBB splicing and expression. The second is based on short-hairpin-RNA (shRNA)-mediated knockdown of the aberrant HBB mRNA to boost protein expression from residual correct HBB mRNA, which unexpectedly outperforms gene addition by the GLOBE vector normal phenotype restoration. We have shown efficiency of both innovative approaches in cell lines and primary erythroid cells from HBB-IVS110(G>A)-homozygous patients, have submitted specific tools for consideration of patent protection, and with this project aim to refine and validate both approaches towards clinical application. For the genome editing approach, we will test shortlisted nucleases in additional, independent patient samples, will characterise off-target activity by genome-wide next-generation sequencing and established tagging technology, and will fine-tune the biosafety of nuclease delivery. For the shRNA approach, we will modify our lentiviral vectors to achieve cell-stage and tissue-specific shRNA expression and will use extant designer nucleases to direct the therapeutic transgene into the endogenous HBB or an inert (safe-harbour) genome site. Combining both lines of investigation draws synergistically on similar sample processing and analysis methods, allows direct comparison of both approaches and will provide and likely improve efficiency and biosafety data required for the submission of a clinical trial protocol.

EXCELLENCE/1216/0523	A personalized risk assessment tool for Colorectal Cancer prevention through 3-prime mRNA sequencing of normal-appearing mucosa in the Cypriot population.	Christos Shammias	AVVA Pharmaceuticals Ltd	PA 1: University of Cyprus PA 2: Stremble Ventures LTD		326,800.00	250,000.00 €	Colonoscopy is the gold standard for the detection of colorectal cancer, but provides no information regarding the risk of a healthy-appearing individual to develop colonic neoplasia. Therefore it is recommended indiscriminately over the age of 50 and every 5 years. Hereafter to everybody, but those with a history of colorectal inflammation or cancer. Despite the wealth of tumor genomic studies, the international and Cypriot market lacks validated molecular tools able to estimate the risk of colorectal neoplasia in healthy-appearing individuals. We propose to develop an affordable personalized risk assessment tool able to predict the relative chance for colorectal neoplasias among individuals currently defined as being at low risk. During "baseline colonoscopy" at the age of 50 or later, we will sample the normal-appearing colonic mucosa to detect molecular alterations via 3-prime mRNA sequencing even before the appearance of morphological alterations. To develop our method we will be recording differences in mRNA abundance along the colonic epithelium of each individual, and between healthy and cancer-prone individuals. Intra-individual (along the colon) and inter-individual (between healthy and cancer-prone) gene expression variability is an unprecedented way of pinpointing genetic and epigenetic signatures in colon cancer prevention. We aim to exploit this variability to stratify healthy-appearing individuals into high and low risk groups. Our 2-year study will conclude with a selection of genes, the expression of which will vary along the colon to a different extent between high and low risk individuals. DNA damage repair (as a factor of gene mutation) and tissue regeneration genes and mucosal and fecal microbiota (as a source of inflammation) are expected to be among the predisposing factors. Following the completion of this study a second prospective study is underway that will involve the customization and validation of our diagnostic method as a service to gastroenterologists and their clients.
<b>Physical Sciences and Environment</b> EXCELLENCE/1216/0515	New quinone/hydroquinone metal complexes for the catalytic conversion of H <sub>2</sub> O/O <sub>2</sub> to H <sub>2</sub> O <sub>2</sub> and the construction of aqueous photosynthetic solar cells	Anastasios Keramidas	University of Cyprus	PA 1: Cyprus University of Technology	FRO 1: University of Patras FRO 2: University of Ioannina	250,000.00	250,000.00	This project gather the scientists from four academic organizations in a multidisciplinary (chemical synthesis and photocatalysis/catalysis) innovative project, the synthesis of novel reversible quinone/hydroquinone-metal photocatalysts/catalysts that selectively catalyze the oxidation/reduction of H <sub>2</sub> O/O <sub>2</sub> to H <sub>2</sub> O <sub>2</sub> and the construction of H <sub>2</sub> O <sub>2</sub> based fuel cells and aqueous photosynthetic solar cells. Furthermore the H <sub>2</sub> O <sub>2</sub> is a compound that can be used as an environmentally friendly energy source, thus, the on-site production of H <sub>2</sub> O <sub>2</sub> and the new technologies that will emerge from this proposal will result in important economic and environmental benefits for Cyprus. Young researchers will be thoroughly trained in modern techniques, in four of the best academic institutions, two of the best Universities in Cyprus and two from Greece. In addition, they will acquire all the necessary skills required for jobs in academia, public sector and industry. The results of this work will be published in high impact research scientific journals, patents and will be disseminated through international and local conferences and public presentations and seminars. Thus, the new researchers will build a curriculum appropriate to help them in their career.
EXCELLENCE/1216/0296	Real-time Communications for Practical Communication Networks	Charalambos Charalambous	University of Cyprus	PA 1: Cyprus University of Technology	FRO 1: McGill University (IMU) FRO 2: Texas A&M University (TAMU) FRO 3: Texas A&M University at Qatar (TAMUQ)	247,840.00 €	247,840.00 €	Over the last decade, information technologies have become an integral part of the society, while the plethora of emerged applications simplify and enrich our daily activities. Future applications, as they are discussed in the context of 5G, require a true generational shift in technology since they demand very low latency, very high data rates, ultra-high reliability, and the integration of control and communication. The project RETUNE aims at laying the foundations for a real-time communication framework, subject to conditions that mirror the actual behavior of practical channels, that will address the stated demands, and is divided into three pillars. The first pillar concerns the formulation of a mathematical framework for real-time communications for sources with side information and channels with noisy feedback, and evaluates the optimal performance for real-time data compression and data transmission, in order to provide the optimal trade-offs between rate, latency and reliability. The adopted breakthrough approach ties together concepts and tools from information theory and stochastic optimal control theory. The second pillar regards the construction of real-time encoding and decoding schemes, with noisy feedback and without feedback, that achieve the optimal performance evaluated in the first pillar. Towards this direction, we employ and extend recent coding approaches and proposed novel coding schemes. Finally, the third-pillar considers integrated control-communication schemes, in which we develop intelligent strategies that can simultaneously stabilize the control system, via a noisy feedback, link and transmit information. These fundamental research activities will lead to better understanding of the potential and the trade-offs of real-time communication systems, their interactions to control systems, the impact of noisy feedback and side information, and the development of novel coding approaches, that will pave the way for innovative communication design as well as emergent applications.
EXCELLENCE/1216/0039	Projecting temperature climate extremes at regional to urban scales	Panos Hadjinicolaou	The Cyprus Institute			250,000.00 €	250,000.00 €	The CELSUS project aims to provide new climate change projections for Middle East/North Africa (MENA), including the eastern Mediterranean and Cyprus, of improved spatial precision and emphasis in temperature extremes and the warming over urban areas. The WRF model is used as a regional climate model (RCM) to dynamically downscale, first, meteorological re-analyses in a series of multi-physics simulations over the MENA region. An optimal for this region WRF model configuration will be obtained, by selecting the best performing (in comparison to observations) physical parametrisations set-up. This model set-up will be used in 20-year simulations to downscale, to 16 km, for the recent past and the mid-21st century, climate fields from the CMIP5 global climate models forced by the RCP8.5 business as usual IPCC emissions scenario. The CMIP5 boundary conditions will be selected among those models that represent more realistically temperature extremes during the recent past or predict the strongest heat extremes for the future. A further downscaling with the WRF will follow, driven by the MENA results, down to 1-4 km, over selected cities around the region (including Nicosia for Cyprus), in order take into account the urban heat island effect. The additional urban heating (not resolved in the previous simulations) adds to the climate change warming and might bring certain areas closer to the intolerable for humans 35 degrees threshold of the wet-bulb temperature (an indicator of warm and humid conditions). Detailed indices of temperature extremes (hot and cold) will be derived from the regional and urban scale projections, with an emphasis in heatwave indices and hot-spots of heat extremes will be identified around the MENA region and within Cyprus. CELSUS will contribute to the MENA-CORDEX initiative and its results will be transmitted to governmental departments pertinent to climate change adaptation and inform other interested stakeholders and the public.
EXCELLENCE/1216/0025	Regularity in Free Boundary Problems	Emmanouil Misiak	University of Cyprus			160,344.00	160,344.00	The proposed project is included in the general area of linear and fully nonlinear differential equations and the theory of Free Boundaries. Partial Differential equations are perhaps the most important link between mathematics and other sciences. Models that appear in Physics, Biology, in Finance etc. are described by means of partial differential equations and the mathematical reasoning is essential for understanding and solving the corresponding problems. The main purpose of this project is to develop the mathematical methodology which will be suitable for a rigorous mathematics analysis of questions included in the area of Free Boundary Problems, and particularly for obstacle type problems. Several free boundary problems arise naturally while studying physical phenomena. These theoretical problems are motivated by applications in elasticity, in phase change of materials, flows of liquids, convection, flame propagation and questions in the general field of shape optimization. The area due to the nature of the problems (direct relationship with technology, natural and economical sciences) remains of topical interest. Obstacle problems are characterized by the fact that the solution must satisfy unilateral constraint i.e. must remain, on its domain of definition or part of it, above a given function the so called obstacle. Parabolic obstacle problems, i.e. when the involved operators are of parabolic type, can be formulated in various ways such as a system of inequalities, variational inequalities, Hamilton- Jacobi equation, etc. The proposed research will produce lasting results and the primary theory for problems with immediate connections to applications that involve linear and nonlinear elliptic and parabolic equations as well as nonlocal operators for obstacle type and related free boundary problems.

EXCELLENCE/1216/0207	Graph Theoretical Tools in Sciences	Vicky Papadopoulou Lesta	European University - Cyprus Ltd	PA 1: AAIScientific Cultural Services Ltd	FRO 1: The Institute of Communication and Computer Systems at National Technical University of Athens FRO 2: Institute for Astronomy/Astrophysics, Space Applications and Remote Sensing FRO 3: University of Hawaii at Manoa	248.960,96 €	248.960,96 €	<p>Graph Theory is undeniably one of the most powerful tools of Applied Mathematics with remarkable interdisciplinary applicability in diverse sciences, spanning Social to Astrophysics. Despite the significant results obtained through the exploration of Graph Theory in various domains recently, the strong potential of the theoretical knowledge included in Graph Theory, promise even more remarkable advances, especially through combination with application based knowledge and techniques.</p> <p>The objective of this research proposal is to bring together experts from diverse scientific domains, with experts on Graph Theory under a joint research collaboration for the further exploitation of Graph Theoretical tools combined with application based tools, for providing efficient solutions for important practical problems originating in diverse Sciences i.e., Neuroscience and Astrophysics. Although the targeted problems concern diverse domains, they lie within a common and important family of problems; i.e. clustering problems.</p> <p>In the Cosmology domain, we will use Graph Theory to study the clustering of galaxies in cosmological simulations and real data. Recent work has shown that such methods are much more informative than traditional methods used in the field. In the Astrophysics domain we will explore whether graph theory can be used to study the evolution of high redshift infrared galaxies by adapting the method used successfully for low redshift galaxies.</p> <p>In the Neuroscience domain we will tackle the task of clustering responses from behavioural data that include in addition to categorical responses the reaction time, measured with a special instrument that allows millisecond accuracy. We will also apply clustering analysis to tomographic estimates obtained from EEG and MEG data for processing emotional faces and from quiet periods of each sleep stage.</p> <p>At the end of the project the family of clustering techniques assembled will be organized so that it could be used in future projects by partners from other disciplines</p>
EXCELLENCE/1216/0256	Expanding the international ITHANET community portal for haemoglobinopathies	Petros Kountouris	The Cyprus Institute of Neurology and Genetics	PA 1: Thalassemia International Federation	FRO 1: The Human Variorne Project	250.000,00 €	250.000,00 €	<p>Haemoglobinopathies are the most common monogenic diseases, with millions of carriers and patients worldwide. In the particular instance of Cyprus, 12% - 15% of the population are carriers of beta-thalassemia, making it one of the commonest single-gene disorders on the island. Online resources for haemoglobinopathies are largely divided into specialised sites catering for patients, researchers and clinicians separately. However, the severity, ubiquity and surprising genetic complexity of the haemoglobinopathies call for an integrated website as a free and comprehensive repository and tool for patients, scientists and health professionals alike.</p> <p>The ITHANET community portal (<a href="http://www.ithanet.eu">http://www.ithanet.eu</a>) is an expanding resource for clinicians and researchers dealing with haemoglobinopathies. It integrates information on news, events, publications, clinical trials and haemoglobinopathy-related organisations and experts, wiki-based content of protocols, clinical guidelines and educational articles and, most importantly, databases of variations, epidemiology and diagnostic and clinical data.</p> <p>The proposed project aims to expand the functionality and content of the ITHANET portal and strengthen its intentional role as a reference point for haemoglobinopathy-related research, treatment and diagnosis and as a daily scientific resource for patients, carriers, and all those interested in haemoglobinopathies. This will be achieved by (1) classifying and interpreting haemoglobinopathy-related variants based on internationally established standards and guidelines, (2) performing worldwide epidemiological studies, with a focus on micromapping and the impact of migration, and (3) developing the first haemoglobinopathy-specific genotype - phenotype database.</p>
EXCELLENCE/1216/0232	CIGS- and CZTSSe-based Thin Film Solar Cells Fabricated by Pulsed Laser Deposition for Terrestrial and Space Applications	Ioannis Giapintzakis	University of Cyprus		FRO 1: Chemical Process & Energy Resources Institute, Centre for Research & Technology Hellas	249.300,00 €	249.300,00 €	<p>Thin-film solar cells based on the chalcopyrite compound Cu(In,Ga)Se<sub>2</sub> (CIGS) have shown the highest laboratory efficiencies of thin film solar cells - up to 20.8%. In addition, CIGS solar cells are considered to be the most suitable candidate for space applications due their superior particle radiation hardness.</p> <p>CIGS cells are multilayer structures, with each layer serving a particular purpose. Different methods have been used to prepare each layer of CIGS solar cells which increases the fabrication cost. It is, therefore, desirable to identify a deposition technique for the fabrication of CIGS cells in order to achieve a single-step, low-cost and high-deposition-rate growth with thickness uniformity and stoichiometry over large areas. In this project, we intend to demonstrate that PLD is a suitable growth method to (i) fabricate the complicated multilayer structure of CIGS solar cells at low temperatures and (ii) achieve cost-effective and high efficiency CIGS solar cells.</p> <p>In addition, fabricating CIGS solar cells using PLD will provide the opportunity to study the impact of each layer and their interfaces to the efficiency of the cell. Alternative materials will also be tested, substituting for the toxic (Mo, Cd) and rare (In, Ga) elements without compromising the efficiency. By choosing alternative materials that are non-toxic and abundant, thin film solar cells will become toxic-free, environmental friendly and inexpensive, paving the way for large scale terrestrial applications. Modeling will assist in the optimization of the cell design and the understanding of its functionality.</p> <p>Finally, the results and knowledge that will derive from the project can be exploited by the thin-film photovoltaic industry and the research community for the development of CIGS-based solar cells that will compete directly with polycrystalline and crystalline silicon cells, giving rise to the manufacturability of CIGS technology.</p>
EXCELLENCE/1216/0352	An Artificial Neural Network Framework for understanding historical monuments Architectural Structure and Style	Yiorgos Chrysanthou	University of Cyprus	PA 1: The Cyprus Institute Amherst FRO 2: University of Girona	FRO 1: University of Massachusetts Amherst FRO 2: University of Girona	249.759,60 €	249.759,60 €	<p>Cultural heritage is an integral element of today's society. It is crucial to the creation of a common identity and the connection to people with similar backgrounds. Historical cultural heritage monuments such as churches and temples are hard to document and organise in digital libraries because of aging, destruction, and geometric complexity. The ability to reason about the structure and the style of a monument is therefore of great importance to cultural heritage experts, as it can assist them in analysing and cataloguing it. Different from previous work in the field of architectural history which is confined to 2D studies, this proposal proposes an innovative framework based on artificial neural networks for learning the structure and style of historical monuments from 3D data.</p> <p>The framework is composed of a neural network that can segment monuments into architectural components, a neural network that can detect the style of a monument and a shape grammar extraction and comparison method. The neural networks will be trained on an annotated 3D monument dataset of historic monuments, and used together with the shape grammar to enable a software package for: organizing monuments according to style; observing the parts of a monument and highlighting its main stylistic influences; analysing and comparing the design rules of monuments. The objectives of this proposal are: to develop the neural networks and shape grammar; to collect annotated monument 3D data to train and test them; to develop and evaluate the software package for assisting cultural heritage experts in their documentation workflows. The successful outcome of this project, enabled by the partners' experience in computer graphics, geometry processing, machine learning and architecture, will have a definite impact on their scientific excellence and expertise, as well as society in general, through its application to the digital cultural heritage field.</p>
EXCELLENCE/1216/0376	Simultaneous Wireless Information & energy Transfer for low-powered Communication technologies - SWITCH	Symeon Nikolaou	Frederick Research Center	PA 1: University of Cyprus PA 2: Open University of Cyprus	FRO 1: Heriot Watt University	250.000,00 €	250.000,00 €	<p>Simultaneous Wireless Information &amp; energy Transfer for low-powered Communication technologies - SWITCH research effort brings together the skills and scientific expertise of four different Cyprus' research groups in the fields of Communications (UCYKIOS and CUC) and Antennas/Microwaves (FRC and UCVECE) with the profound experience and research calibre of an internationally distinguished research group from UK (HWU), in order to implement, and experimentally assess, an entirely novel receiver topology for Simultaneous Wireless Information and Power Transfer (SWIPT). In close relation, it also investigates fundamental research problems related to the deployment of Wireless Powered Sensor Networks (WPSNs) and especially the transmitter's desired characteristics. This proposed research, aims, and is expected to produce high quality publications and suggest technological advancements on topics related to Wireless Powered Communications (WPC).</p>

EXCELLENCE/1216/0365	Hierarchical Organization and Decentralization in Information Communication and Control of Complex Dynamical Systems	Charalambos Charalambous	University of Cyprus	PA 1: Cyprus University of Technology	FRO 1: McGill University FRO 2: University of Pennsylvania FRO 3: National Technical University of Athens FRO 4: Texas A&M University	249.984,00 €	249.984,00 €	Current telecommunication and information systems are designed based on Shannon's operational definitions of coding-capacity and coding-compression for reliable communication. They utilize encoders and decoders, to combat communication noise and to remove redundancy in data. Current dynamical control systems are designed by utilizing feedback controllers, actuators and sensors, to ensure stability, robustness, and optimal performance. One of the key challenges in the upcoming years is the development and design of intelligent hierarchical communication and control systems which simultaneously control and transmit information. The proposed project focuses on developing universal operational definitions, beyond communication systems, to any dynamical system with inputs and outputs, called: a) Control-Coding Capacity of dynamical systems, i.e., the designer's ability to develop an controller-encoder pair to simultaneously control the system and encode information, transmit it through the dynamical system to any process attached to it, and reconstruct it using decoders, with arbitrary small error probability, and b) Control-Coding Compression of information processes, i.e., the designer's ability to develop an controller-encoder pair to simultaneously control the information process and compress information, and decode the compressed information, using decoders with arbitrary small probability of error. The development and design of intelligent hierarchical communication and control systems will be investigated from three different perspectives: i) addressing fundamental questions of interaction of control and information, ii) development of novel robot collaboration and coordination algorithms, and iii) applications to multiple agent systems with intelligent capabilities of information exchanges and signaling through dynamical systems.
EXCELLENCE/1216/0294	Urban Micro-Climate, and the Design of Sustainable Built Environments	Marina Neophytou	University of Cyprus	PA 1: The Cyprus Institute PA 2: Cyprus University of Technology	FRO1: Swiss Federal Institute of Technology FRO2: University of Cambridge	249.999,60 €	249.999,60 €	Urban micro-climate plays a crucial role in determining the energy demands of the built environment for heating and cooling. Moreover, the multi-scale nature of the urban micro-climate is currently ignored in the relevant considerations, and much of the on-going discussion for example on urban heat island mitigation and proposed measures for cooling is based on case-studies taken at a specific scale and settings; the evaluation of the effectiveness of proposed cooling measures is therefore made using performance criteria derived for specific scenarios. The transferability of this knowledge to other sites and climatologies is not ensured. This is because the phenomena dictating the urban climate are inherently multi-scale and the contribution of heating sources or cooling mechanisms as well as their interaction with other ongoing-possibly physical phenomena can be different. Therefore, strategies for urban cooling in a city should consider the multi-scale nature of urban climate, based on which mitigation actions and costs must be considered. In this proposed project we join forces in generating a hub of multi-disciplinary expertise entailing laboratory experiments, urban field data, theoretical developments, computational simulations for generating feasible and economically viable policy and strategy options for reducing energy demands of the urban environment for cooling and/or heating. We aim that the role of excellence will be of international recognition and at the same time be of local relevance to needs of the regulatory or municipality authorities.
EXCELLENCE/1216/0076	Multifunctional Metal Organic Frameworks and the Fine Tuning of their Magnetic, Photoluminescence and Sorption Properties through Single - Crystal Ligand Exchange Reactions	Anastasios Tasiopoulos	University of Cyprus		FRO 1: Dr Ioannis Sanakis FRO 2: Dr Stefania Greco Tanase	250.000,00 €	250.000,00 €	One of the hottest research topics nowadays involves the construction of multifunctional materials. Among the various types of the latter, metal – organic frameworks (MOFs) have attracted significant attention due to their exciting structural features and physical properties. A very recent and important advance in the chemistry of MOFs is related to the development of efficient methods for their postsynthetic modification (PSM). The last few years we have been interested in the development of methods for the PSM of flexible MOFs involving substitution in a single - crystal to single – crystal (SSC) fashion either of their coordinating or of their guest solvent molecules. The goals of the present project include the: i) synthesis of new MOFs based on 3d and 4d metal ions and elongated or pre-functionalized polytopic organic ligands aiming to materials that will combine interesting photoluminescence (PL) or magnetism or sorption with SSC transformation properties, ii) further exploration of single – crystal ligand exchange (SCL) reactions by performing uncommon or even unprecedented SCL reactions and modifying in a controlled fashion the structures of MMOFs that will be firstly prepared in this project, targeting in the fine-tuning of their properties or in the construction of MMOFs with guest-induced properties and iii) detailed study of the structural, physical (magnetism, PL) and sorption properties of the new and exchanged MMOFs. This project will result in new MMOFs, exchanged MMOFs with optimized physical properties compared to those of the pristine materials, development of new synthetic methods to MMOFs, further exploration and development of novel SCL reactions, publications in high quality journals and announcements in international conferences. Finally, a high quality consortium will be established including the researchers participating in this proposal, researchers from Cyprus in the areas of nanotechnology/nanomaterials and possibly Cypriot high-tech companies.
EXCELLENCE/1216/0478	Technical and Social sensor aggregation for smart environment enhancement	Demetris Antoniadou	CY.R.I.C CYPRUS RESEARCH AND INNOVATION CENTER LTD	PA 1: E.U.C. Research Centre Ltd		270.007,24 €	249.842,84 €	"Smart cities are ones that deploy innovative technology, create more innovative ways of delivering public services and make better use of data with the ultimate objective of becoming more prosperous, sustainable and a better place to live". Smart city environments are usually build on two currently disconnected approaches. On one hand IoT sensing devices (Technical Sensors) are used to enable real-time monitoring and response. Data collected from the IoT network are processed both in real-time and posteriori to provide insights for advancing and automating processes within and for the urban city environment. On the other end, research initiatives utilize information posted in social media (Human Sensors) to identify and contextualize events (social and infrastructure related). This area of research is based on humans as sensors and utilizes the power of the crowd to provide citizens, government officials, journalists and other interested parties with city wide situation awareness. "FeedIoT" bring together a private R&D company, CyRIC, and a private University, European University Cyprus, with the goal to exploit the "Technical Sensor" and "Human Sensor" environments and identify points of association between these two currently disconnected worlds. These points of association will aggregate the information coming from the two environments, in what we call the "Feedback Loop", that will allow the enhancement of the insights the two approaches can offer. "FeedIoT" will utilize the "Feedback Loop" to add context to the two environments that would not be possible to detect or measure in their isolated states, thus substantially enhancing the analytical capabilities of each domain. The identified feedback-loop will be integrated into a Smart Environment enhancement application-level service, as part of the CyRIC's own IoT Cloud platform, enabling all stakeholders to provide better quality of life and citizen-oriented innovation in the smart environment.
EXCELLENCE/1216/0492	Monitoring for Aerosol Particle Growth and Chemical Composition During New Particle Formation Events Using Miniaturized Lightweight Instruments	Jean Scire	The Cyprus Institute		FRO 1: University of Helsinki	248.700,00 €	248.700,00 €	A significant fraction of the total number of particles present in the atmosphere is formed originally by nucleation from the gas phase during new particle formation (NPF) events. Events of NPF have been observed frequently at various locations all over the world, identifying NPF as phenomenon of great scientific interest. During the initial steps of nucleation, small stable molecular clusters are formed which subsequently grow in size by coagulation/nucleation processes. Current level of understanding of the mechanisms responsible for NPF is limited by the scarcity of experimental data, which in turn is attributed to disadvantages of existing airborne measuring platforms. State-of-the-art airborne measurements are performed exclusively by cost-intensive flight campaigns which are limited in their ability to operate at a variety of altitudes and locations. The objective of IRI is to develop low-cost airborne measuring platforms and use them to probe NPF events in-situ, right at their location of event initiation. Measurements of these two key aerosol properties will enable monitoring of the particle growth dynamics from the very early stages of formation (i.e. sub 3-nm diameter) up to their final size. The suit of new instruments that will be designed and built within the framework of IRI will include lightweight and fast response instruments for use on the ground and on-board Unmanned Aerial Vehicles (UAVs). Field experimental studies will be performed using these novel platforms at a region of Eastern Mediterranean and Middle East, an area of unique atmospheric conditions for investigating this natural phenomenon.

EXCELLENCE/1216/0010	Low Photon-Energy Up-conversion induced Sensitized Photocurrent Generation in Organic Photodiodes	Panagiotis Keivandis	Cyprus University of Technology			249,117.50 €	249,117.50 €	This project aims to develop a novel methodology for demonstrating the fabrication of organic photodiodes with increased level performance by purposefully exploiting the process of triplet-triplet annihilation (TTA)-induced low photon-energy up-conversion (TTA-UC). The first-ever TTA-sensitized organic photodiode devices will be realized when organic TTA-interlayers will be optically and electrically integrated in working device structures. A systematic device engineering scheme and a detailed electro-optical characterization experimental study will be adopted for enabling the TTA-sensitized photodiodes to generate photocurrent at low photon energies that lie beyond the absorption profile of their photoactive layers. In parallel, advanced spectroscopic characterization experiments encompassing time-resolved photoluminescence and ultrafast transient absorption measurements will be performed for elucidating the hitherto elusive operative mechanism of TTA-UC in the solid-state, and for correlating the TTA-UC performance with the morphology and microstructure of model organic TTA-UC layers. The in-depth understanding of the photophysics that govern the TTA-UC process and the realization of TTA-sensitized organic photodiodes will provide a broad perspective in the research community of organic electronics by demonstrating a novel strategy for the sensitization of an extensive range of light-sensing devices, which are essential for many different industrial R&D activities on next-generation devices such as organic photodetectors, sensors, optocouplers and light-detecting field-effect transistors. Mastering of the TTA-UC process offers a promising outlook for the development of TTA-UC-assisted solar energy resources through the smart combination of solar concentrators and other power-generating devices, including solar cells and solar fuels that will be used as paradigms of excellence by the international research community and that have the potential to improve life quality and to stimulate economic growth.
EXCELLENCE/1216/0217	Study of precipitation aerosols and Clouds in a Coastal area of Cyprus	Dionados Hadjimitsis	Cyprus University of Technology		FRO 1: TROPIS	249,958.00 €	249,958.00 €	Cyprus is an excellent place for atmospheric studies with focus on aerosols, and aerosol-cloud-precipitation interaction. Increasing research activities performed during the last years in the framework of large EU projects (BACCCHUS and ACTRIS) corroborate that Cyprus is one of the hot spot regions of atmospheric and climate research. Following this scientific interest, the state-of-the-art mobile active remote sensing LACROS facility of TROPIS, already started long-term one-year observations in the framework of the Cyprus Cloud Aerosol Rain Experiment (CyCARE) in October 2016, in Limassol, Cyprus. CyCARE is a voluntary CUTTROPIS initiative. We designed the SROCCO proposal in order to use the opportunity of these unique, continuous, vertically resolved, long-term observations of aerosols, clouds, winds and rain (aerosol and cloud dynamics) to study in detail the aerosol-cloud-precipitation processes in the Cyprus region, a coastal region with Middle East climate and complex aerosol mixtures of aerosol pollution and desert dust. Within SROCCO we will analyze the lidar observations (PolyXT, Doppler) for the retrieval of aerosol and aerosol-related parameters (optical properties, aerosols separation, volume extinction coefficient, aerosols number concentration, cloud condensation, ice-nucleating particle concentrations) and the Cloudnet observations (cloud radar, microwave radiometer and disdrometer) for the study of cloud-precipitation relationships (cloud microphysics and dynamics, precipitation rate). We will combine the datasets to perform an in-depth and holistic analysis of the aerosol-cloud-dynamics-precipitation interaction, for the first time in the complex coastal environment of Eastern Mediterranean. The developed general methodology will be applicable to large ground-based and spaceborne datasets (CALIPSO, GPM, and EarthCARE) to study coastal regions beyond Cyprus. The ultimate goal of the SROCCO effort is to identify the dominant processes responsible for the formation of clouds and rain.
<b>Social Sciences and Humanities</b> EXCELLENCE/1216/0093	Bringing Life to Old Museum Collections: The Interdisciplinary Study of Pottery from the Cypriot Iron Age Polities of Salamis, Soli, Lapithos and Chrysoi	George Papasavas	University of Cyprus	PA 1: Ministry of Transport, Communications and Works FRO 1: The Zinman Institute of Archaeology, University of Haifa FRO 2: Fitch Laboratory, British School at Athens		150,001.00 €	150,000.00 €	This project is a comprehensive, interdisciplinary investigation of ceramic assemblages from the polities of Salamis, Soli, Lapithos and Chrysoi during the Iron Age (11th-4th centuries BC). The ceramic material in question forms part of the Cyprus Museum collections, in Nicosia, and derives specifically from mortuary contexts in the above-said regions that were excavated by the Department of Antiquities of Cyprus before 1974. Through the documentation, digitization and study of these museum collections, this project aims at shedding new light into the culture and history of the northern and eastern parts of Cyprus during the Geometric, Archaic and Classical periods and at contributing to the bridge of the 43-year old gap in field research, in areas outside the effective control of the Republic of Cyprus. Combining a sound ceramicological study with targeted scientific (mineralogical and chemical) analyses and GIS mapping, this project will draw upon the characterisation of the regional pottery production of the examined polities and the diffusion of their pottery styles. Such a novel research on old excavation material using current interdisciplinary methods will prompt new insights into the regional socio-cultural settings of Salamis, Soli, Lapithos and Chrysoi, and will allow to approach their distinct politico-economic peripheries during the Iron Age. What is more, by means of a comparative study with Cypriot ceramic material found at Tel Dor in Israel, and other published Levantine sites, these polities will be integrated into their Mediterranean context for assessing the scale and the nature of their trade networks and cultural interaction with their neighbouring Levantine counterparts.
EXCELLENCE/1216/0020	Lactating Breasts: Motherhood and Breastfeeding in Antiquity and Byzantium (4th Century BCE-7th Century CE)	Savvoula Constantinou	University of Cyprus	PA 1: ΠΑΕΔΑΤΗΚΕΤΑΙΡΕΙΑ ΚΥΠΡΟΥ PA 2: Cyprus Breastfeeding AssociationGfR For Life		149,952.00 €	149,952.00 €	According to its etymology, the Ancient Greek word 'thalis' correlates the category of the female with the nursing quality of her breast, the ability to produce milk and to be suckled. The Modern Greek words for: female, nipple and breastfeeding derive from the same root. Thus, language itself points diachronically to a strong interconnection between the female and her natural capacity to breastfeed in Greek thought. The identification of women with breastfeeding in the Greek language reveals a belief system unchanged over millennia in which breastfeeding is one of the most essential female activities. The project MotherBreast will for the first time thoroughly examine and theorize the lactating woman and her place in the Hellenistic and early Byzantine cultures (323 BCE-650 CE). More specifically, MotherBreast will use the concepts of 'gender', 'body' and 'performance' to investigate the close interrelationship between woman (as mother and nurse) and her lactating breast, as well as the social, ideological and medical meanings and uses of motherhood, childbirth and breastfeeding, and their visual and literary representations. By developing the model of the lactating woman, MotherBreast will offer a new analytical framework for understanding a significant part of the still unwritten cultural history of the period in question. Furthermore, MotherBreast will use its research outputs to promote breastfeeding and other relevant ecological practices (e.g. natural childbirth) that are no longer the norm. In an attempt to bridge the past and the present for the benefit of modern societies, MotherBreast will create important synergies between cultural historians and health scientists and professionals. All in all, MotherBreast's engagement with the dynamic relationship between Ancient, Medieval and Modern has a twofold aim: a) to provide fundamental historical research on past societies and b) to influence contemporary debates, practices and policies concerning sustainability, motherhood, and breastfeeding.
EXCELLENCE/1216/0362	Unlocking the Sacred Landscapes of Cyprus	Athanasios Vionis	University of Cyprus	PA 1: Ministry of Transport, Communications and Works PA 2: Cyprus University of Technology	FRO 1: The University of Dublin, Trinity College FRO 2: Laboratory of Geophysical-Satellite Remote Sensing and Archaeo-environment, Institute for Mediterranean Studies, Crete	147,979.60 €	147,979.60 €	Is a contemporary world in which religious confrontations threaten social and economic stability, UnSaLa-Cy will explore and showcase how ancient polytheistic systems supported cultural pluralism, tolerance and the successful coexistence of diverse beliefs. Using the complex, multi-cultural history of the island of Cyprus as a case study and a range of innovative techniques, UnSaLa-Cy will contextualise sacred space from prehistory to Late Antiquity. It aims to: (a) study the development of ritual and sacred space in Cyprus in relation to its wider Mediterranean political and socio-economic setting; (b) trace the evolution of ritual architecture and material assemblages on the island over some eight thousand years; (c) identify and analyse ritual practice and cult; (d) build a framework for the holistic study of ritual and sacred space diachronically that can be applied to other contexts, and (e) develop novel cultural heritage management tools for promoting and experiencing ancient and early Christian ritual space. The Project will employ an interdisciplinary approach to the study of topography, architecture, iconography and material culture and utilise advanced technologies derived from the fields of computer science and the natural and social sciences. Building on a range of both published and newly generated archaeological data manipulated through GIS (Geographic Information Systems), the research team will perform an in-depth diachronic analysis of ritual and cult through different phases of Cypriot history. Ethnographic and anthropological approaches will provide an innovative anthropocentric interpretation of the collected data, and the development of advanced cultural heritage management tools will create new ways to promote past ritual landscapes and improve contemporary experiences of them, serving to bridge the gap between past and present and between scholarly and non-scholarly audiences in a pan-Mediterranean and European context.

EXCELLENCE/1216/0463	THE ANTECEDENTS OF URBANISM IN EUROPE	Efstathia Margaritis	The Cyprus Institute		FRO 1: University of Cambridge FRO 2: University of Oxford FRO 3:Wiener Laboratory, American School of Classical Studies at Athens	149.979,30 €	149.979,30 €	<p>Prior to the inception of urbanisation in the Aegean on Crete after 2200BC, its antecedents may be recognised at a number of sites. In recent years the most interesting of these sites is found on the small island of Keros in the Cyclades. Here, in the period 2750-2300BC a number of factors combine in a unique foreshadowing of the processes of urbanisation soon to take place elsewhere: centralisation, whereby one centre stands out above all contemporaries; exceptional reach, where members of far-flung communities were drawn into a network centred on Keros; intensification, evidenced in a number of spheres, such as metal production, agriculture and architecture; aggrandisement, seen in exceptional architectural programmes which are monumental by prevailing standards; and a strong ritual component, drawing in participants from far and wide and underpinning all the other processes.</p> <p>This project is designed to interrogate the processes that unfolded at Keros over its 450 year history in order to understand its unique position. This project focuses on three strands of evidence. First is the organic evidence from the site, which can be examined in relation to intensification and diversification in the subsistence base, and in terms of how this site imported its food at a time when all other sites operated at a self-sustaining level. Second is the evidence for metal working: smelting (primary production of metals from ore), casting (remelting of metals to make objects) and the working of finished objects. It is remarkable that ores were brought from other islands to Keros for smelting, and it is now clear that an important base for metalworking in the Cyclades operated from Keros. Third is the evidence for architectural aggrandisement. The building programme initiated on Keros was unprecedented for its time, and not outmatched until the later palaces of Crete. The result will be the first comprehensive, multi-disciplinary investigation of incipient urbanism in the Aegean, with implications on a worldwide level.</p>
EXCELLENCE/1216/0483	Social and environmental influences on geographical knowledge	Marinos Avasamides	University of Cyprus	PA 1: SILVERSKYD VR TECHNOLOGIES LTD	FRO 1: University of Alberta	149.821,00 €	149.820,00 €	<p>SIGN aims to investigate how spatial reasoning is influenced by social and geographical factors, by capitalising on the unique geographical, political, and social environment in the island of Cyprus. Since 1974, Cyprus has been divided in two parts, each of which is inhabited, for the most part, by distinct ethnic communities. There had been virtually no contact among the members of the two main communities (Greek and Turkish Cypriots) until 2003, when crossing restrictions were lifted. As people from each side of the island became able to visit the other (but did not necessarily do so), subgroups with different degrees of experience with the other part of the island and its people have arisen naturally (e.g., people who have never crossed to the other side, those who occasionally cross, those who regularly cross and interact with members of the other community, etc.). This natural variation affords an unusual opportunity to explore bases in judging spatial distance as a function of both spatial and non-spatial experience with the environment. By assessing the degree of experience that Cypriots have with each side of the island, along with their attitudes towards the other community, we aim to gain a more nuanced understanding of how the presence of physical divisions and their consequences, influence people's reasoning about space.</p>
EXCELLENCE/1216/0404	The Neurocognitive Study for the Aging-Expanded	Foti Constantinidou	University of Cyprus	PA 1: Nicosia Development Agency PA 2: MINISTRY OF LABOUR, WELFARE AND SOCIAL INSURANCE PA 3: The Cyprus Institute of Neurology and Genetics PA 4: Erevntskio lityma P. L.		151.632,00 €	149.688,00 €	<p>The Neurocognitive Study for the Aging-Expanded (NEUROAGE-e) will generate cutting-edge research in cognitive aging. The study of cognitive aging is concerned with age-related changes in the basic processes of learning and memory, as well as the complex higher order processes of language, reasoning, and executive functioning. Pathological aging associated with the most common cause of dementia, Alzheimer's disease (AD) is a rising epidemic with a prevalence of 38.6 million worldwide and an estimated cost of over 470 billion Euros annually. Despite significant efforts to understand the disease and the factors that contribute to the development of dementia and AD, the exact contribution of risk factors (alone or in combination) has not been fully delineated. NEUROAGE-e will expand our successful large cohort study on aging and will address the aforementioned challenge through a multimodal approach. It will integrate neuropsychological, lifestyle, and biological data using state of the art computational methods to quantitatively assess the exact contribution of modifiable and non-modifiable risk factors to cognitive decline. First, we will implement systematic data collection from carefully selected large cohorts, as well as design and develop an optimized computational framework for multimodal and longitudinal data analysis. We will identify patterns of correlation among different markers within and between cohorts across time, and develop subject-specific predictive models for the onset and rate of cognitive decline. Second, we will implement a theory-driven and evidence-based comprehensive cognitive rehabilitation program to improve cognitive abilities and neurobehavioral functioning in older adults at risk for dementia. Ultimately, the results of NEUROAGE-e could inform the future development of cognitive intervention models that could potentially delay the onset of clinical symptoms. The above can be accomplished through the close collaboration and combined expertise of an interdisciplinary team of scientists.</p>
EXCELLENCE/1216/0034	Spatial updating and domain expertise: the case of dancers	Marinos Avasamides	University of Cyprus	PA 1: Cyprus University of Technology PA 2: SILVERSKYD VR TECHNOLOGIES LTD		149.940,00 €	149.940,00 €	<p>While moving, even with their eyes closed, people are able to keep track of the changing egocentric (i.e., self-to-object) relations to the objects of their environment. This ability, known as spatial updating, is fundamental to navigation as it supports maintaining one's orientation in space. The propose project aims to examine how spatial updating differs as a function of domain expertise. A study will be conducted in which expert dancers, novice dancers, and controls will be repeatedly tested on their ability to keep track of memorized locations while they move in space. fMRI scans will also be captured to examine whether possible improvements in updating performance are associated with changes in the morphological structure of the brain.</p>
EXCELLENCE/1216/0508	READING DIFFICULTIES INTERVENTION: SCIENTIFIC, TECHNOLOGICAL, AND NEW COMMUNITY EFFORTS	Timothy Papadopoulos	University of Cyprus	PA 1: I.R.K.I Leaders Ltd PA 1: Cyprus Psychologists Association PA 2: HOPE FOR CHILDREN CRC POLICYCENTER	FRO 1: JYVASKYLA UNIVERSITY FRO 2: UNIVERSITY OF ALBERTA FRO 3: ST. JOHN'S UNIVERSITY	149.960,00 €	142.320,00 €	<p>Early intervention is crucial to the prevention of reading difficulties (RD). Nevertheless, there are no empirically validated answers to the question of what intervention(s) work best, for which children, in what settings), for what duration, and for what reason. Hence, there is an urgent need for several educational systems to get more deeply involved in this area. The aims of the present project are three-fold. First, we seek to examine the efficacy of two intervention programs, one with more cognitive (PREP: PASS Reading Enhancement Program) and one with a more phoneme-code (GraphoGame) focus. Both programs will be delivered as web-based applications through platforms that will allow data storage and processing via remote servers. Second, we aim to develop a novel framework for analyzing remediation data micro-genetically. We expect that this sort of data processing will help us explore the learning progress dynamics and developmental stages of the readers during the intervention and examine the type of early intervention most useful for treating specific RD. Finally, we aim to intensively train graduate students, special education teachers, and school psychologists to understand better how to apply evidence-based effective intervention in theory and practice. Our most immediate and visible outcomes will be related to early readers' improvement in reading skills of 120 Grade 1 children. More importantly, we expect a reduction in the number of student referrals for the assessment of learning disability by matching interventions to the nature and origins of the child's difficulties. This success will be achieved by the efforts of our academic teams in Cyprus, Finland, and Canada who will share expertise with the stakeholders above. The use of interactive web-based and computer aided reading remediation designed carefully for early elementary school-aged children is expected to have significant effects on the literacy skills of early readers who may be at risk of school failure in Cyprus and Greece.</p>
EXCELLENCE/1216/0074	Mixed Data Sampling (MDAS) models: Theory and Applications	Elena Andreou	University of Cyprus	PA 1: Ministry of Finance	FRO 1: Bocconi University FRO 2: University of North Carolina, Chapel Hill	150.000,00 €	150.000,00 €	<p>The objective of the proposed project is twofold. The first objective is to develop novel econometric models that extend current state-of-the-art techniques for modeling the dynamic behaviour of economic time series which are useful in macroeconomic forecasting as well as economic policy making. The new models apply the Mixed Data Sampling (MDAS) idea to develop further Factor type models with mixed frequencies which have broad applications in macroeconomics and financial economics. The second objective is to develop novel econometric techniques for evaluating and monitoring financial indicators and structural changes which are useful in periods of financial distress and economic crises, and which can be early warning indicators of instability in economies. These techniques will develop sequential change-point tests which test on-line, with the arrival of new data, the stability of economic indicators, capitalizing on the mixed frequencies and properties of financial variables in producing early warning indicators of financial distress in economies or financial institutions. Forecasting and monitoring key economic variables is one of the main activities of financial and government institutions, economic forecasting agencies, investment companies and is useful to economic policy makers.</p>



EXCELLENCE/1216/0025	The Reception of Ancient Cyprus in the Culture of the Western World	Spyridon Tzounakas	University of Cyprus			112.439,60 €	112.439,60 €	<p>The thread of the present proposal unravels across three different readings of the cultural exchange between Ancient Cyprus and Modern Europe: the first one will focus on the examination of the Cypriot identity in the Greco-Roman world, with special emphasis on the literary function of the Cypriot myths, that extends to matters of cultural interaction in illustrations and expressions of Cypriot ritual and religion and to the socio-political implications that emerge from the historicity of the literary and material evidence on Cypriot cults and genealogies. The second objective of the project is to examine the phenomenon of a Pan-European cultural identity in order to identify direct or implicit allusions to the Ancient Cypriot culture, with particular focus on matters of reception in literature and the arts and special emphasis on the European critical view of the Ancient Cypriot civilization as part of the prehistory of Europe's multicultural heritage. A third and final objective covers the interpretative reception of Ancient Cypriot culture in Contemporary Cypriot and Greek literature. The aim of this objective is to conduct a comparative analysis of the general/European and the specific/Greek-Cypriot re-appropriation of the island's distant past.</p> <p>Our approach will be sensitive to intertextuality. Previous texts form parts of the experience which produces organized cognitive models which are the structures with which individuals and communities organize their knowledge of the world.</p> <p>The implementation of the proposed project will benefit Cyprus in multiple ways, primarily in the fields of research, education and culture, as it will examine preserved traditions and myths of antiquity exclusively in connection with Cyprus which carry memories of cultural authenticity. It will also place the dynamic contribution of Cyprus within the heritage of Greco-Roman culture. It will additionally highlight the intercultural character of the Cypriot identity.</p>
EXCELLENCE/1216/0023	PEOPLE IN MOTION: TRACING HUMAN MOBILITY ACROSS THE MEDITERRANEAN IN THE BYZANTINE ERA	Elthymia Nikita	The Cyprus Institute		FRO 1: University of Cape Town	135.600,00 €	135.600,00 €	<p>People in Motion aims at exploring human mobility across the Mediterranean during the Early and Middle Byzantine period. Human mobility has played a key role in the formation of the multi-ethnic Byzantine state. The proposed project will be the first to systematically explore the scale, nature, and impact that migration had on those who relocated and on the local communities in the lands they inhabited based on the most direct evidence of the people in motion, human skeletal remains. To this end, the project will focus on material from Tunisia, Morocco, Italy, Greece and Cyprus. Human mobility and its effect will be explored using a combination of macroscopic (geometric morphometric analysis of cranial and dental morphology), microanalytical (dental calculus microdebris analysis of indigenous and imported plant species and minerals), and biochemical (strontium isotope analysis) methods. The aforementioned markers of palaeomobility will be examined in conjunction with cultural evidence of different ethnic identities in order to formulate a coherent biocultural narrative on the issue of migration and integration. Given the recent waves of migrants across Europe and the worldwide trend towards closing borders, the proposed research is expected to increase public awareness regarding the antiquity of migration and its role in shaping modern identities. In addition, this project will make a substantial contribution in generating novel knowledge regarding the issue of mobility in Byzantium, which has been a pivotal topic in Byzantine studies. On a Mediterranean level, this project will result in maps of local chemical signatures for strontium isotope analyses and the formation of one of the largest dental calculus microdebris archaeological datasets. Finally, the proposed project will bring Cyprus to the forefront of bioarchaeological research in the broader Mediterranean basin and establish the Cyprus Institute as an excellence hub for archaeological science.</p>
EXCELLENCE/1216/0400	Studies in Greek Bible Epic	María Ypsilanti	University of Cyprus		FRO 1: National and Kapodistrian University of Athens	147.400,00 €	147.400,00 €	<p>The project proposes to place the Greek biblical paraphrases in their cultural context and investigate the paraphrastic technique of Ps. Apollinarius in the poem in which the author produces a paraphrase of the Old Testament's Psalms of David in dactylic hexameter verse: the Metaphrasis of the Psalms. Selected passages will be examined in the light of ancient rhetorical theory, allusions to Homer and other pagan poetry in general and religious exegesis. The author's technique of paraphrasing a biblical text will be then compared with the technique of Nonnus in the Paraphrase of St. John's Gospel. A co-authored book and a number of articles are expected to result from the project. The project will contribute to a more complete picture of the aesthetics of the literature of late Antiquity - early Christianity.</p>
EXCELLENCE/1216/0241	Landscapes of Leisure and Politics: The Architectural History of Tourism and Conflict in Cyprus	Panayiota Pyla	University of Cyprus		FRO 1: Technion FRO 2: Sibel Budoguzan (Harvard University)	150.000,80 €	150.000,00 €	<p>The architecture of tourism and leisure has a very complex history in the modern era as it has multiple symbolic and practical ties to national modernisation, economic development, environmental transformations, and even ethnic conflict. In a country like Cyprus, where tourism has been the quintessential strategy for development since the end of colonialism, it is very crucial to have a critical history of the impact of tourism that could also inform current strategies for development.</p> <p>The particular combinations of processes of nation-building and development, intercommunal conflict, foreign funding and influences, land use antagonisms, and more –all of which are intertwined with the creation of the landscapes of tourism in Cyprus– make this island a paradigmatic case through which to contemplate the intertwined histories of modern architecture and tourism. Given current regional and global predicaments –and the widespread emphasis on tourism as a vehicle for economic recovery, sustainable development, or conflict resolution– it is crucial to rigorously consider the socio-spatial manifestations of tourism in Cyprus, both in the context of other Mediterranean histories of leisure-scapes, and in the context of larger critiques of development, peace-building and environmental politics. The project will adopt an interdisciplinary critical approach which incorporates methodological tools from architectural and cultural history, as well as social scientific perspectives on tourism, political conflict, development and sustainability. This project will examine the architecture of tourism and leisure-scapes in Cyprus, focusing on the period 1960-74, which constitutes the first phase of tourism boom in Cyprus. By combining archival and field research with the geospatial analysis and digital annotation tools, the project aims to map the spatial and conceptual processes that shape leisure-scapes by introducing these innovative digital tools as an integral part of the methodology.</p>
EXCELLENCE/1216/0034	Spatial updating and domain expertise: the case of dancers	Marios Avramides	University of Cyprus	PA1-Cyprus University of Technology PA2-SILVERSKY3D VR TECHNOLOGIES LTD		149.940,00	149.940,00	<p>While moving, even with their eyes closed, people are able to keep track of the changing egocentric (i.e., self-to-object) relations to the objects of their environment. This ability, known as spatial updating, is fundamental to navigation as it supports maintaining one's orientation in space. The proposed project aims to examine how spatial updating differs as a function of domain expertise. A study will be conducted in which expert dancers, novice dancers, and controls will be repeatedly tested on their ability to keep track of memorized locations while they move in space. MRI scans will also be captured to examine whether possible improvements in updating performance are associated with changes in the morphological structure of the brain.</p>
EXCELLENCE/1216/0481	Modified Hydraulic Fracturing for Unconsolidated Reservoirs	Panos Papanastasiou	University of Cyprus		FRO 1: Prof . Gennady Mshutis, Aberystwyth University	209.340,00	209.340,00	<p>Hydraulic fracture (HF) is a complex multiphysical phenomenon encountered in many man-made and natural processes. The most notable example of its intended application is fracking, a method widely used to enhance the recovery of hydrocarbons from unconventional reservoirs. Unintentionally induced HF can have a detrimental impact on the environment in the areas of CO2 sequestration or underground waste disposal. All these applications create demand for a proper understanding and prediction of the process through accurate mathematical modelling and numerical simulations. The objective of the project is the development of the mathematical and computational modelling of the hydraulic fracturing (HF) process in weak (unconsolidated) gas and oil reservoirs. This improved modelling will optimize the design of HF in unconsolidated reservoirs and enhance the interpretation of the mini-frac test that is used for the determination of initial reservoir parameters. This goal will be achieved with the development of the modified theory of hydraulic fracturing (HF) process which accounts for: i) poroelastoplastic deformation of the fractured material and resulting shield-tip propagation effect, ii) hydraulically induced tangential traction on the fracture walls, iii) advanced four-parameter rheological models of the non-Newtonian fluids. A numerical simulator of HF based on the modified HF theory will be developed and used to investigate the evolution of HF process in weak reservoirs for sand control completion applications. Modelling of fracture closure after propagation in weak reservoirs will be used for developing a new interpretation technique of mini-frac test that is used for initial parameter determination, such as permeability and minimum initial stress that are needed in drilling, completion and production. This project will improve our understanding hydraulic-fracture initiation and propagation in weakly consolidated rocks representative of the discovered reservoirs in the EEZ of Cyprus in East Mediterranean.</p>