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1. ITN-DCH project

The “Initial Training Network for Digital Cultural Heritage: Projecting our Past to the Future” (ITN-DCH) is a **Marie Curie fellowship projects** in the area of the 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, its consortium comprises **14 full partners and 9 associate members** covering the entire spectrum of European CH actors, ranging from academia, research institutions, industry, museums, archives and libraries. The project aims to train **20 fellows** in the area of CH digital documentation, preservation and protection in order to create them a strong academic profile and market-oriented skills which will significantly contribute to their career prospects. ITN-DCH targets **all aspects of CH** ranging from tangible (e.g. books, newspapers, images, drawings, manuscripts, uniforms, maps, artefacts, archaeological sites, monuments) to intangible content (e.g., music, performing arts, folklore, theatrical performances) and their inter-relationships.

2. New fellows for ITN-DCH

Diego Bellido Castañeda – ESR3 Arctron, Germany

Diego was born and grew up in Spain. He acquired his Bachelor degree in Engineering in Geomatics from the Santiago de Compostela University (USC) with a thesis in the field of remote sensing on the integration of radar and optical images in order to improve land cover techniques. Then he received a Master in Geodesy and Cartography Engineering from the Technical University of Madrid (UPM) with a thesis on UAV platforms to produce accurate products for an archaeology purpose. Thanks to this work he was able to participate in the Erasmus Intensive Programme entitled “ICT at the Service of Cultural Heritage” held in Rhodes Island in July 2013. Since 2014 he was working as a Geospatial Data Analyst for FTTH project before joining the ITN-DCH at ArcTron3D.



Louis Cuel - ER4 MIRALab, Switzerland

Louis is French and has done his master and his PhD at the University Joseph Fourier in Grenoble. He has left France to join the ITN-DCH project to work in MiraLab at the University of Genève. His involvement on the project is entitled “Visual trackers for intangible performing arts”. He is originally a mathematician, but his research interests involve computer science, 3D modeling, 3D reconstruction, tracking, and interaction. His PhD concerned the geometric inference which answers the following question: Given an unknown object that we only know through a data set, which guaranties can we give to recover the geometry and the topology? The algorithms and the theoretical guaranties that Louis developed allowed him to take into account the robustness of several types of 3D data-processing.



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After the PhD, his goal is to apply his knowledge in robustness on 3D processing but in an applied field. Digital cultural heritage and all the fields involved such as acquisition and tracking are some very exciting new challenges for him. Also passionate in psychology, history and art, he loves hiking in the Alps in his free time.

Margarita Papaefthymiou - ESR10 FORTH, Greece

Margarita was born and raised in Larnaca, Cyprus. Her involvement in the ITN-DCH project focuses on geometric and illumination registration of dynamic AR scenes and gesture tracking and user activity recognition. She has a BA in Computer Science with a specialization in Computer Systems and Networks from the University of Cyprus. She recently acquired an MSc in the field of Computer Games and Interactive Technologies at the University of Cyprus in collaboration with the Cyprus University of Technology. Her MSc thesis focused on offering an efficient method that automatically extracts motion characteristics for synthesis of dance animation. The method leverages knowledge from anatomy, kinesiology, and psychology as incorporated in the motion analysis method 'Laban Movement Analysis'. Her primary interests lie in virtual/augmented reality, artificial intelligence for games, computer graphics and especially computer animation. When in the mood, she enjoys a good walk, book or movie.



George Bruseker, ER1 FORTH, Greece

George Bruseker was born in Edmonton, AB, Canada. Since then he has lived, worked and studied in China, Belgium, Greece and Qatar. George's travels followed a passion for the study of philosophy, language and culture, and led to a career in digital cultural heritage. George completed a Bachelor's of Philosophy and History at the University of Alberta, a Master's of Philosophy at the Katholieke Universiteit Leuven in Belgium and his PhD in Philosophy at the National Kapodistrian University of Athens, Greece. His PhD dissertation was in ancient philosophy, interpreting the meaning of Democritus' ethical and political fragments while his MA thesis looked at the project and stakes of intercultural philosophy. Before and after his BA, George spent two years in China, studying Mandarin and teaching English. After his MA, George took up a position with Pax Christi International, a Catholic peace organization, and overhauled their website and documentation management system. After moving to Greece, George spent a year in modern Greek study before taking up the role of IT Officer at the British School at Athens while continuing work on his PhD. There he overhauled the School's ICT infrastructure and worked on integrating the School's collection management and administrative data systems. Following his work at the BSA, George was hired by the Qatar Museums Authority to work on the planning, implementation and maintenance of a unified collection management system for their museum projects, KE Emu. George's involvement in the ITN-DCH is in the use of formal ontology to model and integrate archaeological argumentation with 3D/4D models. The title of his project with DCH-ITN is "A knowledge interface to virtual cultural heritage."



Welcome all onboard!!

3. ITN-DCH Summerschool @ Stuttgart University

Chance Coughenour – (University of Stuttgart, Germany)

During the fourth week in October 2014, the ITN-DCH project fellows, supervisors, and partners took

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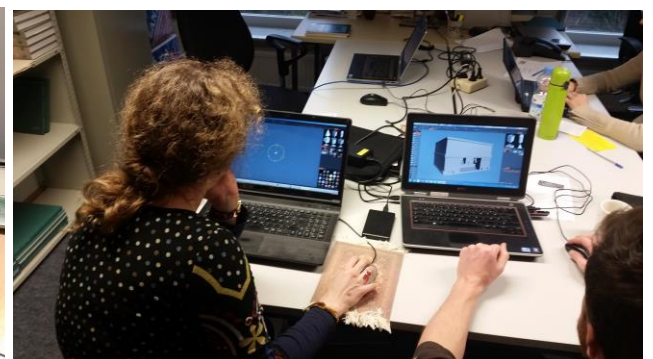
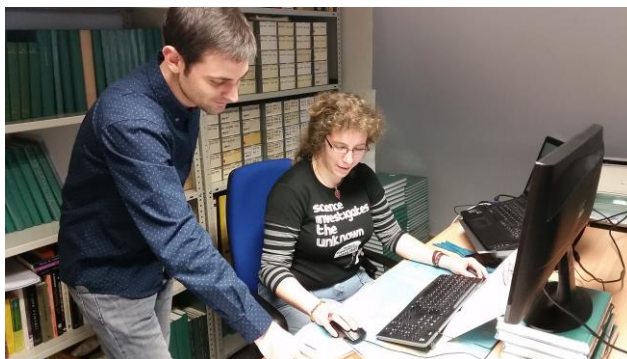
part in the project's **first Summer School** in Stuttgart, Germany. This marked the first time the fellows were given the opportunity to meet, network, and plan for the development of the project. The mornings and afternoons were devoted to presentations by the numerous full and associate partners of the project as well as others from the University of Stuttgart. The host of the event, Prof. Dieter Fritsch from the Institute for Photogrammetry, organized hands-on workshops in the afternoons where the fellows were trained in the methods of photogrammetry, terrestrial laser scanning, and GPS mapping. During a few evenings, the fellows and supervisors also participated in social events which included a visit to a local museum. I was the hosting fellow for this event and believe the event was a great success. This was the first impression, thereby an important one, for the fellows of the true scale of our unique, multidisciplinary approach to the advancement of cultural heritage documentation and preservation.



4. ITN-DCH Secondment

Chance Coughenour (University of Stuttgart, Germany)

I've just returned from my first secondment and can simply sum up the experience as a tremendous opportunity for my training in the field of DCH. I was in Bonn, Germany, at the Commission for Non-European Cultures (KAAK) of the German Archaeological Institute (DAI). The principal reason this associate partner's institution was chosen was my background in archaeology and remote sensing. Together, Marleen (ESR9) and I participated in the development of the MayaArch3D project (mayaarch3d.org) as well as the Nasca-Paracas project. The MayaArch3D, under the direction of Dr. Jennifer von Schwerin, is an ambitious project which seeks to create an elaborate web-based tool for archaeological research of the Maya in the Copan Valley in Honduras with an integrated 2D/3D geobrowser and complex database.



Building on my prior training in photogrammetric processing, I created numerous types of 3D data and metadata from previously collected photos for use in the project's 3D object viewer and

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database. I also helped improve the design of their 3D object database during my time spent processing and making notes on how to best document and preserve their 3D data and metadata for future research and improvement. In addition, future collaborative work was organized for processing and modeling of MayaArch3D's aerial LiDAR data of the Copan Acropolis.

Dr. Markus Reindel, the director of the Nasca-Paracas project in Peru, also supported my training by providing data for photogrammetric processing of recent excavations and a petroglyph stone from his study region. Further work is currently being carried out to help improve our understanding of the region's ancient inhabitants by finding innovative ways to visualize their architectural remains and a unique petroglyph that may represent an ancient map of their settlement and agricultural system.

Anaïs Guillem (University of Ljubljana, Slovenia), George Bruseker (FORTH, Greece), Nicola Carboni (CNRS, France) and Matthew L. Vincent (University of Murcia, Spain)

In January 2015, Dr. Martin Doerr and Maria Theodoridou kindly welcomed three ITN-DCH fellows to FORTH: Nicola Carboni (CNRS, France), Anaïs Guillem (University of Ljubljana, Slovenia) and Matthew L. Vincent (University of Murcia, Spain) for a secondment training period. This secondment coincided with the taking up of post at FORTH of ER1 by Dr. George Bruseker in the beginning of January and of ESR10 by Margarita Papaefthimiou towards the end of the month. The fellows met all together for the first time during a stimulating lab visit organized by Dr. Giorgos Papagiannakis to introduce the work of his team in CH virtual reality environments, computer vision and intelligent behaviour in robotics. The secondment offered a comprehensive introduction to the concepts and application of CIDOC-CRM - a cultural heritage ontology and ISO standard (<http://www.cidoc-crm.org/>) – as well as the family of extensions that have been developed to cover additional specialized domains of knowledge including: CRMarchaeo, CRMgeo, CRMinf, CRMdig and CRMsci. The sessions aimed not only to demonstrate the mature models but also to introduce participants to the general principles, questions, concerns and methodologies used in the fields of conceptual modelling and knowledge engineering.

Making use of the opportunities opened by the ITN-DCH network collaboration, the team of DAI with Dr. Jennifer von Schwerin and Mike Lyons joined the sessions for a period of one week. The mapping of the MayaArch3D database to CIDOC-CRM was used as a case study to explore the issues and principles introduced in previous sessions and to train in the use of the ontology-mapping tool (3M-Mapping Memory Manager) developed by FORTH. These sessions gave a large headstart to the DAI team in tackling the overall mapping process.

Additionally, the secondment offered a chance for mutual collaboration between FORTH and the ITN-DCH network by way of the work undertaken by the fellows in exploring and testing the built heritage documentation tool developed by FORTH for the European Centre of Byzantine and Post-Byzantine Monuments as part of the Anna Komnene project (<http://www.ebmmdb.gr/>). Fellows tested the expressive capacities and extensibility of the database by working on documenting the Church of Phorbiotissa Asinou using the system. The Asinou Church was chosen in order to contribute to the overall work on ITN-DCH's first case study.



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5. Report from Euromed 2014

Marleen de Kramer (7reasons Medien GmbH, Austria)

In the beginning of November, the ITN-DCH project travelled to a surprisingly cold and overcast Cyprus to attend the 5th Euromed conference (<http://www.culturalheritage2014.eu/>). It proved to be a packed week with a dual purpose: allowing us to learn about the current state of the art in digital cultural heritage and presenting our project to heritage professionals, demonstrating how we intend to contribute to and expand this fast-developing field. It gave a good overview over the many individual disciplines that feed into digital cultural heritage, but also showed what is lacking and what we intend to become: someone who maintains an overview of the entire process to ensure that data are acquired, processed, stored, and disseminated in a way that will allow them to be used and re-used for very different purposes, now and in the future. The brightening weather and winter sunshine outside passed by almost unnoticed except for brief forays to the terrace during coffee breaks; welcome interludes that allowed us to ask more specific questions of speakers that had caught our attention. The variety of work represented was truly astonishing, covering tangible and intangible heritage, from single-object scale to entire landscapes, data acquisition to databases to dissemination, the preservation of physical objects to non-destructive investigations. Despite the "Euromed" title, the topics covered were pleasantly non-Eurocentric, and also included helpful contributions from professionals in other areas that would be using, but not producing digital heritage data, such as Interpol and customs organisations.

As the next generation of DCH experts, we were also introduced to the potential next generation - a group of students from a local school that came to see our data capture and processing tools at work, and a group of young Cypriot and Turkish dancers working on a cross-community project to preserve their common intangible heritage.



6. Report from ITN-DCH Asinou Church Mission

Ellie Stathopoulou (NTUA, Greece)

Before the EuroMed conference, the ITN-DCH partners visited the first study case of the project. It is the Panayia Phorvotissa or Asinou, located on the mountain of Troodos in Cyprus. Since 1985, it is included in UNESCO World Heritage Sites along with other 9 painted Byzantine Churches of Cyprus. It was initially erected around 1100 AD and suffered serious damages since then that lead to partial rebuildings and wall redecorations of the monument. The scope of the mission was to get familiar with the first case study monument, learn about its history, take some initial digital data and measurements and roughly plan the digitization procedure and further relevant actions from now on. Various images of the exterior of the church were taken in order to fully reconstruct the monument in 3D with structure from motion (SfM) techniques. Being a cloudy day, there were perfect lighting

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conditions, without dark shadows or over illuminated regions. A Canon 500D DSLR CMOS camera was used. For a full 3D reconstruction, images from various aspects (different orientations and scales) should be acquired. Therefore, images taken from a UAS (Unmanned Aerial System) that depict the roof of the church should be combined with the ones taken from the ground. SfM techniques do not require strict camera geometries between the stereopairs, but can work also with unordered image sequences. During the day different data acquisition techniques were shown too, not concerning directly 2D or 3D documentation. A collaborator of Civil and Geomatics Engineering Dept. of CUT presented a 3D printed model of the church, which they had constructed from UAV photography. This was fascinating and I am really looking forward to conduct research within this multi-disciplinary environment for the benefit of Cultural Heritage.



Rossella Suma (University of Warwick, UK)

The 2nd of November 2014 was a very important date for the ITN-DCH project. It was in fact the very first field mission that has seen reunited every partner and fellow involved in the project in one place. The church of Asinou is among the most famous in Cyprus. Built around 1100, the edifice is a UNESCO World Heritage Site since 1985 together with nine other painted Byzantine churches of the Troodos region. The Church, also called Panagia Forbiotissa, used to be the katholicon (monastery church) of the Monastery of Forbion, as its name implies. Its wall paintings are some of the finest examples of Byzantine art on the island and therefore embodying the perfect case study for our

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project. The mission has seen the many different skills and expertise all united in one place to pursue a common goal: preserving the legacy of this building not just in terms of shape and materials, but also in terms of history and significance for the local culture. Prof. Alan Chalmers (Warwick University) and I had the chance to demonstrate the use of a Spheron HDR camera and a Flare HDR video camera, to accurately capture the actual light at the Church site. This information will help in relighting authentically the entire church 3D digital reconstruction. Prof. Antonia Moropoulou (NTUA) and Manolis Alexakis illustrated the use of Infrared Thermography enabling the diversification of the materials constituting the monument, and so help in preservation of its structural materials. Prof. Žarnič (UL) Nikoletta Skordaki and Anaïs Guillem brought their 3D microscope and demonstrated how it can be used for an accurate analysis, in order to evaluate and identify damage and cracks that might be endanger the wall paintings materials. Prof. Marinos Ioannides, the project coordinator, together with other CUT collaborators showed an inexpensive and effective drone for 3D mesh SfM reconstruction. We had the chance to meet the priest in charge of the Church, who keeps the local memory alive and a local guide who explained the monument's history and described the church paintings and their symbolical meaning. Prof. Ioannides with his spirit and enthusiasm pitched how each of the partner's skills and competence will be essential to the creation of a new way to access cultural heritage material, in order to create a unique European repository for preserving our history, our roots and bringing this knowledge to future generations.

7. ITN-DCH Outreaching activities

Magda Ramos Calles (FBK, Italy)

As outreaching activities during the Euromed 2014 conference, it is worth to mention the attendance of a group of students coming from the Kokkinochoria Lyceum "Photis Pittas". Within the frame of their "Architectural and Technical Design" lesson, the students visited Euromed to take part in different activities lead by the ITN-DCH fellows: a demonstration of a terrestrial laser scanner survey of an ancient tomb, a 3D digital representation of CH monuments and several discussions with conference delegates on data acquisition technologies and data processing in CH documentation, preservation and protection. The surveyed tomb is a Cypro-Archaic monument (7th century B.C), part of the ancient necropolis of the ancient city of Amathus and located in the garden of the Amathus Beach Hotel (venue of EuroMed 2014). The fellows showed to the students the possibility to digitally record CH monuments even with their mobile camera and they seemed impressed by the laser scanning technology.



Rossella Suma (University of Warwick, UK)

As part of the ITN-DCH dissemination and outreaching mission during these months, I participated in a number of activity with the University of Warwick and WMG Outreaching department. The Midlands 2014 Imagineering Fair is a major event in the Midlands region. Each year thousands of visitors enjoy hundreds of activities developed and laid on by some of the UK's major manufacturers, engineering organisations and education establishments. This fair is particularly aimed at young people so they can learn about the importance of modern engineering in our everyday life and how things are designed and made.

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In the Science and Survival event, 120 students from local schools come onto campus and learn about studying science at degree level (in order to inform their A-Level choices).

In collaboration with the Royal Institution, one of the oldest organisation devoted to scientific education and research in the UK, Warwick University is currently hosting a number of masterclasses with youngster from different schools in the region where they are able to meet young engineers and researchers. This event aims to open the eyes of young people and let them have an insight into mathematicians and engineers work.

In these events, my role was to engage young people, teach them about science and how technology can be used for Cultural Heritage purposes. In particular, I illustrated the ITN-DCH project and its importance in order to preserve our past and make it accessible to everyone. I showed the steps necessary to recreate an accurate 3D model of a monument. To illustrate in practice how this kind of resources can be effectively employed I created a short demo using a 3D Model of the Angeloktisti Church in Cyprus and the Oculus Rift (HMD) and let people explore and admire the 3D Virtual Reconstruction of the building in an immersive environment.



8. Incoming meetings & events



<http://www.3d-arch.org>

ISPRS 3D-ARCH Workshop on "3D Virtual Reconstruction and Visualization of Complex Architectures", 25-27 February 2015, Avila, Spain

The 6th edition of the event will focus on the steps and processes for smart 3D terrestrial modelling, accessing and understanding of virtual environments from multiple data sources.

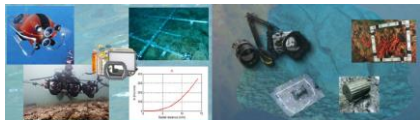
Int. Computer Applications and Quantitative Methods in Archaeology (CAA), 20 March – 3 April 2015, Siena, Italy



<http://caaconference.org/>

The 43rd Computer Applications and Quantitative Methods in Archaeology "KEEP THE REVOLUTION GOING" Conference (CAA 2015 SIENA) will explore a multitude of topics to showcase ground-breaking technologies and best practice from various archaeological and computer sciences disciplines, with a large diversity of case studies from all over the world. Some of these topics are specific to the Italian scientific community, which played since the early stage of computer application a central role, participating to the debate and development in particular of GIS, databases, semantic, remote sensing, 3D data collection, modeling, visualization, etc.

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<http://3dom.fbk.eu/files/underwater/index.html>

ISPRS/CIPA Workshop on Underwater 3D Surveying and Modeling”, 16-17 April 2015, Sorrento, Italy

The workshop aims at bringing together scientists, developers and advanced users in underwater 3D recording and related disciplines for documentation in underwater environments.



<http://www.cipa2015.org>

25th International CIPA Symposium, 31 Aug – 5 Sept., 2015, Taipei, Taiwan

The International Committee for Documentation of Cultural Heritage (CIPA) will held its next symposium in Taiwan, heading back to Asia after the 2009 event in Japan. The congress direct is Dr. Alex Ya-Ning Yen from the China University of Technology (CUTE). Four organizations will support and work with CUTE to prepare this important event; they are, namely, Taiwan Heritage Society, Taiwan Geographic Information Society, Chinese Society of Photogrammetry and Remote Sensing and Architectural Institute of Taiwan.



<http://lrv.ugr.es/DH2015/>

Int. Conference Digital Heritage 2015, 5-9 October 2015, Granada, Spain

The second edition of the large heritage conference will be held in Granada in October 2015.