Furthermore, Beantable can act as a diagnostic tool that provides educators and child development strategies recording, face tracking, head position estimation, skeleton tracking, and speech recognition. Beantable provides a set of motivating smart games that will attract the attention of children throughout the age range that is targeted by the system, continuously adapted in terms of the in- obtrusive manner. Beantable monitors the children's interactions and extracts indications of the achieved maturity level and skills by taking into account: (a) the way the child plays, (b) the selection of materials and game themes, and (c) the way the child takes part into the activities. Beantable supports a number of alternative natural interaction techniques, integrating facilities such as ges- tures recording, face tracking, head position estimation, skeleton tracking, and speech recognition. Beantable provides a set of motivating smart games that will attract the attention of children throughout the age range that is targeted by the system, continuously adapted in terms of the in- interaction modality, content and/or task difficulty to meet the recognized skills and abilities of the child. At the same time, parents are able to get information about the development progress of their child, including performance statistics and general information of the child's skills and abilities. Furthermore, Beantable can act as a diagnostic tool that provides educators and child development experts with extensive data (extracted from the interaction history) that can be used for determining whether the child is meeting developmental milestones.

Virtual Fitting Room: Virtual Fitting Room is an interactive augmented reality system which allows users to be immersed in a “virtual mirror” where they can try on clothes and accessories. The system adapts and fits on top of the users’ bodies 2D and 3D clothes that follow the user’s movements. User interaction is accomplished using hand gestures, allowing the users to try on different clothes while manipulating the system at a distance. Furthermore, users are able to keep their own favorite collections of clothes in a virtual wardrobe and compare different combinations. Virtual Fitting Room also provides recommendations for additional clothes that may be of users’ interest, according to their previous selections. Users can take photos of themselves and optionally share them on social networks such as Facebook and Twitter, sharing their experience with their friends but also adver- tising the system itself. The “Virtual Fitting Room” project constitutes one of the applied re- search conducted by the Institute of Computer Science, Foundation for Research and Technology – Hellas (ICS – FORTH) under the Ambient Intelligence Programme. The project is funded and com- mercialized by LATER PC, a Greek innovative startup company in the retail domain with a well-es- tablished international presence.

Hippolus: A Preference-enriched Exploratory System: The Hippolus system is a preference-enriched exploratory system which can be exploited in a number of applications (e.g., e-commerce). The pref- erence actions are given dynamically, in a simple and intuitive way, as the user interacts with the available products / services. As a result, the users of the system are able to successfully select the most preferred product / service for them in an efficient way.

OctoBot: Octopus-inspired compliant-body aquatic robot: Inspired by the morphology and out- standing locomotor capabilities of the octopus, an 8-arm robotic swimmer was developed. The robot was designed to mimic the natural locomotion of the octopus, which is primarily characterized by its capacity to adapt readily to changing environmental conditions. The robot is equipped with an on-board camera, which allows it to capture images and videos in real time. These images and videos are transmitted back to a central control station on land, where they are processed using machine learning algorithms to identify and track objects of interest in the environment. The data collected from these images is then used to control the robot’s movements, allowing it to navigate through complex underwater environments.

Locomotion and balancing of humanoid robots: Humanoid robots constitute a particularly modern trend in robotics, since they constitute “mechanical creatures” as close as possible to human morphology. Gaitting and balancing in such systems regard particularly important, yet extremely difficult tasks in robotics research. Appropriate methods for achieving the above have been developed in our lab, and will be demonstrated in the Researcher’s Night.

INSTITUTE OF ELECTRONIC STRUCTURE AND LASER (IESL)

Single photons and interference: Is light made up of particles or waves? Well, it depends. We present an experiment in which light travels along two different paths and behaves as both, par- ticles and waves.

An acoustic interferometer: One moment you hear it, one moment you don’t. This simple experi- ment explores the idea of interferometry: sometimes blocking some of the sound makes it possible to hear it.

Optoacoustic microscopy: Listening to light: Demonstration of optoacoustic imaging on phan- tom and plant tissue samples.

Unprecedented light: Total internal reflection, inverted images, bouncing light and more light tricks.

Application of Optical spectroscopy for quality control investigation in foods: We focus on optical spectroscopic methods such as Ultraviolet/Visible Fluorescence and Time Resolved Fluorescence spectroscopy as facile techniques with minimum sample pre-treatment for recording characteristic chemical fingerprints of edible products.

Optical fibers: Demonstration of manufacture, principle of operation and application filed of opti- cal fibers.

Laser in the sale of Tissue Engineering: Video demonstration and microscopic observation of the 3D call cultures.

Metamaterials: New possibilities in light control: Video demonstration of the properties and pos- sibilities of metamaterials in light-control applications.

Indoor Air quality with the use of Photocatalytic Nanomaterials: The achievement of Indoor Air Quality with the use of Nanomaterials: Real time experiment on the degradation of various pol- lutants in Demo houses, with the use of Titanium Dioxide nanomaterial fabricated at FORTH-IESL by the Transparent Conductive materials and Devices group.

Laser Induced Breakdown Spectroscopy: Demonstration of remote LIBS for assessing the opera- tional quality of outdoor HV polymeric insulators.

Skinakas Observatory: Video Presentation.

Crete University Press (CUP): Methods. Crete University Press presents Greek Massive Open Online Courses (MOOCs) powered by OpenEDX.

www.researchernight.gr  www.forth.gr
Lasers for Cultural Heritage analysis, diagnosis and conservation: Laser based systems, developed at IESL-FORTH, for analysis, diagnosis and conservation of artworks and monuments will be presented. Emphasis will be given to videos and photos describing typical examples (PERION-CH gr) and in-situ applications (KRIPIS-POLITEIA).

Laboratory of Geophysics - Satellite Remote Sensing and Archaeo-environment: Presentation of methodological approaches and results on the implementation of ground, aerial and satellite remote sensing technique and GIS management of CH monuments and sites in the framework of the KRIPIS-POLITEIA research project. (Institute of Mediterranean Studies)

Analysis of ancient DNA: A completely new view of the past: Can we retrieve DNA from objects found in archaeological excavations such as bones from humans and animals or food residues such as olives and beans? Now, in the first laboratory for analysis of ancient DNA in Greece, which is equipped with specialized and modern technologies (as used in forensic research) we can! With these analyses we can shed light on the origin and migration of populations and for the first time understand in detail how ancient farmers produced and stored food and merchandise. We can open a window to our past.

The Information System for Cultural Heritage. Exploring the Byzantine World: Targeted digital content showcasing the Byzantine culture will be presented. The e-services created within the “Exploring the Byzantine World” project are designed to inform teachers, researchers, school children and interested members of the general public about monuments, persons, historical events, achievements and aspects of daily life in Byzantium. A set of interactive educational activities that will enable students to discover Byzantium by playing, will also be available.

Reassuring an Virtual Reconstruction: On-going results of the Marie Curie ITN-DCH project, "Initial Training Network for Digital Cultural Heritage (ITN-DCH): Projecting our Past to the Future" is the first and one of the largest Marie Curie fellowship projects in the area of e-documentation / e-preservation and CH protection funded by the European Union under the FP7 PEOPLE research framework. The project targets to develop tools and services for the promotion of CH, which have already been released by the partners for public use. This project brings together knowledge from the past both by experts and the general public. It discusses the methodology for creating 3D models as accurate representations of a monument or an archaeological site. It proposes an information system that supports argumentation and reasoning on the virtual reconstructions and the 3D models.

Initial Training Network for Digital Cultural Heritage: Rendering and animation in mobile VR and AR: On-going results of the Marie Curie ITN-DCH project. The "Initial Training Network for Digital Cultural Heritage (ITN-DCH): Projecting our Past to the Future" is the first and one of the largest Marie Curie fellowship projects in the area of e-documentation / e-preservation and CH protection funded by the European Union under the FP7 PEOPLE research framework. The project started on the 1st of October 2013 and its consortium comprises of 14 full partners and 8 associate members covering the entire spectrum of European CH actors, ranging from academia, research institutions, industry, museums, archives and libraries. In this demo we illustrate recently published, on-going Virtual Reality and Augmented Reality applications for digital heritage preservation and curation that allow real-time simulation of virtual characters, rendering and animation.

Characterization of building elements and materials and methods for historic monuments‘ conservation: Recent research and advances as regards the characterization of building elements as well as new materials and methods for historic monuments‘ conservation will be presented by the Institute of Chemical Engineering Sciences of FORTH.

Climatic changes and coastal monuments: Presentation of the contribution of the Coastal Research Laboratory in the study of climate change on coastal environment (sea level rising, intensification of extreme weather events, erosion, safety of coastal infrastructure) and its impact on the natural environment and cultural heritage. Risk assessment from the climatic change can contribute, through the provision of protection measures, and resilience development of economic activities associated with them, such as tourism.

Interactive systems in the domain of cultural heritage: The presentation will focus on interactive systems developed by ICS in the domain of cultural heritage. These systems are facilitated for presenting cultural information, allowing the interaction of users with cultural resources in digital form and the augmentation of artefacts with digital information. The presentation will also include content that demonstrates the practical exploitation of these systems within cultural heritage institutions. Furthermore the "TimeViewer" system will be demonstrated. "TimeViewer" is an interactive system that presents information with temporal characteristics in a large scale display, while user interaction is achieved through remote gesturing. Besides representing information as a traditional two-dimensional timeline, the system also supports three-dimensional information representation in a "time - tunnel", i.e., a corridor along which the events are placed with chronological order. User interaction in the time - tunnel is accomplished through full - body kinesthetic interaction.

INSTITUTE OF MOLECULAR BIOLOGY AND BIOTECHNOLOGY (IMBB)

An in silico tour of the living cell: The visitor will be guided through the inner life of the cell in a video presentation (from BioVisions at Harvard University). They will be shown how macromolecules interact and how this results in the building of subcellular structures and how these function. Three dimensional images of the cell nucleus will also be shown, in which specific DNA areas have been marked with fluorescent dyes. It will be demonstrated how one can follow the movement of these areas inside the nucleus during activation or differentiation of the cells. With the help of time - lapse movies, the visitor can tour the nucleus of cells which have been processed using DNA fluorescent In Situ Hybridization (DNA-FISH).

Exploring the amazing fly: The fruitfly Drosophila melanogaster has been at the center of biological research for over a century. Scientists perform fine manipulations on the fly’s genes in order to approach basic questions about life and disease. After all, the molecular building blocks of all organisms are very similar and studying the humble fly can open new avenues in the understanding of human diseases. Our research focuses on the genetic pathways controlling the physiological development of the nervous system, which are often found implicated in neuronal diseases.

Study of human diseases in a nematode model system: The Neurogenetics and Ageing lab uses the nematode Caenorhabditis elegans to investigate the molecular mechanisms of neuronal function and dysfunction and the pathways that control ageing. We work on human diseases that can be studied in the C. elegans model system such as Parkinson’s disease and Alzheimer’s disease. The behavior of wild type and mutant C. elegans strains will be monitored in the stereoscope. The mutant animals display locomotory defects due to a mutation in a gene encoding a cuticle collagen. This mutant gene is used as a transformation marker to select transgenic nematodes. Images of C. elegans models of human diseases will also be shown.

The hidden life of malaria parasites: Malaria is caused by the protozoan parasite Plasmodium and is transmitted by Anopheles mosquitoes. Malaria is one of the most deadly diseases in the world, with close to 1 million lethal cases and several hundred millions cases yearly. At IMBB we study the events taking place when the parasite enters the mosquito which coincides with the sexual stages of the parasite. The parasites undergo many changes during the three weeks that it lives within the mosquito until it is transmitted to a new person. Both the mosquito and the parasite will be presented and the life of the parasite in the mosquito will be described.

An innovative platform for analysis of mosquito disease vectors: Insects pose tremendous threats to human health, economic and environmental systems. Insect vectors are responsible for tremendous loss of agricultural production. Control of the insect population largely relies on the use of insecticides. However, insects develop resistance against insecticides. The Molecular Entomology group investigates the mechanisms by which insects (mosquitoes) develop resistance to insecticides, aiming to develop new means of managing and overcoming resistance. An innovative, fully integrated and automated (“sample to answer”) multiplex vector-diagnostic platform (LabDisk) for analysis of mosquito DNA and RNA in field samples will be demonstrated.

The platform will monitor the species ID, the insect status and the insecticide resistance profile of malaria vectors. The LabDisk will contribute to improved management of mosquitoes.

Insects and Agriculture: Besides tourism agriculture is the main source of wealth in Crete. For the traditional crops of olive and fruit two insects, Dacus and Medfly, are major threats, diminishing production and reducing the quality of the produce. The visitors will be shown the different stages in the life cycle of these insects and the damage they do to the crops. Furthermore, they will learn how new eco-friendly methods for the control of these insects are being developed at IMBB.

The structures of natural antibiotic peptides at the atomic resolution: Structures of molecules at the atomic resolution help researchers understand how the molecules function. A video will be shown with the 3-dimensional structure of the peptide trehalovirin with its hydrogen-bonding network at the atomic resolution. The structure was determined from very thin hair-like crystals using synchrotron radiation. The structure of the protein Rop, which binds RNA will also be presented. This protein is an example of an anti-parallel bundle of 4 alpha helices. The third examples will be the structure of a small metallo-proteins. You will have the opportunity to make your own crystals from proteins and see how the crystals form in a few minutes!

Agriculture startups: How can a tiny humble bacterium produce high purity products used in scientific research (cloning tools) and biomedicine (identification of DNA samples by PCR)? MINOTECH biotechnology, the production unit of Institute of Molecular Biology and Biotechnology for almost three decades, specializes in isolating high-value proteins with applications in biotechnology and biomedicine. MINOTECH biotechnology members will demonstrate protein isolation techniques.

Modelling the brain: The Computational Biology Laboratory of IMBB-FORTH will showcase computational models of brain cells and networks and explain their application towards understanding learning and memory formation in the brain. The exhibition will include cartoon-like slide presentations, videos as well as hands-on experimentation with models.

Genome instability and aging: Aging in mammals is accompanied by a progressive atrophy of tissues and organs, stochastic damage accumulation in DNA and improper folding of proteins. A cumulating evidence suggests that loss of genomic maintenance may causally contribute to aging. Distinct evidence for a role of imperfect DNA repair in aging is that several premature aging syndromes have underlying genetic DNA repair defects. Our lab is studying the mechanistic role of DNA repair defect in central metabolic organs such as liver and pancreas, as well as in adipose tissue and immune system, using loss-of-Cre recombination technology to restrict DNA repair deficiency in a single type of tissue while leaving the remaining part of the organism intact. Here we will present examples of a number of advanced molecular, genomic and imaging approaches such as mass spectrometry, next generation sequencing coupled to chromatin immunoprecipitation, transmission electron microscopy and immunofluorescence to investigate the role of DNA repair proteins in progenia and age-related pathologies.

Address: aDDress is a Maria Skłodowska-Curie Initial Training Network, funded by the European Commission 7th Framework Programme. The Network of aDDress establishes a European research platform of excellence in the field of DNA repair and ageing, builds a well-structured multi-disciplinary European science area and strong links to the industry, thereby providing young researchers with a unique skill set that enhances their future career prospects.