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JPICH Digital Heritage

Application Template for Proposals

Note:
Your application must follow the structure as specified below. The document should be written in English. All pages must be numbered and each page should contain the project acronym. The minimum font size allowed is 11. All margins should be at least 15 mm (not including footers or headers). Incomplete proposals will not be evaluated!

Project Title	**S**afeguarding the **C**ultural **HE**ritage of **D**ance through **A**ugmented **R**eality
Acronym	**SCHEDAR**
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Associate Partner 2 (AP2)	The Morris Federation Sheffield, United Kingdom Contact Person: Melanie Barber
Associate Partner 3 (AP3)	Fibre Performing Arts Nicosia, Cyprus Contact Person: Stavri Kalopetridou
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Section I: Publishable Project Summary

Dance is an integral part of any culture. Through its choreography and costumes dance imparts richness and uniqueness to that culture. Over the last decade, technological developments have been exploited to record, curate, remediate, provide access, preserve and protect tangible CH. However, intangible assets, such as dance, has largely been excluded from this previous work.

UNESCO states in its 2003 Convention for the Safeguarding of the Intangible Cultural Heritage (ICH) that ICH is a mainspring of humanity's cultural diversity and its maintenance is a guarantee for continuing creativity. However, modern factors such as globalization and the massive movement of people have diminished the unique culture of many communities, and indeed there is a now a very real risk that many types of ICH may disappear forever.

Recent computing advances have enabled the accurate 3D digitization of human motion. Such systems provide a new means for capturing, preserving and subsequently re-creating ICH which goes far beyond traditional written or imaging approaches. However, 3D motion data is expensive to create and maintain, encompassed semantic information is difficult to extract and formulate, and current software tools to search and visualize this data are too complex for most end-users.

SCHEDAR will provide novel solutions to the three key challenges of archiving, re-using and re-purposing, and ultimately disseminating ICH motion data. In addition, we will devise a comprehensive set of new guidelines, a framework and software tools for leveraging existing ICH motion databases. Data acquisition will be undertaken holistically; encompassing data related to the performance, the performer, the kind of the dance, the hidden/untold story, etc.

Innovative use of state-of-the-art multisensory Augmented Reality technology will enable direct interaction with the dance, providing new experiences and training in traditional dance which is key to ensure this rich culture asset is preserved for future generations.

Keywords: augmented reality, motion capture, traditional dances, intangible cultural heritage

Section II: Description of Work and associated information

Part A: Description of Research

A1 Concept, and research questions and objectives of the JPICH Digital Heritage project and how it fits the call specification.

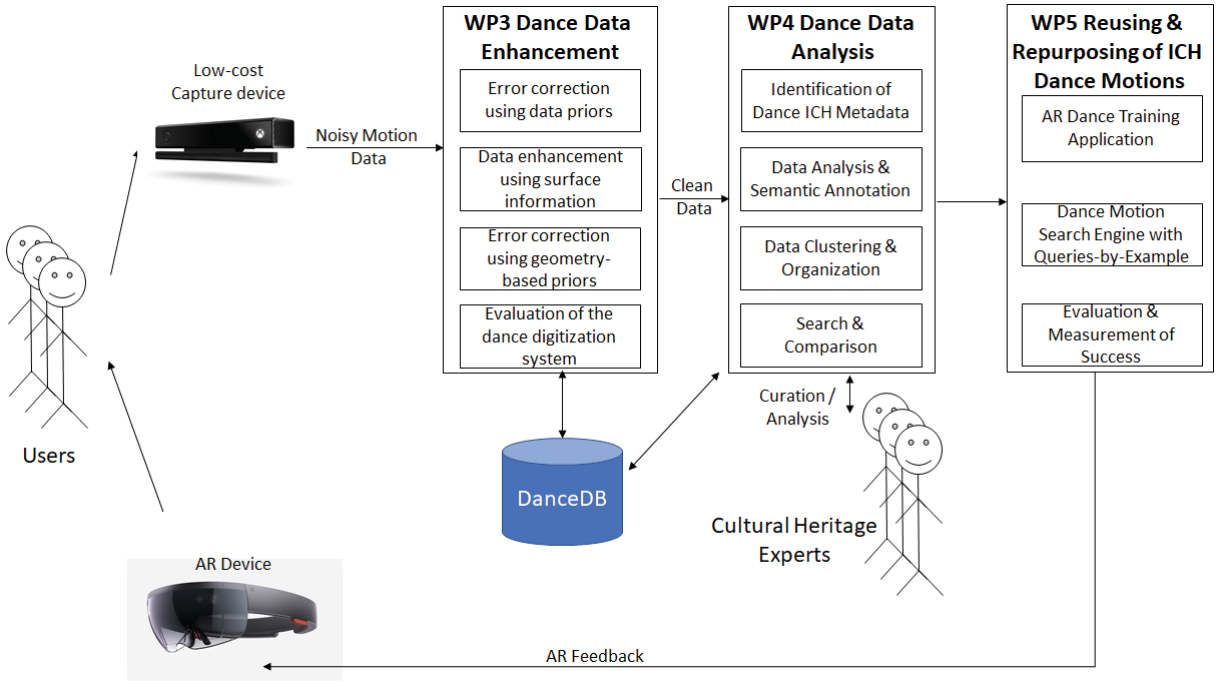

Figure 1: Process Diagram of the AR-Dance project

Our ancestors have been recording dance for thousands of years. Ancient paintings, such as those from the Rock Shelters of Bhimbetka, India (9,000 BP), and tomb decoration in Egypt (5,000 BP) clearly show that dance is a key part of any rich culture. In the past, dance played an important role in passing culture down the generations. In addition to paintings and carvings, for example in ancient Greece and in the Bible, dances were described in written form. Modern technology now makes it possible to capture the holistic dance experience, including the motion, music, costumes, etc. However, such a detailed capture is seldom undertaken as (a) it is expensive to create, archive and maintain, (b) semantic information encompassed in the captured multimedia dance data is difficult to extract and formulate in a usable manner, and (c) software tools to visualize, search through or otherwise utilize this data is scarce and too technical for most end-users. With increased globalisation in the modern world and the mass migration of people, unique cultural assets, such as dance are under threat, as communities disperse and vital knowledge relating to the dance performance is lost.

SCHEDAR intends to reverse this situation by designing novel algorithms and computational tools for archiving, curating, preserving and most importantly reusing dance data. SCHEDAR aims at (a) making dance 3D digitization accessible to everyone without expensive equipment or expertise, (b) enabling semantic information retrieval from these otherwise opaque datasets without the need of manual labelling and annotation of dance data, and (c) devising a highly immersive Augmented Reality (AR) platform for interactive dance teaching based on motion data reusability and advanced 3D character visualization.

In particular, SCHEDAR will develop the guidelines, algorithmic framework and software necessary for leveraging existing ICH motion databases, such as UCY's DanceDB (https://dancedb.cs.ucy.ac.cy/), making dance motion data available to scientists, educators and the general public. SCHEDAR will devise motion data improvement algorithms and apply them on inaccurate data sensed with commodity hardware. The improved error corrected data will be stored in a highly available cloud-based infrastructure and will be processed by novel motion analysis algorithms to extract motion features and annotate them semantically. Two applications will be developed to demonstrate data re-use and re-purposing: (a) a query-by-example dance motion search engine, i.e. an internet-based search engine that takes as input a short motion sequence and uses motion similarity algorithms to retrieve

similar dances, without the use of text-based keyword searches, and (b) a next-generation dance teaching AR application that uses all the technologies and tools developed in SCHEDAR to search, retrieve and utilize existing dance performances to provide 3D virtual dancers that can coach users.

The project directly tackles the 2017 JPI CH Digital Heritage call topic category "Safeguarding Digital Heritage". SCHEDAR's philosophy and motivation aligns with UNESCO's 2003 Convention for the Safeguarding of the Intangible Cultural Heritage (ICH) which states that ICH is a mainspring of humanity's cultural diversity and its maintenance is a guarantee for continuing creativity.

Figure 1 presents an overview of the project's work subdivided into discrete components and presented along with the envisioned user involvement.

A2 Research context and how the proposed project is innovative, timely and important.

Current technology trends in motion sensing and AR hardware make realisation of our proposed system feasible and timely, however, it is necessary to address a number of open problems in computer animation and graphics and advanced beyond the state-of-the-art.

Motion Data Cleanup and Improvement

Capturing live human performance is still an open problem. Current accurate solutions consist of laboratory systems based on wearable sensors or optoelectronic multi-camera systems, leading to calibration procedures and expert manipulation. The recent access to inexpensive depth cameras remove the requirements of wearable sensors, calibration, or expert users. Skeleton data are obtained using deep learning on simulated depth images obtained with sensors placed ideally in front of the user. We have proven that accuracy strongly decreases when the sensor is not ideally placed and when occlusions (especially self-occlusions) occur [Plantard et al., 2015]. There have been several proposals to correct a badly reconstructed skeleton, replacing machine learning by tracking approaches [Wei et al., 2012], but these require heavy calibration, impossible if on-site with non-expert users. An alternative is to replace potential errors using prior knowledge of human movement [Shum et al., 2013], which can be extended to ensure continuous and reliable results in highly constrained environments [Plantard et al., 2017]. A performing dancer cannot always face the sensor, and self-occlusions frequently occur. However, as dancing motion may have never been seen before, it is difficult to only rely on prior knowledge, especially for rare styles. Hence, in this project, we propose to extend this approach by coupling several Kinects. We have explored multi-Kinect easy-calibration and capture [Auvinet et al., 2012] but could merge this approach to motion correction to enhance the quality of the results in this highly challenging situation. In addition, chosen from a database of captured 3D models, a best matching model will be fitted onto the captured data to enhance robustness, inspired by approaches such as [Blache et al. 2016].

Dance Motion Analysis, Indexing and Searching

Motion capture has advanced the ability to digitally store and document intangible creations such as dancing. However, digitization alone generates vast amounts of opaque data that require advanced motion analysis techniques to extract and construct metadata beyond the sequences of 3D positional data of the human body. In previous work, we have motion captured a wide range of folk and contemporary dances and have made them freely available online through the Dance Motion Capture Database (DanceDB – dancedb.cs.ucy.ac.cy) at the UCY. It has become clear however that using the data is hindered by: (a) the lack of semantic information that can sufficiently describe different aspects of the motions to help organize and cluster them, and (b) the lack of a suitable search functionality that can enable users to retrieve motions.

In many cases, motion data does not contain any labels or annotations, so clustering relies only on the motion skeletal information [Krüger et al. 2010]. Building on our recent work [Aristidou et al., 2015, Aristidou et al., 2017] on characterizing highly stylized motion and extracting semantic labels (i.e. emotions) we will create visual vocabularies which extract a combination of geometric and stylistic feature descriptors that can be used to annotate motion segments and define motion semantics. We will use semantic labels for inter-cluster linking of motion and for indexing and organizing large dance motion collections, thus unveiling potential similarities between different dances or variations of dances performed by different dancers.

Subsequently, motion similarity algorithms perform feature extraction and attempt to retrieve motions that are similar, according to user-defined criteria. In recent approaches for motion retrieval [Deng et al. 2009, Kapadia et al. 2013] it has been demonstrated that using motion segments as search queries is effective, but style variations in motions can yield undesirable search results. Finally, retrieving motions similar to a search query, even when that is

a motion query, raises the problem of presenting the end-user with a comprehensive visualization that allows for fast exploration and visualization of the results. Automatic generation of image summaries, such as Motion Belts and interactive tools for motion visualization, such as MotionExplorer, attempt to address this problem [Li et al. 2016]. We will use the extracted meta-information to filter motion search results and generate interactive visual summaries suitable for exploration through AR.

AR Dance coaching

Preserving cultural activities such as traditional dance, and passing this knowledge to the next generation is a key aim. However, as coaches are rare in these very specific dances, technology can help to spread their expertise over the world. Virtual reality has been explored to coach users in many sports [Bideau et al., 2010] but the technological choices, such as the graphical quality [Vignais et al., 2010] or the visual perspective [Covaci et al., 2010], have a strong influence on the performance of this coaching VR system. Hence dancing learning systems using VR [Chan et al., 2011] have to be carefully designed and tested to ensure transfer between the VR and real experience. Augmented Reality (AR) is very promising for cheap application of such approaches as it enables to perceive our own body as a visual feedback/control, contrary to cheap VR systems based on Head Mounted (HMD) where the user's body is invisible or transformed through the control of an avatar. Hence, exploring AR for dance training is a promising challenge to explore, to spread rare dancing styles over the world.

A3 Research design and methodology, including interdisciplinary approach.

The research methodology used in SCHEDAR formulates, understands and evaluates the efficacy of re-using existing dance motion datasets through Augmented Reality. The interdisciplinary nature of the project and the level of technology required suggests that a proof by construction will be necessary to meet the objectives of the project and deliver a demonstrable proof-of-concept. A thorough literature review will be conducted ahead of each scientific task to ensure project results advance beyond the current state-of-the-art.

Thus, in SCHEDAR existing dance motion data will be used, enriched, error corrected and algorithmically improved to allow advanced motion analysis that can extract features, stylistic characteristics and semantically decorate these motions. This data analysis will be driven by expert advice and consultation of dance ICH experts, choreographers and performers who are participating as the Associate Partners. These non-technical experts together with the scientists of the consortium partners will identify which aspects of the data can be useful for understanding, studying and re-using dance motion data, e.g., dance foot steps, pace, or characteristic motion segment of different dance styles. Building on these rich ICH metadata, the consortium will design demonstrators using AR to re-use these motions in a dance teaching scenario and a dance motion search engine. Comparative user evaluation of the proof-of-concept demonstrators will provide insight on the effectiveness of the proposed technology and set the foundation for further exploitation of the project's results.

In SCHEDAR we will strive to work closely with dance and CH experts at each step to ensure our solutions meet their expectations and are fine tuned to satisfy their needs. For this reason, we have allocated tasks for involving them throughout the duration of the project to extract the user requirements and valuable insights in dance performance ahead of conducting the technical work and obtain essential feedback.

A4 Work plan, detailed timeline and milestones.

The project is divided into five Work Packages (WPs). WP1 is a horizontal activity dedicated to the project's management, while WP2 encompasses tasks related to the communication, dissemination and exploitation of the project's results. The remaining WPs are dedicated to research and implementation tasks to meet the project's objectives. Specifically, WP3 focuses on tasks for dance motion data enhancement, WP4 includes all tasks related to dance data analysis, and WP5 consists of tasks for demonstrating dance motion data reuse and re-purposing. Figure 2 shows the interrelations and flow of information/know-how among the WPs, while Table 1 presents the detailed timeline of the project as a Gantt chart.

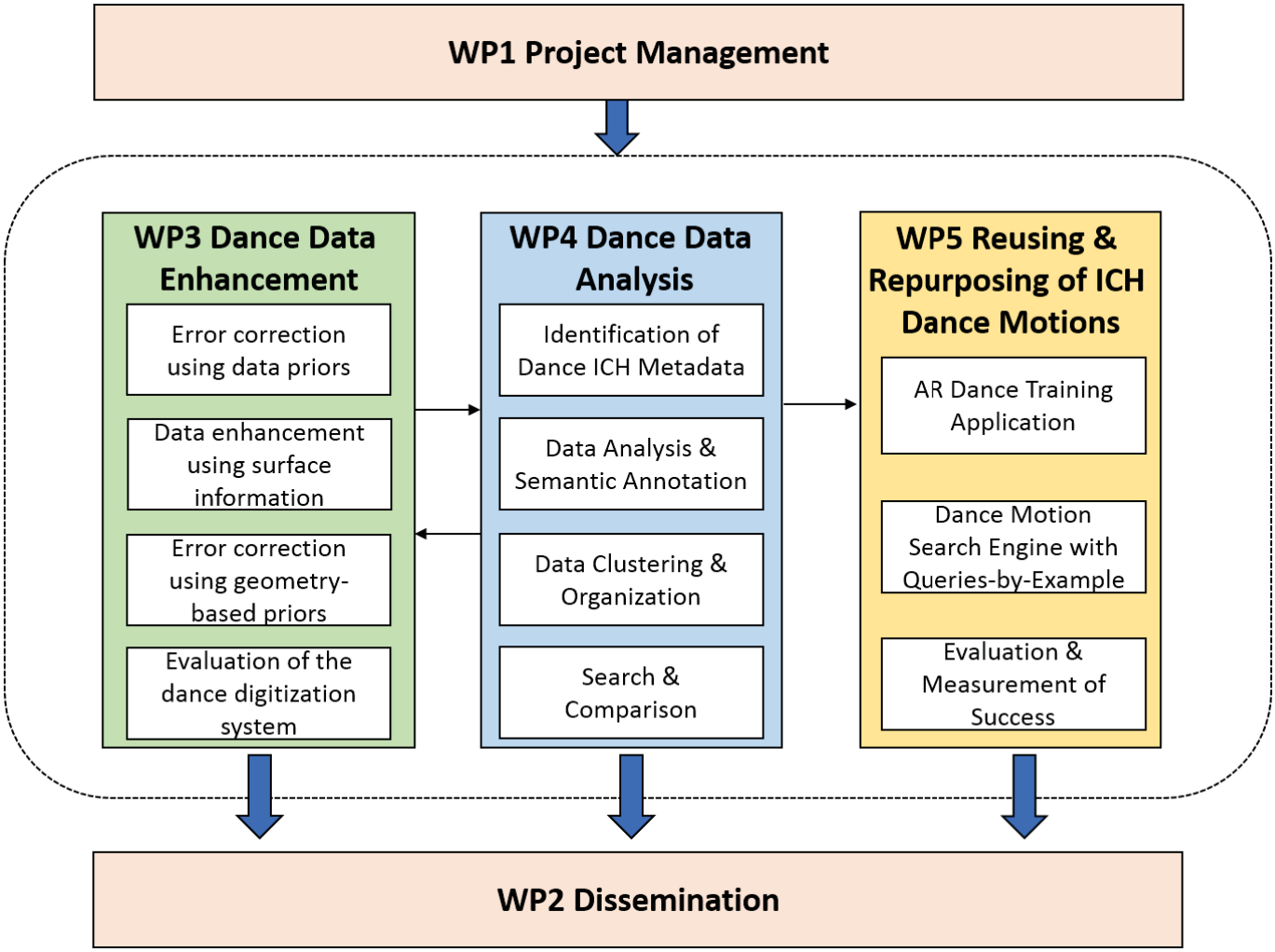

Figure 2: Relation between the Work Packages

WORK PACKAGE	DURATION
	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
WP1. Project Management	
WP2. Dissemination	
WP3. Dance Data Enhancement	
WP4. Dance Data Analysis	
WP5. Reusing & Repurposing of ICH Dance Motions	
Project Meetings	

Table 1 Timing of work packages (Gantt chart)

A4.1 Detailed Work Package List

Work package number	1	**Lead beneficiary**	UCY
Work package title	**Project Management**		
Start month	1	**End month**	36

Objectives

- Monitor all work packages and deliverables to ensure timely completion, within budget and with the appropriate quality.
- Coordinate the partners of the consortium to ensure their communication and confirm that each partner's expertise and experience is well utilized.
- Manage the infrastructure of the project to ensure all equipment is well utilized.
- Manage the Intellectual Property arising from the implementation of the project.

Description of work

The work in WP1 is divided into three tasks. For more details on the management structure and procedures, see Part C1.

T1.1 Project management (Lead UCY)

This task will be led by UCY. All partners will participate in project meetings and give appropriate input. The goal of this task is to monitor progress in each work package, coordinate partner collaboration and communication, assure the quality of deliverables and respond to any challenges arising. The project leader, supported by the consortium partners will ensure the successful completion of this task.

T1.2 Technical management (Lead ALG)

The purpose of the technical management performed by technical manager and supported by management committee is to co-ordinate the technical co-operation and contents of the work packages in order to ensure consistent and compatible outcomes.

T1.3 Intellectual Property Rights management (Lead UCY)

In this task, IPR-related issues are considered and reviewed, mostly involving access to asset repositories, software and other outcomes of the project. This task will ensure that consortium partners and associate partners obtain sufficient access to the necessary resources to carry out their tasks.

Deliverables & Milestones

M1.1 First annual project review (Month 12)

Technical, managerial and financial reporting based on progress of all WPs. Includes IPR management reporting and all annexes for the methodology developed up to this point.

D1.1 First annual project report (Month 12)

M1.2 Second annual project review (Month 12)

Technical, managerial and financial reporting up to month 24.

D1.2 Second annual project report. (Month 24)

M1.3 Second annual project review (Month 12)

Technical, managerial and financial reporting with regard to the entire project execution.

D1.3 Final project report. (Month 36)

Work package number	2	Lead beneficiary		UCY
Work package title	**Dissemination**			
Start month	1	**End month**	36	

Objectives

- Disseminate project results to the scientific communities of digital heritage, computer science, and the general public.
- Promote the resulting system to public bodies and national digital archive authorities. This is linked to the potential exploitation, since potential end-users are public bodies in many cases.
- Explore and pursue commercial exploitation possibilities. This is linked to the dissemination objectives, since the feedback from the involved communities will determine to some extent the exploitation plan.
- Maximize the exchange of knowledge inside the Consortium.

Description of work

T2.1 Communication activities (Lead UCY)

A project website will be created in the early months of the project (D2.1) hosting all publicly available data and reports and maintained during and after the end of the project. Additionally, the progress of SCHEDAR will be promoted through various social networks and participation in public events.

T2.2 Dissemination (Lead UCY)

The task involves all dissemination activities relevant to the project. A detailed overview of this task's planned work is provided in the preliminary dissemination plan (see part B2). Dissemination of the project will target different research communities - ICT, performing arts and cultural heritage. This task will also provide the means and tools to engage with external stakeholders covering the design and production of dissemination material.

T2.3 Exploitation (Lead ALG)

The exploitation potential of several components of SCHEDAR will be investigated in this task. A detailed overview of this task's planned work is provided in the preliminary exploitation plan (see part B2). The exploitation report will be delivered at the end of the project (M36). In addition, all the liaison activities with external stakeholders (both on scientific and industrial levels) are envisioned here.

Deliverables & Milestones

M2.1 Website (Month 3)

Initial version of the website. This will continuously be updated.

M2.2 Dissemination and communication plan (Month 3)

Planning of the communication and dissemination activities (e.g. publications, media coverage, invitations to key persons to join the project's general assemblies, events).

D2.1 Final exploitation, dissemination and communication activities report (Month 36)

A summary of all dissemination effort, results of the workshop (including proceedings) and the outcome of our outreach activities in the media. The same holds for all publications made during the project. The report will include a section on post-project dissemination and exploitation activities that will be followed.

Work package number	3	Lead beneficiary		UR2
Work package title	Dance Data Enhancement			
Start month	1		End month	30

Objectives

This WP addresses the problem of delivering reliable motion data, enabling the capture of subtle stylistic gestures, on-site, without complex manipulation, such as calibration, post-processing, sensor positioning… The unreliable nature of cheap and easy-to-use systems, such as depth cameras, make it difficult to capture these styles on-site. This WP aims at developing innovative approaches to tackle this problem, and to make such a system be available for non-expert users worldwide, helping them to capture local dancing styles. In addition to joint movements, motion data contains surface information and textures, so that future users can experiment this dance as if actually being present with this particular dancer.

Description of work

In order to achieve the objectives, we propose to build on some of the previous work in UR2 and URCA, which uses raw depth images, RGB images and reconstructed skeleton data delivered by one or a set of depth cameras. For correcting the inaccurate data delivered by the depth cameras, different innovative approaches will be developed that fuse together the various available information and previously collected data. We then will be able to adapt the resulting data to be compatible with the DanceDB database, also used in the other WPs.

Task 3.1 Error correction using data priors (Lead URCA)

Depth cameras are cheap and easy-to-use systems but provide only a subset of the relevant information: surface of the visible part of the body. Based on previous work, we will explore multi-Kinect capture by designing a simple calibration method and fusion of information. We will concurrently explore how to enrich partial data using as priors existing data from the dance DB to provide as reliable motion data as possible per depth camera. A large set of experiments with the APs will enable us to evaluate the weaknesses of the resulting system for 1) better understanding of the limits, and 2) provide specifications to Task 3.2 and Task 3.3 in order to enhance the quality of final motion data.

Task 3.2 Data enhancement using surface information (Lead UR2)

We will adapt the example-based Kinect data correction developed in UR2 in order to address the complexity of the dancing motion and take advantage of the availability of additional data (such as the surface information and RGB images). We will explore how using the database as an input of this method will help correct unreliable data. If required, collaboration with expert dancers will enable us to enrich the database of examples used to correct unreliable data. We will also explore merging tracking and correction approaches to significantly enhance the resulting motion data. Immermove mocap platform (internal UR2 billing) will be used in Rennes to calibrate and validate the Skeleton Data correction.

Task 3.3 Error correction using geometry-based priors (Lead URCA)

Several representative geometric models with their associated skeletal representation will be captured of performing dancers with costumes and accessories. They will be built using the data acquisition of Task 3.1 and will serve as reference models. A best-fitted geometric model will be chosen and carved to match the multi-kinect data. Carving will be performed considering subsequent frames to build a coherent animated mesh. The reconstructed model will enable us to improve robustness of data acquired in Task 3.1, and improve the positioning accuracy of the skeleton even for complex data with costumes and accessories, thus completing Task 3.2. In addition, the carved model together with its fitted skeleton will be added to the reference database, also enriching the type of content in DanceDB (Task 3.4).

Task 3.4 Evaluation of the dance digitization system (Lead UR2)

Using a user-centered approach, we will involve expert dancers at various stages of the development, to test the system and check its use and acceptability. Evaluation will consist in testing if the system is easy to set-up, use and if the collected data are in accordance with the expectation of experts dancers.

Deliverables & Milestones

M3.1 First prototype for the on-site dance digitization tool (Month 16)

A first solution using commodity hardware and custom software for on-site measurement of dancing. The mocap already in the danceDB will be used as priors for the error correction of noisy captured data (T3.1).

M3.2 Final prototype for the on-site dance digitization tool (Month 28)

An advanced version of the solution provided in M3.1. It will use surface information and geometry priors, in addition to the mocap priors, to improve the correction of the captured skeleton (T3.2 & T3.3).

D3.1 Evaluation reports of the system by expert dancers (Month 18 and Month 30)

Work package number	4	**Lead beneficiary**		UCY
Work package title	**Dance Data Analysis**			
Start month	8	**End month**	30	

Objectives

- Identify, with the help of the APs, the type of metadata useful for dance CH and other dance experts (choreographers, dance teachers, etc.).
- Develop methods for extracting semantic information, metadata and features from dance mocap data.

Description of work

Using the existing high quality dances of the danceDB and any newly acquired dance motion performances (see WP3), we aim at developing motion analysis algorithms to holistically describe movements (both geometrically and stylistically) and extract those characteristics that are important to describe them. The tasks for this work package are:

Task 4.1 Identification of Dance ICH Metadata (Lead UCY)

In close collaboration with experts from the Associate Partners we will identify which metadata are useful for archiving, curating, presenting and re-using dance motion data. This metadata scheme will be used to drive the subsequent design of motion analysis and semantic information retrieval methods.

Task 4.2 Data Analysis & Semantic Annotation (Lead UCY)

This task aims at enriching the captured dance movements with semantic metadata information. Our target is to assign semantic tags (A) related to the quality of the performance (e.g., style, emotion, action, nuance) and (B) semantic information that will be provided manually taken from dance experts or cultural organizations with regard to the intangible part of the performance (e.g. story telling, country of origin, purpose, year, group/solo, amateur/professional). More specifically, a holistic schema will be designed to include, additionally to the dance mocap data, inferred information from metadata descriptions, to be used to establish semantic links between dances.

Task 4.3 Data Clustering and Organisation (Lead UCY)

Implement algorithms for clustering motion clips and organizing data dance motion collections. We will extract motion elements from each dance category that are both repeating and discriminative and can characterize/classify dance motions. In addition, our motion analysis will detect statistically significant dance movements occurring regularly even in small subsets of motion sequences which will also help in the development of the data-assisted correction of T3.2. The semantic links will be additionally utilized to set parent-child relationships between dances in order to structure a genealogy tree, thus paving the way for creating the first digital dance ethnography.

Task 4.4 Search & Comparison (Lead ALG)

Aims at developing motion search and comparison algorithms that, in addition to the skeletal geometry, take into consideration stylistic variations of the dance performance, including the required effort, energy, and interaction of

the performer with the others and/or the environment. We aim at implementing automatic algorithms that given a specific motion sample (e.g., a short dance motion), will identify which performances stored in the dance DB contain similar movements with regard to the skeletal geometry, style, emotion etc. These algorithms will form the basis for the search engine to be developed in T5.2.

Deliverables & Milestones

M4.1 Report on the type of metadata to be collected (Month 10)

This will be a report on the result of T4.1.

M4.2 Data analysis and semantic annotation tools (Month 20)

The first version of the tools coming out of T4.2 and a very basic search method

D4.1 The complete dance analysis toolset (Month 30)

All the results coming out of tasks T4.2-T4.4, including an improved version of the results of T4.2.

Work package number	5	**Lead beneficiary**	UoW
Work package title	**Reusing & Repurposing of ICH Dance Motions**		
Start month	20	**End month**	36

Objectives

To develop state-of-the-art end-user applications that utilize the technologies and know-how developed in the project to provide stakeholders with next-generation tools for leveraging digitized dance motions.

Specifically, in this WP an Augmented Reality dance training application will be developed, as well as a dance motion search engine featuring queries-by-example.

Description of work

Task 5.1: Augmented Reality dance training application (Lead UoW)

To develop the framework that will enable the user to assume directly the role of one of the captured dancers and through this the skills of a real dancer can be transferred in a straightforward manner to this user. The AR system will comprise a HoloLens and kinect, spatialized 3D audio, voice, free user movement, gesture control and/or voice control and will enable the user to see and interact with others dancers. In addition, abstract visualisation of key parts of the chosen dancer's motions will enable the user to attempt to follow these motions as accurately as possible. Continuous visual feedback will inform the user as to how well he/she is performing compared to the captured dancer as well as providing suggestions on what to do to be able to more closely follow the recorded dancer's actions. At the end of the dance, the user will be able to visualise his/her dance overlaid on the actual dance of their chosen dancer, and a virtual coach will analyze and quantify any errors. With this framework, a user will be able to practice their dancing with the virtual dancers whenever convenient . These frequent rehearsals and valuable dynamic and post-dance feedback should shorten training duration and enable the user to improve their skills by themselves, with confidence that these skills will seamlessly integrate into the group dance activity.

Task 5.2: Dance Motion Search Engine with Queries-by-Example (Lead ALG)

Through this task a next-generation search engine will be developed for querying and retrieving dance motions from existing databases. The primary goal is to address the challenge of making 3D motion data of ICH (dances) high accessible and easily searchable for all potential user groups.

The search functionality will enable the user to conduct searches through a *query-by-example paradigm*, i.e. the user will be conduct a short and even inaccurate dance motion segment which will be captured and used as a search query. The search engine, building on top of the algorithms of WP3 and WP4, will use the example motion segment to stylistically compare it to existing database motions, subsequently retrieving, ranking, ordering and providing intuitive visualizations of the most similar dance motions. An intuitive user interface will be designed

and implements to make the engine more functionable. It could be integrated into dance training applications, such as that of Task 5.1 and dancing games.

Task 5.3: Evaluation and Measurement of Success (Lead UoW)

Comprehensively evaluate the efficacy of the framework developed in Task 5.1 and measure its success for teaching dances in a rapid and straightforward manner. The performance of two groups will be evaluated:

(a) the sports science students and their dance professors

(b) the children at the Politistiko Ergastiri Ayion Omologiton

We will use standard user evaluation methods to assess the efficacy and usability of our systems.

Deliverables & Milestones

M5.1 - An AR framework for directly interacting with the virtual dancers (Month 36)

This milestone will include any refinements based on results of the evaluation (T5.3)

D5.1 - A cloud-based, publicly accessible *query-by-example* dance motion search engine (Month 36)

A5 Short bibliography supporting the research case. (1 page - 500 words)

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Part B: Potential Impact

B1.1 Expected relevance of the project outcomes and its potential value for researchers, non-academic stakeholders and society, including SMEs, heritage owners, public administrations, research partners and local communities.

The proposed project is uniquely placed to have an impact on a wide ranging sectors of the society, including researchers, dance experts and non-specialist members of the society that have an interest to learn how to dance or just about dance in general. The straightforward nature of the systems developed will facilitate even the non-expert general public to be able to engage intuitively with the dances, ensuring the outcomes of this project will be widely accessible. Interested parties ranging from national bodies to local communities will be able to safeguard their nuances of any dance, preserving it holistically for future generations.

This project's vision is that the widespread availability of cultural content in digitized forms is a critical necessity for the preservation of the continuity of our heritage and identity as Europeans. In such a context, digitization and online availability of digitized cultural content, such as dancing, has always been a top-level priority of the European Commission. Digital storage and manipulation of intangible forms of cultural assets, such as dance performances, offers a whole new range of opportunities in the educational context by allowing integration of our project outcomes with the large-scale online libraries (such as the EUROPEANA repository; the European digital platform for cultural heritage). This will allow not only potential storage of intangible assets, but it will also enable seamless integration with existing resources into frameworks that will be able to exploit the common knowledge representation schemes be used to provide unprecedented amounts of digital cultural resources by means of recent and emerging technologies for new and exciting educational purposes.

By providing an easy to use digitization tool (WP3), with easy access to our database, the project is opening up the possibility of capturing a dance, in its native environment to the wider public. No-more will it require a specialised group with expensive equipment, difficult to use set-up and a sterile lab environment. This will enable, in the long term, the development of a dataset with enough variation so that it really holistically captures the richness of our dance heritage.

The availability of data in its turn increases the requirements for using and manipulating it. Thus, storage and access of digital cultural object nowadays seems just the starting point of any truly ambitious relevant initiative. The project aims at providing a set of specialised tools (WP4), such as:
An intuitive and user-friendly 3D environment for content-based motion retrieval.
Real-time motion comparison and evaluation algorithms that compare the movements of two sequences taking into consideration not only the posture matching, as most of the currently available approaches do, but also the style.
A holistic schema, with inferred information from metadata descriptions taken from dance experts, that can be used to define semantic links, encompassing data related to the dance performance, the dance origin, the performer, the kind of the dance (e.g., group, solo, male, female, mix), the hidden/untold story etc.
A method for organizing large dance motion collections by automatically grouping dance performances, thus revealing potential similarities between dances from neighboring countries.
The above tools that will allow researchers and other dance enthusiasts to reason about the captured dances in ways that has not been easy or even possible up to now.

The AR Dance Coach application (T5.1), will feature 3D characters animated using the DanceDB motion data. End-users will use AR eyewear to view the 3D animated characters in their physical space and interact with them through free motion, without being required to sit in front of a computer or use physical controllers. The application will provide users with audio-visual instructions and explanations of the movements and interactively coach the users to learn these dances. This type of AR applications can provide next-generation proof-of-concept for home education in CH, since users will be able to use them at the convenience of their home, but also will enable museums and cultural institutions to provide unique interactive experiences to their visitors. Through this means the dance dance heritage becomes more easily accessible, in a fun way, to the wider public.

Finally, the search engine (T5.2) will be very useful to end-users interested in dancing, but may possess no expert knowledge. Exemplary uses include finding which kind of dance a movement may belong to (similar to how Google Image Search can retrieve images using an image as a query, or similar to how Shazam music discovery

service can find music tracks based on a short audio sample) or integrated into dance training applications, such as our AR Coach and dancing games.
Other beneficiaries of this motion searching framework are CH stakeholders and practitioners. CH researchers, curators, historians, etc. will be able to easily retrieve dancing motions, without specifying keywords or relying on the quality of human-contributed metadata, which are most often missing from motion databases. They will be able to uncover style similarities, facilitate cross-cultural research into dancing and enable validating relevant hypotheses.
In addition, dancers and choreographers can tremendously benefit in their work using motion queries, since they will be able to not only retrieve motions, but also visualize 3D motion data and study choreographic structure and dance vocabularies.

B1.2 Involvement and contributions of APs.

In addition to the research teams involved in the project, the wider consortium includes 4 associated partners who are all experts in their own domain on different type of dances (modern, Greek & Cypriot folk, Morris). We specifically chose to address various different types of dances in order to allow us to develop methods and tools with a wide applicability but also to have as diverse as possible input. The APs will be involved in a number of ways: (a) help in defining the requirements, (b) test our results, (c) provide data and (d) help with the dissemination.

B2 Planned activities and measures to maximise knowledge exchange and transfer, and the dissemination and/or exploitation of transnational JPICH Digital Heritage project results, and management of copyright, intellectual property, ethical issues* and research integrity. In this section a detailed communication plan specifying the activities to be organised with the various user groups and stakeholders must be included, including communication of academic research results to key decision makers and other public and private stakeholders and to the general public is of particular importance.**

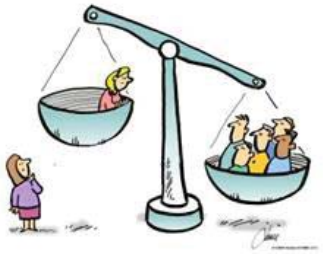
Dissemination

Wide dissemination activities and very clear communication are of key importance. It is essential that dissemination and communication occur continuously both during the project, in order to create wide visibility and significantly raise awareness within stakeholder and the envisaged wide diverse audience, as well as after the project, in order to exploit and sustain the project's results and offer substantial opportunities for further innovation. The multidisciplinary nature of SCHEDAR means that the research results of the project can be disseminated through publications in high-impact-factor, peer-reviewed journals and international conference proceedings in a number of fields, including cultural heritage, dance, computer graphics, computer vision, and sports sciences. A total of 3-4 top quality papers are expected to be submitted to journals. Target journals include Journal of Cultural Heritage, ACM Journal on Computing and Cultural Heritage, ACM Transactions on Graphics, Computer Graphics Forum, IEEE Transactions on Graphics and Visualization, Sensors, Journal of Sports Sciences. Research results will also be presented as peer-reviewed papers in 3-4 leading European and international conferences. Target conferences include ACM SIGGRAPH, ACM SIGGRAPH ASIA, Eurographics, Eurographics Workshop on Cultural Heritage, European College of Sports Sciences, CVPR, ICCV and ECCV. In accordance to the H2020 Open Access policy, preprints of the publications disseminating from this project will be added to the website designed for this project (see communication activities) and will referenced by all the partner groups websites, freely accessible by everyone. Each publication will also be uploaded to the Heritage Portal. Additionally, all partners will take part in a JPI Cultural Heritage event during the course of the project in order to present the project's results. Furthermore, it is expected that SCHEDAR will apply to showcase its results in the Future Zone section of IBC. Held every year in Amsterdam in September, this is Europe's largest broadcast exhibition which regularly attracts over 52,000 participants.

Communication to the public and stakeholders outside the academy

Regarding communication activities for engaging non-academic stakeholders, it should be noted that the proposed project will have a positive impact in European society, through the development of tools for assisting in the documentation and preservation of intangible cultural heritage. Therefore, direct engagement with the public is of paramount importance, and the key communication strategy of SCHEDAR is to create awareness regarding the project's topic. In accordance with the European Charter & Code for Researchers, it is ensured that the research activities will be made known to the public in a way that can be understood by non-specialists. For this purpose, a complete public engagement strategy is planned, involving the following actions:

1. **Open Day event:** UCY will organize an open day for students and the public to visit the Computer Graphics and Hypermedia lab and receive a first-hand experience regarding the project aims, results and applications to cultural heritage preservation. This will include a short lecture, and a visit to the lab space for demos. Local media will be invited to cover part of the event and talk to members of the consortium. Media coverage and word of mouth from attendees will help promote the project's results in the local society. For greater impact it could be combined with the open day of the University.
2. **Website:** A dynamic, user-friendly website presenting the project objectives, progress and results will be created at the beginning of the project and maintained so that it is up-to-date throughout its duration. Individual project pages for each of the planned publications will also be maintained, and will include figures, embedded videos, code and data. The consortium members already maintain such pages for previous publications. Google analytics will be used to track global viewership and number of visits.
3. **AR Dance Demo at Politistiko Ergastiri Ayion Omologiton:** A temporary exhibit will be placed at Politistiko Ergastiri Ayion Omologiton which will be based on the AR Dance Coach application developed as part of WP5. This will remain at the premises for a period of at least one week and it will visited by local school groups and locals. It will give the opportunity to the visitor to interact with a virtual avatar who will challenge the visitor to dance traditional folklore dances and score points for every correct dance move. It is expected that this immersive experience will be highly engaging for visitors who will transfer their experience to friends, spreading the word about the traditional dances, assisting in preserving them. It will also be used as a means for evaluating the system since some of the kids taking dance classes at the Politistiko Ergastiri will be enrolled as experiment subjects (T5.3).
4. **Motion capture at folklore festivals:** Once the capture system (WP3) is developed, it will be taken to at least one festival in Cyprus as a way to test the capture under real conditions but also for dissemination of the project's capabilities.
5. **Sport students at Rennes:** The danse professors at UR2 will use the system developed in T5.1 with their sports students who are learning dance, This will have a dual effect. On one hand, it will enable us to collect data for the evaluation of the system (T5.3) but also it can be used as a dissemination venue, not only to the specific students but to the University in general, through announcements and an open presentation.



6. **Gender imbalance:** Addressing gender imbalance, inspiring early career investigators (ECIs) and training the future workforce is a key part of this (and any) European project. Building on the successful Gender Imbalance activities of EU COST Action IC1005 chaired by Chalmers (UoW), a coordinator elected specifically for this task will ensure these activities remain a central priority for SCHEDAR and that appropriate gender balance is respected in all its activities. The project will also be committed to considerably involving ECIs. The ECIs will be encouraged to take the lead in establishing and maintaining the project's visibility especially to its envisaged diverse audience, through modern social networking opportunities.

Exploitation of results

Regarding exploitation measures, the immediate research results will be exploited in two ways. First, they will constitute background for future collaborative research projects between the members of the consortium, as they will be published in international journals and presented in conferences.

Second, since one of the project's scientific objectives is dedicated to the development of a software tool that will allow searching for mocap data, there is a potential for exploitation of the software by out-licensing. For this purpose, the consortium will secure the benefits of the exploitation through legal protection, specifically, through appropriate protection of Intellectual Property Rights, including copyrights. According to the European IPR Helpdesk's recommendation, a specific IPR Agreement will be prepared at the beginning of the project. This will specify the background for intellectual property in terms of existing software and publications of the partners. It will also specify the relevant ownership rights, the allocation of an intellectual property rights manager, and the route of exploitation through out-licensing. In the case of commercially exploitable results, the industrial partner in the consortium, ALGO, can capitalize on the results to build a commercial-grade search engine for mocap data that can be licensed to companies in the creative industries such as game developers, animators, VR or AR producers etc. Its contacts will be used for locating and presenting the software to companies that can potentially license it. UCY's Centre for Entrepreneurship will also be consulted for locating potential licensees in the industry.

Part C: Description of Implementation and management

C1 Description of the JPICH Digital Heritage project management structure and procedures.

The management of the project will be carried out according to the schedule of communications and meetings laid out in WP1, to ensure that implementation is progressing according to the workplan and all administrative, technical and financial issues are tackled promptly and goals are met. The Project Leader will chair these meetings and distribute an agenda ahead of each meeting to all PIs.

Bi-monthly video conference meetings will be scheduled for discussing progress and challenges, presenting results, reviewing progress, suggesting the next steps and providing scientific guidance among partners participating in the implementation of different tasks and workpackages.

Furthermore, 4 physical meetings of all the partners are planned during the course of the project: a kickoff meeting, two intermediate and a final meeting. During these meetings the progress of the project at large will be presented by each partner and decisions will be made on matters that pose a risk or require intervention.

The Project Leader in collaboration with the PIs will ensure that flawless communication is established with the funding agency and the National Contact Points of each partner, all reporting requirements are met and deliverables are submitted on time. In addition, the PL in close contact with the PIs will overlook budget spending and the PL with the WP leaders will be responsible for ensuring the technical development of the project progresses as planned.

All PIs will respect, exercise and safeguard the principles of non-discrimination and gender equality for all staff appointment. Furthermore, the PIs will ensure that all staff members adhere to these principles, as well as the European Code of Conduct for Research Integrity for the entire duration of the project.

C2 Description of the relevant expertise and experience of the individual participants (including experience of coordinating research across national boundaries).

Yiorgos L. Chrysanthou will be the Project Coordinator of SCHEDAR. He is an Associate Professor at the Computer Science Department of the University of Cyprus, directing the Graphics and VR lab. Holds a PhD from Queen Mary College and worked for several years as a research fellow and a lecturer at University College London. Yiorgos published over 75 papers, chapters and books in the areas of 3D graphics, virtual reality, games and related applications. He is currently an Associate Editor for 3 Journals and has served as Organising or Program Chair for several conferences. Yiorgos is an experienced project coordinator, having managed 24 funded research projects, both National and European, many of them on ICT for cultural heritage (see CV for some examples). On the technical side, Yiorgos brings expertise on computer animation, motion capture and motion analysis methods. Over the last few years he has worked specifically on capturing and processing dances, publishing extensively and helping to set up the DanceDB online repository with over 200 full mocap dances.

Efstathios Stavrakis (ALG) a senior researcher and algorithms engineer at Algolysis Ltd and has been conducting research in academia and the industry for 15 years. His research is mainly in the areas of computer graphics, animation virtual reality and games. He has a MSc with distinction in Computer-Aided Graphical Technical Applications from the University of Teesside (UK), as well as a PhD in Computer Science with distinction from the Vienna University of Technology (Austria). Efstathios has co-founded Algolysis Ltd in 2014, a research, technology and innovation start-up company in Cyprus, with a diverse range of activities in interactive 3D computer graphics, data analytics of large datasets. He is currently the PI and Coordinator of DriveNest (www.drivenest.com), a cloud-based storage device monitoring service funded as a research and innovation project by the Ministry of Energy, Commerce Industry and Tourism of Cyprus. He has previously designed and implemented the DanceDB online repository (dancedb.cs.ucy.ac.cy) while at the University of Cyprus and has published several papers in dance motion analysis.

Alan Chalmers (UoW) is a Professor of Visualisation at WMG, University of Warwick, UK and formerly a Royal Society Industrial Fellow. He has an MSc with distinction from Rhodes University, 1985 and a PhD from University of Bristol, 1991. Chalmers is Founder of the spinout company of Sensomatics Ltd. He has been active in virtual reality research and development for over 15 years and currently leads a team of 15 researchers investigating

many aspects of the field. He is Honorary President of Afrigraph, a former Vice President of ACM SIGGRAPH. He has published over 245 papers in journals and international conferences on high-fidelity virtual environments, High Dynamic Range HDR imaging, multi-sensory perception, quality metrics and virtual archaeology and successfully supervised 43 PhD students. Chalmers was Chair of EU COST Action "IC1005 HDR" that co-ordinated HDR research across Europe to facilitate its widespread uptake. He is also a UK representative on IST/37 considering virtual reality standards within MPEG.

Franck Multon (UR2) is a Professor in Sports Sciences and Computer Sciences, University Rennes2, France since 1999. He is leading a multidisciplinary Inria team named "MimeTIC" to address the problem of human motion analysis and synthesis. His research interests are computer animation, biomechanics, motion analysis, virtual training and motion capture. He is co-founder of a start-up company "Kimea" developing innovative technology to capture human performance in complex environment, such as workstations in industry, based on Kinect sensors. He has co-authored 52 international journal papers, and 41 peer-reviewed conference papers in biomechanics, computer graphics and virtual reality. He participated in 13 national collaborative projects and 1 European FP5 project. He was guest Editor of a Presence (MIT Press) special issue about "VR & Sports". He is member of the Presence editorial board, and participated in several scientific program committees, including ACM SIGGRAPH, Eurographics, IEEE VR.

Céline Loscos (URCA) is a Professor in Computer Science. She received her Ph.D. in computer science at the UJF (Grenoble, France) in 1999. She lectured at University College London, UK, until 2007. She then joined the University of Girona, Spain. In 2010, she was appointed professor at URCA. Since 2016, she has lead the RVM team of the CReSTIC laboratory. She was involved in many projects of which 3 as principal investigator (2 FP5 IST and 1 Spanish MEC). She was leader of the HDR capture working group of the HDRi COST action (IC1005). Within the RECOVER 3D industrial collaborative project (2011-2015), she co-supervised two PhD students on actor performance modeling from multi-view capture studio. She has co-authored more than 50 peer-reviewed international publications. She has co-advised 15 PhD students. She is regularly involved in chairing international program committees, including EUROGRAPHICS.

C3 Description of the consortium as a whole (including complementarity, balance between disciplines, level of staffing, plans for effective collaboration), including other stakeholders. Active involvement of user groups in developing the research questions and carrying out the project is encouraged.

The SCHEDAR Consortium along with its Associate Partners bring into the project interdisciplinary complementary expertise and provide for accessing essential resources for addressing the challenges tackled in the proposed work.

The 5 core Partners will combine their scientific expertise in Computer Science, Sport Science and ICT Cultural Heritage to solve the technical challenges, while the 4 Associate Partners will contribute their extensive and diverse proficiency in Cultural Heritage specifically related to folk and contemporary dance performance and choreography.

Figure 3, shows the composition of the SCHEDAR project and the multidisciplinary expertise contributed by all partners.

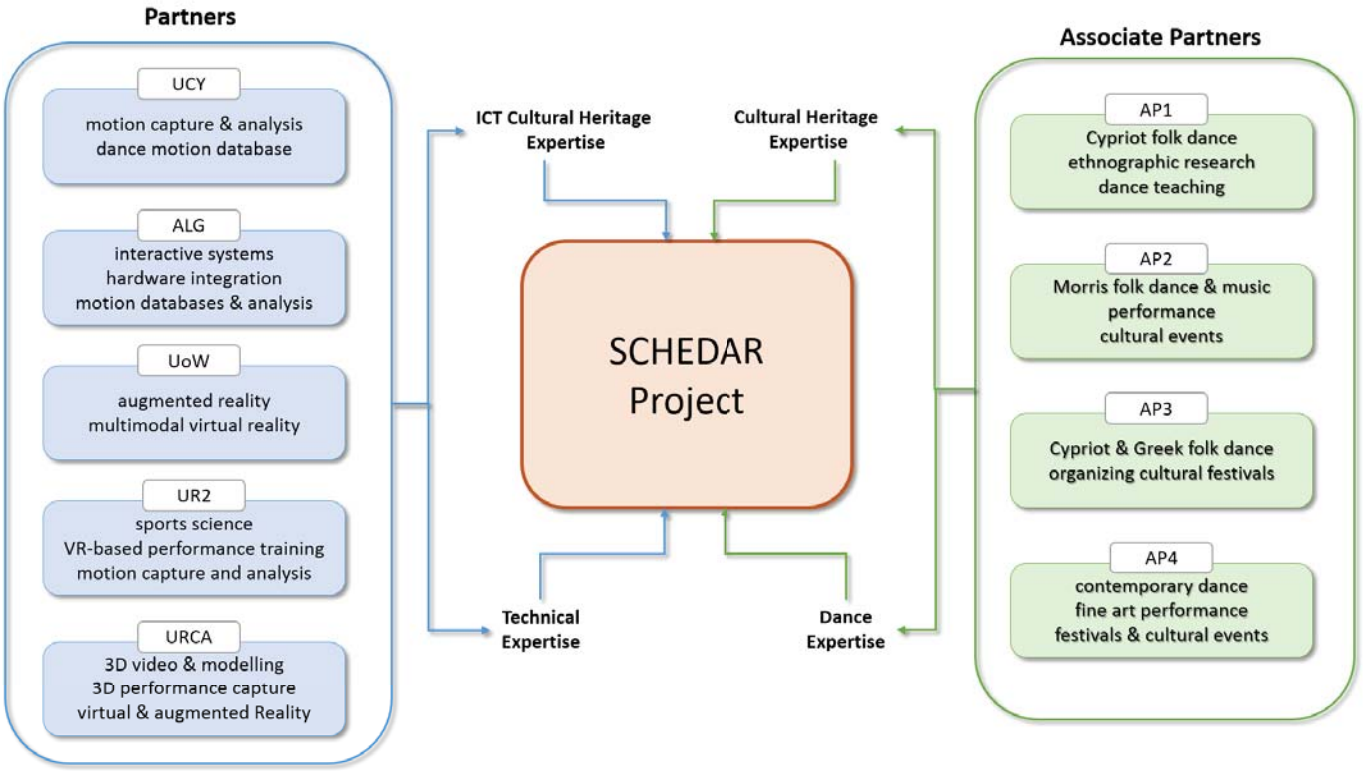


Figure 3. An overview of the SCHEDAR Consortium and Associate Partners

University of Cyprus (UCY)

The University of Cyprus was established in 1989 as the first university in Cyprus, with its main objectives being twofold: the promotion of scholarship and education through teaching and research, and the enhancement of the cultural, social, and economic development of Cyprus. It has 8 Faculties/Schools (Humanities, Medical, Pure and Applied Sciences, Social Sciences and Education, Economics and Management, Engineering, Letters & the Postgraduate School), 22 Departments and 11 Research Units, with 7,000 students and nearly 1,000 employees. UCY currently delivers up to 350 externally funded research projects, including many H2020 projects, and 10 ERC Grants, as well as national and regional research programmes. The University is home to Nobel Laureate Professor Christopher Pissarides and several other distinguished academics.

The Graphics and VR group of UCY has extensive experience in the development of training simulators and serious games, both desktop and immersive, many of them with CH applications. A lot of its recent work has been concentrating on the development of algorithms for analysing and processing motion captured dance sequences. They have published extensively on the subject over the last few years and created one of the largest motion capture dance database.

Algolysis Ltd (ALG)

Algolysis Ltd (www.algolysis.com) is a research, technology and innovation start-up company focusing on tackling real-life problems by devising state-of-the-art algorithmic solutions. Founded in 2014, Algolysis is a recent entrant in Cyprus' innovation ecosystem and is currently undertaking projects related to real-time distributed systems, data analysis and visualization, mobile & sensor networks. Algolysis' researchers have been conducting scientific research for over 15 years, in the areas of computer graphics, virtual and augmented, video games, visual perception and visualization, distributed computing, and algorithm design and analysis. They have also coordinated and participated in several National and EU projects prior to forming the company. The company has been recently awarded a research and innovation grant by the Ministry of Energy, Commerce, Industry and Tourism for its DriveNest storage monitoring crowd-sourced system.

The scientists of the company have the capacity to develop software, web-platforms, and network applications that utilize cutting-edge software technologies and can be deployed across all popular computing (stationary or mobile) computing platforms. In particular, through current and past projects Algolysis' scientists, have developed specialized and complex web-platforms (e.g., www.drivenest.com), 2D and 3D graphical applications and user

interfaces, and network protocols both in single processor simulators as well as real-life network environments. They have also participated in user experiments with cutting-edge technologies like eye tracking devices, head-mounted displays, cameras and motion trackers.

University of Warwick (UoW)
The University of Warwick is globally connected, forward-looking, and entrepreneurial. UoW is ranked as one of the UK's best universities, consistently at the top of UK league tables. The project will be delivered by the Visualisation Group within WMG. WMG is a department of the University of Warwick with a world leading research and innovation reputation. Its activity over the last 30 years is an acknowledged blueprint for how universities and business can successfully work together. It provides innovation support, new technologies, cutting edge research, and skills deployment to industries and organisations across the world in both the large and small business sectors. The Visualisation Group has a leading track record in multisensory virtual reality and virtual archaeology with strong international academic networks, and access to some highly novel equipment including a unique virtual experience. Comprising 1 Professor, 1 Associate Professor and 14 Research Fellows, the Visualisation Group and its spinout company Sensomatics, have undertaken a range of projects looking at the application of VR/AR imagery to:

- Cultural heritage
- Wellbeing
- Automotive design

UoW has been invited to showcase its research into multisensory VR at the Future Zone section of IBC in September 2017. IBC is the largest media conference and exhibition in Europe attracting over 50,000 participants.

University Rennes 2 (UR2) through the Inria joint MimeTIC team in M2S Laboratory has a long experience in motion analysis and synthesis. MimeTIC is a multidisciplinary team (computer graphics, virtual reality, biomechanics, robotics, and sports sciences), which develops an approach coupling motion analysis and synthesis to 1) improve knowledge about human motion and performance, 2) better simulate natural autonomous virtual humans, and 3) promote Virtual Reality as a mean to explore interaction between humans. MimeTIC is composed of 13 permanent researchers and has unique technological facilities: a 30x20m stadium equipped with 24 Vicon 4-MPixels cameras, 2 120x60cm force plates, a wireless EMG system with 24 channels, and two large immersive rooms (12x4x4m and 9x3x3m). Main recent contributions in relation to the projects consist in:

- designing a method to correct unreliable skeleton Kinect data in uncontrolled and complex environment. The system has been transferred to a start-up Company Kimea to be used in industry for ergonomic assessment,
- developing new metrics for motion comparison to differentiate experts and non-experts performance,
- exploring Virtual Reality to train human performance, ensuring the transfer of motor skills from VR experience to real practice.

Since 2010 MimeTIC has participated in collaborative national and international projects, through 8 ANR projects (3 as leaders), 1 FP7 project, 4 Cifre contracts with private companies, and several contracts with national sports Federations.
MimeTIC published papers in most relevant journals and conferences in computer graphics (such as 5 ACM SIGGRAPH papers), virtual reality (6 IEEE VR papers), biomechanics/motion analysis (8 Gait&Posture papers) and sports sciences.

University of Reims Champagne-Ardenne (URCA)
The University of Reims Champagne-Ardenne is a multidisciplinary university which develops innovative, fundamental and applied research. It provides more than 22,000 students with a wide undergraduate, graduate and postgraduate program choice. Always geared towards the future, research at URCA is structured around the 30 recognized research units including one specialized in ICT. Founded in 2006, the ICT research lab (CReSTIC) is an inter-departmental and inter-school laboratory. It has currently more than 100 staff members – 80 lecturers and professors, 10 technicians and administrative staff, and more than 30 PhD students. Research is structured into the computer science department and automatic and signal processing department. The RVM research team (8 EC in section 27, 1 IGR, 3 associate researchers), part of the computer science department, led by Prof. Céline Loscos involved in this project, has developed expertise in visual computing, graphic computing and interaction, to meet the demands for current innovations, in particular around the creative and medical industries, and applications such as heritage, archeology, and geographic information systems. The approach of this team is to rely on the creation and visualization of "rich" content, which coordinates a set of information related to the technology of images and

metadata, in order to offer tracks of uses of this content. The research is based on innovative visual technology (multi-view cameras, HDR (High-Dynamic Range), depth and motion sensors, virtual reality technology). The intention is to anticipate the technology of tomorrow and participate in the definition of characteristics through the development of prototypes and the demonstration of the potential increase in the quality of experience. The main themes addressed are of three types: (1) methodology for acquiring creative content rich from reality, (2) content enrichment, coding and interpretation, (3) interactive and / or immersive high-performance visualization.

C4 Allocation and justification of the resources to be committed along with a justification of the distribution of costs across the PIs and of the overall requested budget, including additional external funding (if applicable).

Overall total costs per PI and of the project as a whole

Budget Items	*Total Overall Costs PI 1 (UCY - Cyprus)*	*Total Overall Costs PI 2 (ALG - Cyprus)*	*Total Overall Costs PI 3 (UoW - United Kingdom)*	*Total Overall Costs PI 4 (UR2 - France)*	*Total Overall Costs PI 5 (URCA - France)*	***Total Overall Costs***
1. Employment Costs	96,600.00	63,000.00	90,813.00	158,476.00	176,768.80	585,657.80
2. Equipment	3,300.00	7,150.00	15,800.00	13,100.00	2,000.00	41,350.00
3. Travel and Meeting costs	8,000.00	4,000.00	24,880.00	14,000.00	8,000.00	58,880.00
4. Consumables	0.00	0.00	3,000.00	0.00	1,000.00	4,000.00
5. Dissemination and Knowledge Exchange Costs	3,550.00	500.00	4,050.00	0.00	2,000.00	10,100.00
6. Other costs – Please specify*	0.00	0.00	1,350.00	15,000.00	1,000.00	17,350.00
7. Overheads (if applicable)	22,290.00	14,930.00	110,107.00	9,416.00	9,092.22	165,835.22
Total	133,740.00	89,580.00	250,000.00	209,992.00	199,861.02	883,173.02

Overall requested JPICH DH funding per PI and of the project as a whole

Budget Items	*Total Requested JPICH Funding PI 1 (UCY)*	*Total Requested JPICH Funding PI 2 (ALG)*	*Total Requested JPICH Funding PI 3 (UoW)*	*Total Requested JPICH Funding PI 4 (UR2)*	*Total Requested JPICH Funding PI 5 (URCA)*	***Total Requested JPICH funding***
1. Employment Costs	81,600.00	58,521.00	72,650.00	75,600.00	99,652.80	388,023.80
2. Equipment	3,300.00	7,150.00	12,640.00	13,100.00	2,000.00	38,190.00
3. Travel and Meeting costs	8,000.00	4,000.00	19,904.00	14,000.00	8,000.00	53,904.00
4. Consumables	0.00	0.00	2,400.00	0.00	1,000.00	3,400.00
5. Dissemination and Knowledge Exchange Costs	3,550.00	500.00	3,240.00	0.00	2,000.00	9,290.00
6. Other costs – Please specify*	0.00	0.00	1,080.00	15,000.00	1,000.00	17,080.00
7. Overheads (if applicable)	19,290.00	14,034.20	88,086.00	9,416.00	9,092.22	139,918.42
Total	115,740.00	84,205.20	200,000.00	127,116.00	122,745.02	649,806.22

Overall additional funding per PI and of the project as a whole**

Budget Items	*Additional Funding PI 1 (UCY)*	*Additional Funding PI 2 (ALG)*	*Additional Funding PI 3 (UoW)*	*Additional Funding PI 4 (UR2)*	*Additional Funding PI 5 (URCA)*	***Total Additional Funding***
1. Employment Costs	15,000.00	4,479.00	18,163.00	82,876.00	77,116.00	197,634.00
2. Equipment	0.00	0.00	3,160.00	0.00	0.00	3,160.00
3. Travel and Meeting costs	0.00	0.00	4,976.00	0.00	0.00	4,976.00
4. Consumables	0.00	0.00	600.00	0.00	0.00	600.00
5. Dissemination and Knowledge Exchange Costs	0.00	0.00	810.00	0.00	0.00	810.00
6. Other costs – Please specify*	0.00	0.00	270.00	0.00	0.00	270.00
7. Overheads (if applicable)	3,000.00	895.80	22,021.00	0.00	0.00	25,916.80
Total	18,000.00	5,374.80	50,000.00	82,876.00	77,116.00	233,366.80

Table 2. Summary Budget Tables

PI number	1					
PI name	Yiorgos Chrysanthou					
PI institution, country	University of Cyprus, Cyprus					
BUDGET ITEMS	**YEAR 1 Costs** *(in Euros)*	**YEAR 2 Costs** *(in Euros)*	**YEAR 3 Costs** *(in Euros)*	**TOTAL Costs** *(in Euros)*	**to be funded by JPICH DH** (in Euros)	**to be funded from own /additional funds**** (in Euros)
1. Employment costs						
Senior researcher (s)	5,000.00	5,000.00	5,000.00	*15,000.00*	0.00	15,000.00
Post-doc. researcher(s)	34,800.00			*34,800.00*	34,800.00	0.00
PhD Student (s)						
Administrative personnel						
Research Assistant		23,400.00	23,400.00	*46,800.00*	46,800.00	0.00
Subtotal Employment costs	***39,800.00***	***28,400.00***	***28,400.00***	***96,600.00***	***81,600.00***	***15,000.00***
2. Equipment						
Microsoft Hololens or similar AR Device	3,300.00			*3,300.00*	3,300.00	0.00
Subtotal Equipment	***3,300.00***	***0.00***	***0.00***	***3,300.00***	***3,300.00***	***0.00***
3. Travel and meeting costs						
Conferences and JPICH event		2,000.00	3,000.00	*5,000.00*	5,000.00	0.00
Project meetings …		1,500.00	1,500.00	*3,000.00*	3,000.00	0.00
Subtotal Travel and Meeting costs	***0.00***	***3,500.00***	***4,500.00***	***8,000.00***	***8,000.00***	***0.00***
4. Consumables						
Subtotal Consumables	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
5. Dissemination and Knowledge Exchange costs						
Communication events & expert costs	550.00	1,500.00	1,500.00	*3,550.00*	3,550.00	0.00
Subtotal Dissemination and Knowledge Exchange	***550.00***	***1,500.00***	***1,500.00***	***3,550.00***	***3,550.00***	***0.00***
6. Other costs – Please specify*						
Subtotal Other costs	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
7. Overheads (if applicable)	8,730.00	6,680.00	6,880.00	22,290.00	19,290.00	3,000.00
Subtotal Overheads (if applicable)	***8,730.00***	***6,680.00***	***6,880.00***	***22,290.00***	***19,290.00***	***3,000.00***
TOTAL PER PI	***52,380.00***	***40,080.00***	***41,280.00***	***133,740.00***	***115,740.00***	***18,000.00***

Table 3. UCY Budget Table

PI number	2					
PI name	**Efstathios Stavrakis**					
PI institution, country	**Algolysis LTD, Cyprus**					
BUDGET ITEMS	**YEAR 1 Costs** *(in Euros)*	**YEAR 2 Costs** *(in Euros)*	**YEAR 3 Costs** *(in Euros)*	**TOTAL Costs** *(in Euros)*	**to be funded by JPICH DH** (in Euros)	**to be funded from own /additional funds**** (in Euros)
1. Employment costs						
Senior researcher (s)	3,000.00	6,000.00	9,000.00	*18,000.00*	18,000.00	0.00
Research Assistant		5,400.00	21,600.00	*27,000.00*	26,121.00	879.00
Software Engineer			18,000.00	*18,000.00*	14,400.00	3,600.00
Subtotal Employment costs	***3,000.00***	***11,400.00***	***48,600.00***	***63,000.00***	***58,521.00***	***4,479.00***
2. Equipment						
HoloLens (or equivalent AR device)		3,300.00		*3,300.00*	3,300.00	0.00
Kinect (or equivalent motion/depth sensor) (2x)		350.00		*350.00*	350.00	0.00
Development Server Hardware		3,500.00		*3,500.00*	3,500.00	0.00
Subtotal Equipment	***0.00***	***7,150.00***	***0.00***	***7,150.00***	***7,150.00***	***0.00***
3. Travel and meeting costs						
Conferences						
Fieldwork						
Project meetings ...		2,000.00	2,000.00	*4,000.00*	4,000.00	0.00
Other (please specify)						
Subtotal Travel and Meeting costs	***0.00***	***2,000.00***	***2,000.00***	***4,000.00***	***4,000.00***	
4. Consumables						
Subtotal Consumables	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
5. Dissemination and Knowledge Exchange costs						
Advertising & Promotional Material	100.00	150.00	250.00	*500.00*	500.00	0.00
Subtotal Dissemination and Knowledge Exchange	***100.00***	***150.00***	***250.00***	***500.00***	***500.00***	***0.00***
6. Other costs – Please specify*						
Subtotal Other costs	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
7. Overheads (if applicable)	620.00	4,140.00	10,170.00	*14,930.00*	14,034.20	895.80
Subtotal Overheads (if applicable)	***620.00***	***4,140.00***	***10,170.00***	***14,930.00***	***14,034.20***	***895.80***
TOTAL PER PI	***3,720.00***	***24,840.00***	***61,020.00***	***89,580.00***	***84,205.20***	***5,374.80***

Table 4. ALG Budget Table

PI number	3					
PI name	Alan Chalmers					
PI institution, country	University of Warwick, United Kingdom					
BUDGET ITEMS	YEAR 1 Costs *(in Euros)*	YEAR 2 Costs *(in Euros)*	YEAR 3 Costs *(in Euros)*	TOTAL Costs *(in Euros)*	to be funded by JPICH DH (in Euros)	to be funded from own /additional funds** (in Euros)
1. Employment costs						
Senior researcher (s)	3,042.00	3,209.00	5,567.00	*11,818.00*	9,454.40	2,363.60
Post-doc. researcher(s)	0.00	17,900.00	55,049.00	*72,949.00*	58,359.20	14,589.80
PhD Student (s)						
Administrative personnel						
Other (Technician)	0.00	1,511.00	4,535.00	*6,046.00*	4,836.80	1,209.20
Subtotal Employment costs	***3,042.00***	***22,620.00***	***65,151.00***	***90,813.00***	***72,650.40***	***18,162.60***
2. Equipment						
Motion capture system	9,600.00			*9,600.00*	7,680.00	1,920.00
Imaging system	4,200.00			*4,200.00*	3,360.00	840.00
High perfomance laptop	2,000.00			*2,000.00*	1,600.00	400.00
Subtotal Equipment	***15,800.00***	***0.00***	***0.00***	***15,800.00***	***12,640.00***	***3,160.00***
3. Travel and meeting costs						
Conferences	864.00	864.00	3,248.20	*4,975.20*	3,980.16	995.04
Fieldwork	1,728.00	1,728.00	6,496.40	*9,952.40*	7,961.92	1,990.48
Project meetings ...	1,728.00	1,728.00	6,496.40	*9,952.40*	7,961.92	1,990.48
Subtotal Travel and Meeting costs	***4,320.00***	***4,320.00***	***16,241.00***	***24,880.00***	***19,904.00***	***4,976.00***
4. Consumables						
paying participants for user studies	0.00	525.00	1,575.00	*2,100.00*	1,680.00	420.00
Hard disks and printer supplies	0.00	225.00	675.00	*900.00*	720.00	180.00
				0.00	0.00	0.00
Subtotal Consumables	***0.00***	***750.00***	***2,250.00***	***3,000.00***	***2,400.00***	***600.00***
5. Dissemination and Knowledge Exchange costs						
Open Access Fees	0.00	0.00	4,050.00	*4,050.00*	3,240.00	810.00
Subtotal Dissemination and Knowledge Exchange	***0.00***	***0.00***	***4,050.00***	***4,050.00***	***3,240.00***	***810.00***
6. Other costs – Please specify*						
Recruitment	0.00	1,350.00	0.00	*1,350.00*	1,080.00	270.00
Subtotal Other costs	***0.00***	***1,350.00***	***0.00***	***1,350.00***	***1,080.00***	***270.00***
7. Overheads (if applicable)	1,558.00	27,525.00	81,024.00	*110,107.00*	88,085.60	22,021.40
Subtotal Overheads (if applicable)	***1,558.00***	***27,525.00***	***81,024.00***	***110,107.00***	***88,085.60***	***22,021.40***
TOTAL PER PI	***24,720.00***	***56,565.00***	***168,716.00***	***250,000.00***	***200,000.00***	***50,000.00***

Table 5. UoW Budget Table

PI number	4					
PI name	Franck Multon					
PI institution, country	Universite Rennes 2, France					
BUDGET ITEMS	**YEAR 1 Costs** *(in Euros)*	**YEAR 2 Costs** *(in Euros)*	**YEAR 3 Costs** *(in Euros)*	**TOTAL Costs** *(in Euros)*	**to be funded by JPICH DH** (in Euros)	**to be funded from own /additional funds**** (in Euros)
1. Employment costs						
Senior researcher (s)	27,625.00	27,625.00	27,626.00	*82,876.00*	0.00	82,876.00
Post-doc. researcher(s) for WP5		25,200.00	50,400.00	*75,600.00*	75,600.00	0.00
PhD Student (s)						
Administrative personnel						
Other (please specify)						
Subtotal Employment costs	***27,625.00***	***52,825.00***	***78,026.00***	***158,476.00***	***75,600.00***	***82,876.00***
2. Equipment						
Microsoft Kinects x3 for WP3	500.00			*500.00*	500.00	0.00
Microsoft hololens x2 for WP5	6,600.00			*6,600.00*	6,600.00	0.00
laptop x3 for WP3 and WP5	4,000.00	2,000.00		*6,000.00*	6,000.00	0.00
Subtotal Equipment	***11,100.00***	***2,000.00***	***0.00***	***13,100.00***	***13,100.00***	***0.00***
3. Travel and meeting costs						
Conferences	1,500.00	2,500.00	2,500.00	*6,500.00*	6,500.00	0.00
Experiments travels	1,500.00	1,500.00		*3,000.00*	3,000.00	0.00
Project meetings ...	1,500.00	1,500.00	1,500.00	*4,500.00*	4,500.00	0.00
Subtotal Travel and Meeting costs	***4,500.00***	***5,500.00***	***4,000.00***	***14,000.00***	***14,000.00***	***0.00***
4. Consumables						
Subtotal Consumables	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
5. Dissemination and Knowledge Exchange costs						
Subtotal Dissemination and Knowledge Exchange	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***	***0.00***
6. Other costs – Please specify*						
Use of ImmerMove mocap platform in Re	10,000.00	5,000.00		*15,000.00*	15,000.00	0.00
Subtotal Other costs	***10,000.00***	***5,000.00***	***0.00***	***15,000.00***	***15,000.00***	***0.00***
7.Overheads(management fee 8%)	2,048.00	3,016.00	4,352.00	*9,416.00*	9,416.00	0.00
Subtotal Overheads (if applicable)	***2,048.00***	***3,016.00***	***4,352.00***	***9,416.00***	***9,416.00***	***0.00***
TOTAL PER PI	***55,273.00***	***68,341.00***	***86,378.00***	***209,992.00***	***127,116.00***	***82,876.00***

Table 6. UR2 Budget Table

PI number	5					
PI name	**Céline Loscos**					
PI institution, country	**University of Reims Champagne-Ardenne**					
BUDGET ITEMS	**YEAR 1 Costs** *(in Euros)*	**YEAR 2 Costs** *(in Euros)*	**YEAR 3 Costs** *(in Euros)*	**TOTAL Costs** *(in Euros)*	**to be funded by JPICH DH** (in Euros)	**to be funded from own /additional funds**** (in Euros)
1. Employment costs						
Senior researcher (s)	25,705.33	25,705.33	25,705.33	*77,116.00*	0.00	77,116.00
Post-doc. researcher(s)						
PhD Student (s)	31,000.00	31,000.00	31,000.00	*93,000.00*	93,000.00	0.00
Administrative personnel						
Other (Intern Master level)		3,326.40	3,326.40	*6,652.80*	6,652.80	0.00
Subtotal Employment costs	***56,705.33***	***60,031.73***	***60,031.73***	***176,768.80***	***99,652.80***	***77,116.00***
2. Equipment						
Computer	2,000.00			*2,000.00*	2,000.00	0.00
Subtotal Equipment	***2,000.00***	***0.00***	***0.00***	***2,000.00***	***2,000.00***	***0.00***
3. Travel and meeting costs						
Conferences		2,000.00	2,000.00	*4,000.00*	4,000.00	0.00
Project meetings …	1,000.00	1,500.00	1,500.00	*4,000.00*	4,000.00	0.00
Subtotal Travel and Meeting costs	***1,000.00***	***3,500.00***	***3,500.00***	***8,000.00***	***8,000.00***	***0.00***
4. Consumables						
Camera	1,000.00			*1,000.00*	1,000.00	0.00
Subtotal Consumables	***1,000.00***	***0.00***	***0.00***	***1,000.00***	***1,000.00***	***0.00***
5. Dissemination and Knowledge Exchange costs						
Open Access			2,000.00	*2,000.00*	2,000.00	0.00
Subtotal Dissemination and Knowledge Exchange	***0.00***	***0.00***	***2,000.00***	***2,000.00***	***2,000.00***	***0.00***
6. Other costs – Please specify*						
Subcontracting ROMEO	200.00	400.00	400.00	*1,000.00*	1,000.00	0.00
Subtotal Other costs	***200.00***	***400.00***	***400.00***	***1,000.00***	***1,000.00***	***0.00***
7. Overheads (if applicable)	2,816.00	3,058.11	3,218.11	*9,092.22*	9,092.22	0.00
Subtotal Overheads (if applicable)	***2,816.00***	***3,058.11***	***3,218.11***	***9,092.22***	***9,092.22***	***0.00***
TOTAL PER PI	***63,721.33***	***66,989.85***	***69,149.85***	***199,861.02***	***122,745.02***	***77,116.00***

Table 7. URCA Budget Table

As summarized in the budget tables for each member of the consortium, the expenses are as follows:

Employment costs
UCY will hire a Post-doc researcher for one year to contribute mainly to WP4, and a Researcher Assistant for two years to contribute mainly to WP3 and WP5. The time dedicated by the Project Leader at UCY will be contributed by UCY's own funds.

ALG will hire a Research Assistant (RA) for 15PM and a Software Engineer (SE) for 9PM to perform the tasks described in WP4 and WP5. The RA will mainly focus on conducting basic research and will contribute a small percentage of his time (3PM) to industrial research activities related to the project. The work of the RA in industrial activities will be funded partially (20% of its cost) by own funds of ALG. ALG will also fund 20% of the salary of the SE, as he will be developing software as part of the industrial research activities of ALG partially fulfilling the requirements of WP5. The PI (Senior Scientist) in ALG will coordinate the management of the project, as well as supervise the activities of the RA and the SE, and ensure the timely completion of deliverables and tasks assigned to ALG.

UoW will lead the activities to research, develop and comprehensively evaluate the novel framework for training users through direct interaction with the virtual dancers (WP5). This work will be undertaken by a Post-doc hired by UoW. In addition, UoW will play a key role in acquiring the holistic data for the traditional English Morris dancing in close collaboration with the Morris Federation.
UR2 will collaborate with URCA on WP3 by co-supervising a PhD student (hired by URCA but doing short stays in UR2). A 18-month Post-doc hired in UR2 will contribute to WP5 for the training of dancers using AR.

Equipment costs
UCY will buy a Microsoft Hololens or similar AR device to use in evaluation and experiments in WP4 and WP5.

ALG will purchase a Microsoft HoloLens AR device (or equivalent) and 2 Kinect motion/depth sensors to support the implementation and testing of the motion search engine which requires using AR devices for viewing results, as well as real-time motion capture to submit example queries (WP5). In addition, the devices can be used to assist other partners with testing and debugging other relevant algorithms and software. ALG will buy suitable server hardware (solid state drives, RAM, backup system, etc.) to equip better its cluster that will be used for software development and testing, hosting the motion database and archiving of large amounts of motion data.

URCA will get a camera to acquire visual information of the dance performance (WP3) that will be coupled with sensing devices already owned through MASCA.
UoW will acquire a portable dance capture system to enable traditional dances, such as Morris dancing, to be captured "in the field".
UR2 will buy 2 hololens, Kinects and associated laptop in order to carry-out motion capture on-site and to evaluate the AR training system with sports sciences students in University Rennes2.

Travelling costs
All partners will use the travelling budget to attend all the project meetings, and international conferences. In addition, UCY will require travelling to one JPICH event. Extra two trips will be required to France and UK for the intermediate project meetings. UoW will travel within the UK to capture the traditional English Morris dancing in situ. UR2 will travel to Cyprus and the UK to carry-out motion capture of traditional dances on-site.

Dissemination costs
UCY requests funding for the expenses of the Open Day event, the AR Demo event, and possible dance experts costs.
ALG will use a small amount of the budget to promote and disseminate the project through printed and/or online material.

UoW request funds to enable open access publications in leading journals.

Other costs
The SCHEDAR project will make use of two platforms , ROMEO and "Centre Image", that are part of "Maison de la Simulation de Champagne-Ardenne" (MaSCA and. is budgeted as internal service expense in the URCA budget.

The SCHEDAR project will make use of two platforms in Champagne-Ardenne that are part of "Maison de la Simulation de Champagne-Ardenne" (MaSCA) and technicians will assist the SCHEDAR staff in their research development. ROMEO, a dedicated platform to high-performance computing (HPC) labeled by NVIDIA. The "Centre Image" is dedicated to virtual reality and 3D imaging. Equipment includes several interaction and sensing devices.

UR2 will use the internal immermove platform with accurate motion capture facilities (laboratory condition) to calibrate and evaluate the final low-cost mocap system developed during the project. It consists in UR2 internal billing as immermove has its financial autonomy.

Part D: CVs

In the following are the CVs.

CHRYSANTHOU L. Yiorgos

EDUCATION/EMPLOYMENT

2007-now: Associate Professor, CS Department, **University of Cyprus**, Director of the Graphics and VR Lab

2001-2007: Assistant Professor, CS Department, **University of Cyprus**, Director of the Graphics and VR Lab

1998-2001: Lecturer, Computer Science Department, **University College London**

1996-1998: Research Fellow, Computer Science Department, **University College London**

1991-1996: PhD in Computer Science: "*Shadow Computation for 3D Interaction and Animation*", supervised by Mel Slater, **Queen Mary and Westfield College** (QMW), **University Of London**

FUNDED PROJECTS

Participated as **PI or PL in 24 National or European collaborative projects** on computer graphics, VR and AR, serious games & training simulators and applications to cultural heritage. Some **example projects** include:

- **Visual Dance Performance for Interactive Characters,** Cyprus RPF, 2012-2014
- **Reconstruction of everyday life in the 19th century Nicosia,** Cyprus RPF, 2012-2014
- **Cyprus Food Virtual Museum,** Cyprus RPF, 2009-2010
- **Mediterranean Harbors – Ships And The Sea: The Invisible Routes,** EU Interreg III B Archimed, 2009
- **A VR Tour in Nicosia of the 19th Century,** The Leventis Municipal Museum, 2008-2009

PROFESSIONAL ACTIVITIES

Member of the Editorial Board of the journals Computer Graphics Forum (2017-today), Computers & Graphics (2011-today) and of the **Journal of Eastern Mediterranean Archaeology and Heritage Studies**, (2012-2016). Review Editor for the Journal Frontiers in Robotics and AI, Virtual Environments specialty (2014-today)

Invited speaker for V-Crowds 2005, MIG 2008, City Modeling, Simulation & Vis 2008, MIG 2009, e-Learning Expo, Athens 2012, TEDx Univ of Nicosia 2014, V-Crowds 2017

Program Co-Chair for the international conferences: MIG 2010, ECMS 2008, ACM VRST 2006, VAST/EGSGH 2004 & VAST STARS 2010, ACM VRST 2005, and STAR Reports for EG 2005

PUBLICATIONS – H-INDEX=25

24 papers in international journals, 33 papers in reviewed international conferences, 16 book chapters, 8 edited volumes and special issues and 1 text book in computer graphics, virtual reality and cultural heritage

A. Aristidou, Q. Zeng, E. Stavrakis, K. Yin, D. Cohen-Or, Y. Chrysanthou and B. Chen, "Dance Synthesis with Emotion Control", accepted at the Symposium of Computer Animation 2017.

A. Aristidou, Y. Chrysanthou and J. Lasenby, "Extending FABRIK with Model Constraints", Computer Animation and Virtual Worlds, 27:1, 35-57, January 2016.

Marios Kyriakou, Xueni Pan, and Yiorgos Chrysanthou. "Interaction with Virtual Crowds in Immersive and Semi-Immersive Virtual Reality Systems", Computer Animation andVirtual Worlds, 10.1002/cav.1729, August 2016.

A. Aristidou, P. Charalambous, Y. Chrysanthou, "Emotion Analysis and Classification: Understanding the Performers' Emotions Using the LMA Entities", Computer Graphics Forum, 34: 262–276, 2015.

A. Aristidou, E. Stavrakis, P. Charalambous, Y. Chrysanthou, S. Himona, "Folk Dance Evaluation Using Laban Movement Analysis", ACM Journal on Computing and Cultural Heritage (JOCCH) 8 (4), 20, August 2015. (**Best Paper Award at EG GCH 2015**)

P. Charalambous and Y. Chrysanthou. The PAG Crowd: A Graph Based Approach for Efficient Data-Driven Crowd Simulation, accepted at Computer Graphics Forum, DOI: 10.1111/cgf.12403, June 2014.

P. Charalambous, I. Karamouzas, S. Guy,and Y. Chrysanthou. A Data-Driven Framework for Visual Crowd Analysis, Pacific Graphics (Computer Graphics forum), October 2014.

H. Zacharatos, C. Gatzoulis and Y. Chrysanthou. "Automatic Emotion Recognition based on Body Movement Analysis: A Survey", IEEE Comp. Graph. and Applications, Special Issue - The Next Big Thing, 34 (6), Nov 2014.

P. Zaharias, D. Michael, and Y. Chrysanthou."Learning Through Multi-Touch Interfaces in Museum Exhibits: an Empirical Investigation". In: Educational Technology & Society 16.3, pp. 374-384, 2013.

P. Zaharias, C. Gatzoulis, and Y. Chrysanthou. "Exploring User Experience While Playing Educational Games: Focus on Temporality and Attractiveness". In: International Journal of Gaming and Computer-Mediated Simulations (IJGCMS) 4.4, pp. 19-32, 2012.

STAVRAKIS Efstathios

EDUCATION/EMPLOYMENT

2014-now: Senior Scientist (CEO / Co-Founder), Algolysis Ltd, CY

2015-2016: Scientific & Technical Consultant, Nicosia Municipality, CY

2013-2015: Researcher, CaSToRC, The Cyprus Institute, CY

2011-2013: Visiting Lecturer, Department of Computer Science, University of Cyprus, CY

2009-2011: Researcher, Department of Computer Science, University of Cyprus, CY

2009: Research Programmer, Glasgow School of Art, UK

2007-2008: Researcher, **INRIA - Sophia-Antipolis, FR**

2002-2007: Research Assistant, **Vienna University of Technology, AT**

2002-2009: PhD in Computer Science, **Vienna University of Technology, AT**

2000-2001: MSc in Computer-Aided Graphical Technology Applications, **University of Teesside, UK**

1997-2000: BA (Hons) in Creative Visualisation, **University of Teesside, UK**

FUNDED PROJECTS

Participated as a **Researcher in 8 National and European collaborative projects**, primarily related to computer graphics, vision and virtual reality:

- RISE (664584 - EU H2020 WIDESPREAD-1-2014 - Teaming - Phase 1) ⠿ 2015-2016
- ENEGRA (Research Promotion Foundation Cyprus - EPIXEIRHSEIS/PROION/0311) ⠿ 2013-2015
- SimPol (Research Promotion Foundation Cyprus - TPE/PLHR/0308(BIE)/03) ⠿ 2010-2011
- CROSSMOD (EU FP6-IST CROSSMOD 014891) ⠿ 2007-2008
- Video3D (Austrian Science Fund (FWF) - P15663) ⠿ 2002-2006
- E-ISLAM (EU FP5 IST-2000-29582), REGNET (EU FP5 IST-2000-26336), LAB@FUTURE (EU FP5 IST-2001-34204) ⠿ 2001

PROFESSIONAL ACTIVITIES

Founder and CEO: Algolysis Ltd (2014-now) - Devising business, research & innovation strategy.

Awarded start-up innovation grant for the DriveNest (www.drivenest.com) monitoring service. (2017)

Conducts scientific research, software development and technical analysis for products/services.

Technical consultant in research and innovation projects.

Member: IEEE, ACM, EuroGraphics

PUBLICATIONS – H-INDEX=9

4 articles in international journals, 14 papers in reviewed international conferences and 2 book chapters.

A. Aristidou, E. Stavrakis, M. Papaefthimiou, G. Papagiannakis, Y. Chrysanthou, “Style-based Motion Analysis for Dance Composition”, The Visual Computer, 2017. (under review)

A. Aristidou, Q. Zeng, E. Stavrakis, K. Yin, D. Cohen-Or, Y. Chrysanthou and B. Chen, “Dance Synthesis with Emotion Control”, accepted at the Symposium of Computer Animation 2017.

A. Aristidou, E. Stavrakis, P. Charalambous, Y. Chrysanthou, S. Himona, “Folk Dance Evaluation Using Laban Movement Analysis”, ACM Journal on Computing and Cultural Heritage (JOCCH) 8 (4), 20, August 2015.

A. Aristidou, E. Stavrakis, and Y. Chrysanthou (2014) LMA-Based Motion Retrieval for Folk Dance Cultural Heritage. In: Digital Heritage. Progress in Cultural Heritage: Documentation, Preservation, and Protection. EuroMed 2014. Lecture Notes in Computer Science, vol 8740, pp. 207–216, Springer.

A. Aristidou, E. Stavrakis, and Y. Chrysanthou. “Motion Analysis for Folk Dance Evaluation”. In: 12th EG Workshop on Graphics and Cultural Heritage (GCH). Eurographics, (Best Paper Award), 2014, pp. 55–64.

CHALMERS Alan G.

EDUCATION/EMPLOYMENT

2007-now: Professor, WMG, **University of Warwick, UK**, Leader of Visualisation Group

1989-2007: Professor (from 2003), Computer Science Department, **University of Bristol, UK**

1988: Lecturer, Computer Science Department, **University of Natal, Pietermaritzburg, SA**

1986-1987: Lecturer, Computer Science Department, **University of Witwatersrand, SA**

1989-1991: PhD in Computer Science: "A Minimum Path Configuration", **University of Bristol, UK**

FUNDED PROJECTS

Participated as **PI or PL in over 40 National or European collaborative projects** on multisensory virtual experiences, High Dynamic Range (HDR) imaging, and virtual archaeology. Some **example projects** include:

- **Programme of Simulation (PSi): Visualisation and Virtual Experiences,** UK EPSRC with Jaguar Land Rover, 2012-2016
- **Royal Society Industrial Fellowship, Bespoke High-Fidelity Visualisation,** UK Royal Society, 2012-2016
- **EU COST Action IC1005: HDRi,** EU, (44 institutions from 25 countries), 2011-2015
- **ITN-DCH Initial Training Networks for Digital Cultural Heritage: Projecting our Past to the Future,** FP7-PEOPLE-2013-ITN, Marie Curie Actions, with 22 academic and industrial partners from Cyprus, Austria, Germany, France, Greece, Croatia, Slovenia, Italy, Belgium Switzerland and UK, 2013-2017

PROFESSIONAL ACTIVITIES

Invitations to Showcase Research at Top International Exhibitions: IBC, Amsterdam: 2011, 2013, 2015, 2016; NAB, Las Vegas: 2012-2016; NAB East, New York: 2016

Invited speaker for 23 leading international conferences

PhD supervision: 43 completed and 10 current

Founded 4 conference series: Eurographics Symposia on Computer Graphics & Visualisation (1996), Eurograpics Symposia on Graphics and Cultural Heritage (2001), Afrigraph (2001), Graphite (now SIGGRAPH Asia) (2003).

Founder and CEO/CIO of Spinout companies: goHDR 2009-2015, TrueDR and Sensomatics 2016-now

PUBLICATIONS – H-INDEX=32

69 papers in international journals, 179 papers in reviewed international conferences, 7 book chapters, 8 edited volumes and special issues, 9 patents and 7 books. 43 PhD students successfully supervised.

Suma R., Stavropoulou G., Stathopoulou E., van Gool L., Georgopoulos A., Chalmers A.G Evaluation of the effectiveness of HDR tone-mapping operators for photogrammetric applications, Virtual Archaeology Review, 7, 15, 54–66, November 2016.

Satilmis P., Bashford-Rogers T., Debattista K., Chalmers A.G. A Machine Learning Driven Sky Model. IEEE Computer Graphics and Applications, May 2016.

Harvey C., Debattista K., Bashford-Rogers T., Chalmers A.G. Multi-Modal Perception for Selective Rendering, Computer Graphics Forum, January 2016.

Rodrigues N., Magalhães L., Moura J., Chalmers A.G., Reconstruction and Generation of Virtual Heritage Sites, Digital Applications in Archaeology and Cultural Heritage, 1(3–4), 92-102, July 2014.

Ramic-Brkic B., Chalmers A.G. Olfactory Adaptation in Virtual Environments, ACM Transactions on Applied Perception, 11(2), 1–16, July 2014.

Broome M.R., Zányi E., Hamborg T., Selmanovic E., Czanner S., Birchwood M.J., Chalmers A.G., Singh S.P. A high fidelity virtual environment for the study of paranoia, Schizophrenia Research and Treatment, 2013.

Kwon J.H., Powell J., Chalmers A.G. How Level of Realism Influences Anxiety in Virtual Reality Environments for a Job Interview, International Journal of Human-Computer Studies, 71(10), 978–987, October 2013.

Gonçalves A., Magalhães L., Moura J., and Chalmers A.G. Perceptual images of Conimbriga using High Dynamic Range. Journal of Archaeological Science, 40(1), 116–128, Elsevier, January 2013.

Happa J., Bashford-Rogers T., Wilkie A., Artusi A., Debattista K., Chalmers A.G. Cultural Heritage Predictive Rendering, Computer Graphics Forum, 31(6), 1823–1836, September 2012.

MULTON Franck

EDUCATION/EMPLOYMENT

2007-now: Professor, M2S Lab, **Univ. Rennes2, FR,** leader of the **Inria** « MimeTIC » joint group

2006: Habilitation to Supervise Research, Univ. Rennes1 « Human Motion Analysis, Modeling & Simulation »

1999-2007: Associate Professor, M2S Lab, **Univ. Rennes2,** leader of the biomechanics research group

1998-1999: Assistant Professor, M2S Lab, **Univ. Rennes2**

1995-1998: PhD in Computer Science « Virtual Human Motion Synthesis »**, Univ. Rennes1, FR**

FUNDED PROJECTS

Participation in **13 national collaborative projects (ANR or FUI)** in computer animation, motion analysis, sports training, **1 European FP5 STREP project** « CHARM » 1994-1997 about human biomechanical simulation

Leader of **2 international PHC projects** with **Edinburgh University** and **Queen's University Belfast**

Inria Associate Team 3-years project with **State Key Lab CAD&CG, Zheijiang Univ., China**

4 ANRT Cifre PhD thesis

PROFESSIONAL ACTIVITIES

Co-Founder of Spinout companies: Kimea 2017, transfer of software to **Golaem** start-up company 2010-2014

Invited speaker in international conferences MIRAGE 2009, CASA 2009, MIG 2008, MIG2010, ISBS2015

Best paper award in 2014 in ACM VRST, Best manipulation paper award in 2013 in IEEE ICRA, Third price for the best paper awardds in Eurographics 2005

PUBLICATIONS – H-INDEX=22

52 papers in international journals, 41 papers in reviewed international conferences, 8 book chapters, one special issue Guest Editor in Presence (MIT Press), 4 softwares "patents" (APP in France)

Motion capture and analysis

P. Plantard, H. Shum, F. Multon (2016) Filtered Pose Graph for Efficient Kinect Pose Reconstruction. Multimedia Tools and Applications, Springer Verlag, 2016, pp.24.

S.Y. Boulahia, E. Anquetil, R. Kulpa, F. Multon (2016) HIF3D: Handwriting-Inspired Features for 3D Skeleton-Based Action Recognition. IEEE. 23rd International Conference on Pattern Recognition (ICPR 2016), Cancun, Mexico

P. Plantard, E. Auvinet, A.S. Le Pierres, Franck Multon (2015) Pose Estimation with a Kinect for Ergonomic Studies: Evaluation of the Accuracy Using a Virtual Mannequin, Sensors, MDPI, 2015, 15, pp.1785-1803.

E. Auvinet, Franck Multon, A. Saint-Arnaud, J. Rousseau, J. Meunier (2011) Fall detection with multiple cameras: An occlusion-resistant method based on 3D silhouette vertical distribution. IEEE Transactions on Information Technology in Biomedicine, 15 (2), pp.290-300.

E. Auvinet, F. Multon, J. Meunier (2011) Gait analysis with multiple depth cameras. IEEE Eng Med Biol Soc., Aug 2011, Boston, Massachusetts, United States. IEEE Press

Character animation

F. Multon, R. Kulpa, B. Bideau (2008) MKM: a global framework for animating humans in virtual reality applications. Presence and Teleoperation, undef, 2008, 17 (1), pp.17-28

F. Multon, L. France, M.P. Cani, G. Debunne (1999) Computer Animation of Human Walking: a Survey. Journal of Visualization and Computer Animation, John Wiley & Sons, 1999, 10, pp.39—54

Virtual coaching

A. Covaci, A.H. Olivier, F. Multon (2015) Visual Perspective and Feedback Guidance for VR Free-Throw Training. IEEE Computer Graphics and Applications, 35 (5), pp.55 - 65.

D.A. Gómez Jáuregui, F. Argelaguet Sanz, A.H. Olivier, M. Marchal, F. Multon, A. Lécuyer (2014) Toward "Pseudo-Haptic Avatars": Modifying the Visual Animation of Self-Avatar Can Simulate the Perception of Weight Lifting. IEEE Transactions on Visualization and Computer Graphics, pp.654-661.

B. Bideau, R. Kulpa, N. Vignais, S. Brault, F. Multon, C. Craig (2010) Using Virtual Reality to Analyze Sports Performance. IEEE Computer Graphics and Applications, 30 (2), pp.14-21.

LOSCOS Céline

EDUCATION/EMPLOYMENT

2010	**Professor**, Dept. of Computer Sciences, University Institute of Technology, University of Reims Champagne-Ardenne (France) leader of the **RVM research team**
2010	**Professor**, Dept. of Computer Sciences, University Institute of Technology, University of Reims Champagne-Ardenne (France)
2007	**Full time researcher**, RAMON y CAJAL program, University of Girona (Spain)
2001	**Lecturer**, Senior Lecturer (2006), University College London, (UK)
2000	**Post-Doctorate**, University College London, (UK)
1999	**PhD** in computer science, University Joseph Fourier, Grenoble (France)

FUNDED PROJECTS

2011-2015	HDRi COST action, IC2005, 2011-2015, representative for France. EU-funded project.
2011-2014	3D HDR, Region Reims Champagne Ardenne, Approx. €100.000. **PI**.
2011-2015	RECOVER3D, project participant.
2009-2011	High-dynamic range imaging for uncontrollable environments, TIN2008-02046-E/TIN, National project (MEC - EXPLORA), €90.000, **PI**.
2002-2005	CREATE: Constructivist Mixed Reality for Design, Education and Cultural Heritage. IST-2001-34231, EU-funded. **Coordinator** (Approx €450.000 for UCL, €2.3M total).
2001-2004	PUREFORM: The museum of PureForm. IST 2000-29580, EU-funded. **PI** for UCL. (Approx €170.000 for UCL, €1.6M total).

PROFESSIONAL ACTIVITIES

Research interests: 3D performance capture, 3D video, computational photography, illumination simulation, and virtual reality.

Research animation: President of the French association in computer graphics (AFIG)

International activities: Peer reviewing in top ranked journals (Computer & Graphics associate editor), and conferences (EUROGRAPHICS program committee).

PUBLICATIONS – H-INDEX=19

50 papers in international journals and peer-reviewed international conferences, 2 books, 13 book chapters, one special issue Guest Editor in Computer Graphics and Applications

Journal

L. Blache, C. Loscos et L. Lucas, Robust motion flow for mesh tracking of freely moving actors, Springer Berlin Heidelberg, The Visual Computer, pp 1-12, december 2015. doi: 10.1007/s00371-015-1191-y

Book and chapters

Laurent Lucas (Editor), Céline Loscos (Editor), Yannick Rémion (Editor), 3D Video: From Capture to Diffusion, ISBN: 978-1-84821-507-8, 325 pages. October 2013, Wiley-ISTE

Edmond Boyer, Adrian Hilton, Céline Loscos, Dynamic geometry reconstruction, Digital Representations of the Real World: How to Capture, Model, and Render Visual Reality, Marcus A. Magnor, Oliver Grau, Olga Sorkine-Hornung, Christian Theobalt, CRC Press, Taylor & Francis Group, ISBN 9781482243819, 2015.

Yebin Liu, Juergen Gall, Céline Loscos, Qionghai Dai, Reconstruction of human motion, Digital Representations of the Real World: How to Capture, Model, and Render Visual Reality, Marcus A. Magnor, Oliver Grau, Olga Sorkine-Hornung, Christian Theobalt, CRC Press, Taylor & Francis Group, ISBN 9781482243819, 2015.

Conferences

L. Blache, M. Desbrun, C. Loscos et L. Lucas, Time-varying surface reconstruction of an actor's, 11th International Symposium on Visual Computing (ISVC), Lecture Notes in Computer Science, vol. 9474, pp 92-101, Springer International Publishing, Las Vegas, Nevada, USA, december 2015. doi:10.1007/978-3-319-27857-5_9

M. Ismael, S. Prévost, C. Loscos et Y. Remion, Materiality maps: a novel scene-based framework for direct multi-view stereovision reconstruction, IEEE International Conference on Image Processing (ICIP), pp 5467-5471, IEEE, Paris, France, october 2014.

L. Blache, C. Loscos, O. Nocent, L. Lucas, 3D Volume Matching for Mesh Animation of Moving Actors, Eurographics Workshop on 3D Object Retrieval, Strasbourg, France, 6 April 2014.

Part E

Letters of commitment

In the following are the Letters of Commitment.

University of Cyprus

20 June 2017
Nicosia, Cyprus

To Whom it May Concern

Object: *Proposal for Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017.*

Proposal title: *Safeguarding the Cultural Heritage of Dance through Augmented Reality.*

I, the undersigned, **Xenia Constantinou**, **University Officer** of the University of Cyprus, confirm its participation as Lead Partner of the proposal submitted by **Dr Yiorgos Chrysanthou,** representing **University of Cyprus** as Project Leader.

The undersigned, confirms that the University of Cyprus is eligible and in accordance with the criteria set out in the specific call for proposals and that it has the financial and operational capacity to carry out the proposed action.

Signature

Xenia CONSTANTINOU
University Officer
University of Cyprus

P.O.Box 20537, CY 1678 Nicosia, Cyprus – Tel.: + 357 -22894297/4313, Fax: + 357 -22894472

algolysis
algorithmic solutions

www.algolysis.com

19 June 2017
Limassol,
Cyprus

To Whom It May Concern

Object: Proposal for Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017.

Proposal title: Safeguarding the Cultural Heritage of Dance through Augmented Reality.

I, the undersigned, **Efstathios Stavrakis, Director & Authorized Legal Representative** of Algolysis Ltd established in 2014, confirm its participation as Partner to the proposal submitted by **Dr Yiorgos Chrysanthou,** representing **University of Cyprus** as Project Leader.

The undersigned, confirms that Algolysis Ltd is eligible and in accordance with the criteria set out in the specific call for proposals and that it has the financial and operational capacity to carry out the proposed action.

ALGOLYSIS LTD

Efstathios Stavrakis
Director

WARWICK
THE UNIVERSITY OF WARWICK

21 June 2017

University of Warwick,
University House,
Kirby Corner Road,
Coventry, CV4 8UW.

To Whom it May Concern

Object: Proposal for Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017.

Proposal title: Safeguarding the Cultural Heritage of Dance through Augmented Reality.

I, the undersigned, Dr. Navdeep Bains, Head of Research Support of the University of Warwick established in 1965, confirm its participation as Partner to the proposal submitted by **Dr Yiorgos Chrysanthou,** representing **University of Cyprus** as Project Leader.

The undersigned, confirms that the University of Warwick is eligible and in accordance with the criteria set out in the specific call for proposals and that it has the financial and operational capacity to carry out the proposed action.

Dr. Navdeep Bains
Head of Research Support

Research & Impact Services
University of Warwick
University House
Kirby Corner Road
Coventry CV4 8UW UK
T +44 (0)24 76 1 50709
E N.K.Bains@warwick.ac.uk
www.warwick.ac.uk

19 June 2017
Rennes

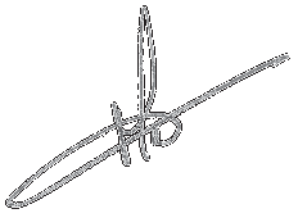
UNIVERSITÉ RENNES 2

To Whom it May Concern

Object: Proposal for Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017.
Proposal title: Safeguarding the Cultural Heritage of Dance through Augmented Reality.

I, the undersigned, MULTON Franck**, Professor of University Rennes2,** confirm its participation as Partner to the proposal submitted by **Dr Yiorgos Chrysanthou,** representing **University of Cyprus** as Project Leader.

The undersigned, confirms that the **University Rennes2** is eligible and in accordance with the criteria set out in the specific call for proposals and that it has the financial and operational capacity to carry out the proposed action.



MULTON Franck
Professor University Rennes2

19 June 2017
Reims,
France

To Whom it May Concern

Object: Proposal for Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017.
Proposal title: Safeguarding the Cultural Heritage of Dance through Augmented Reality.

I, the undersigned, Céline Loscos, Professor in Computer Science, head of the RVM research team of the CReSTIC laboratory of the Université de Reims Champagne-Ardenne established in 1967, confirms its participation as Partner to the proposal submitted by Dr Yiorgos Chrysanthou, representing University of Cyprus as Project Leader.

The undersigned, confirms that the Université de Reims Champagne-Ardenne is eligible and in accordance with the criteria set out in the specific call for proposals and that it has the financial and operational capacity to carry out the proposed action.

Céline Loscos
Professor in computer science

20 June 2017
Achialou 1,
1080, Lefkosia
Cyprus

www.politistiko-ergastiri

To whom it may concern,

Letter of Commitment for Collaboration on the Project SCHEDAR

I hereby, representing Politistiko Ergastiri Ayion Omoloyiton (Cultural Workshop Ayion Omologiton) state our intention to act as Associate Partner in the project "SCHEDAR - Safeguarding the Cultural HEritage of Dance through Augmented Reality", should the proposal submitted by the University of the Cyprus, under the *Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017*, be funded.

Politistiko Ergastiri was established as a nonprofit organization in 2002, to host the Workshop of Traditional Dancing, which was initiated in 1999 and the other cultural activities which were developed throughout the years. (Traditional music workshop, workshop of Film, Photography and theatre). More than 100 children and adults have the chance to be involved and express themselves artistically through the various activities offered by the Politistiko Ergastiri every year. The base of our philosophy and guidance is the respect of tradition and cultural heritage (tangible and intangible). To support this we have implemented small scale ethnographic research in Cyprus traditional dances and music, cooperated with specialists in the field of traditional music and dance and been actively getting involved in European funded projects concerning culture and education. Politistiko Ergastiri has a long list of activities and outcomes to introduce.
We have represented the Ministry of Education and Culture in various events (eg. Form Unesco Meeting for transmit ion of Intangible Heritage in Paris 2007, TEDeX Nicosia "Traces of Tradition 2016). Politisitko Ergastiri is an accredited NGO and acting as and Advisory Capacity to the Committee of Unesco for matters of Intangible Heritage.

Our contribution to the project will be to:

- offer our expertise and experience in the study and dissemination of folk dancing, enabling the Consortium to offer technological solutions that satisfy user needs of cultural heritage researchers and practitioners.
- facilitate access of the Consortium to dance performers and experts through our members and broader network.
- participate in user studies and technology trials the Consortium may conduct and in particular in the final AR Dance Coach trail which can be installed for a week at our premises for a trial.

Through our engagement in this project we will:

- gain access to selected project deliverables – including the digitized dance data and analysis tools.
- obtain exposure through the project's dissemination activities (e.g. website, events, credits, etc.)
- receive free-to-use access of the project results (AR Dance coaching application and dance motion search engine) for non-commercial use.

Christiana [illegible], Director

Melanie Barber
72 Freedom Road
Sheffield
S6 2XD

20th June 2017

www.morrisfed.org.uk

To whom it may concern,

Letter of Support for Collaboration on the Project SCHEDAR

I hereby, representing The Morris Federation state our intention to offer support to the project "SCHEDAR - **S**afeguarding the **C**ultural **HE**ritage of **D**ance through **A**ugmented **R**eality", should the proposal submitted by the University of the Cyprus, under the *Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017,* be funded.

The Morris Federation was founded in 1975. Its main focus is to encourage and maintain interest in the cultural practice of Morris dancing by women and men of all ages. The Morris Federation maintains a close collaboration with diverse group of music and dance heritage specialists, researchers, performers and folklorists. Through its continuous research, collection, recording and processing of folklore music and dance, The Morris Federation has established an important archive of relevant memorabilia, notations and photographs, as well as a library of traditional dance related books. These resources are essential for further research, preservation and understanding of the music and dance intangible cultural heritage of British traditional dance.

Our contribution to the project will be to:

- provide access to our archive and library for the enrichment of the end-user software applications with information and metadata related to the digitized morris dances.
- offer our expertise and experience in the study and dissemination of morris dancing, enabling the Consortium to offer technological solutions that satisfy user needs of cultural heritage researchers and practitioners.
- facilitate access of the Consortium to dance performers and experts through our members and broader network.
- participate in user studies and technology trials the Consortium may conduct.

Through our engagement in this project we will:

- gain access to selected project deliverables – including the digitized dance data and analysis tools.
- obtain exposure through the project's dissemination activities (e.g. website, events, credits, etc.)
- receive free-to-use access of the project results (AR Dance coaching application and dance motion search engine), for non-commercial use.

Yours sincerely,
Melanie Barber

Melanie Barber
President
The Morris Federation

20 June 2017
01a Iouliou Vern , Limassol, 3071
Cyprus

To whom it may concern,

Letter of Commitment for Collaboration on the Project SCHEDAR

I hereby, representing the Cultural and Dancing Association "DIONYSOS" state our intention to act as Associate Partner in the project "SCHEDAR - Safeguarding the Cultural HEritage of Dance through Augmented Reality", should the proposal submitted by the University of the Cyprus, under the *Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017*, be funded.

The Cultural and Dancing Association "DIONYSOS" was founded in 1991 and today has a core group of 60 active dancers and 200 dancing students. Its main focus is in the preservation and dissemination of the musical and dancing heritage, both of Cyprus and of the rest of Hellenism. The Association maintains a close collaboration with diverse group of music and dance heritage specialists, researchers, performers and folklorists. Through its continuous research, collection, recording and processing of folklore music and dance materials, the Association has established a remarkable wardrobe of numerous Cypriot and Greek traditional costumes and maintains an important archive of relevant films and photographs, as well as a library of folk themes. These resources are essential for further research, preservation and understanding of the music and dance intangible cultural heritage of Cyprus.

Our contribution to the project will be to:

- Provide access to our archive and library for the enrichment of the end-user software applications with information and metadata related to the digitized folk dances.
- Offer our expertise and experience in the study and dissemination of folk dancing, enabling the Consortium to offer technological solutions that satisfy user needs of cultural heritage researchers and practitioners.
- Facilitate access of the Consortium to dance performers and experts through our members and broader network.
- Participate in user studies and technology trials the Consortium may conduct.

Through our engagement in this project we will:

- Gain access to selected project deliverables – including the digitized dancing data and analysis tools.
- Obtain exposure through the project's dissemination activities (e.g. website, events, credits, etc.)
- Receive free-to-use access of the project results (AR Dance coaching application and dance motion search engine), for non-commercial use.

Signed here
Name & role in organization
Stamp

VICE PRESIDENT
DANCING TEACHER

20 June 2017
64 Metochiou st. flat 210
2403 Cyprus

FIBRE PERFORMING ARTS

To whom it may concern,

Letter of Commitment for Collaboration on the Project SCHEDAR

I hereby, representing the Fibre Performing Arts state our intention to act as Associate Partner in the project "SCHEDAR - **S**afeguarding the **C**ultural **HE**ritage of **D**ance through **A**ugmented **R**eality", should the proposal submitted by the University of the Cyprus, under the *Joint Programming Initiative in Cultural Heritage and Global Change Digital Heritage Call 2017,* be funded.

The Fibre Performing Arts is a performance group founded in Cyprus in 2011 and today has a core group of 5 active performers. Its activities mainly focus on the choreography and production of contemporary dance performances with attention to the structure of body movement. The Fine Performing Arts group has performed in Cyprus and abroad in live video art installations, short films and festivals.

Our contribution to the project will be to:

- offer our expertise and experience in the study and dissemination of contemporary dancing, enabling the Consortium to offer technological solutions that satisfy user needs of cultural heritage researchers and practitioners.
- facilitate access of the Consortium to dance performers and experts through our members and broader network.
- participate in user studies and technology trials the Consortium may conduct.

Through our engagement in this project we will:

- gain access to selected project deliverables – including the digitized dance data and analysis tools.
- obtain exposure through the project's dissemination activities (e.g. website, events, credits, etc.)
- receive free-to-use access of the project results (AR Dance coaching application and dance motion search engine), for non-commercial use.

Artistic Director
Stavri Kalopetridou