RISE | Research Centre on Interactive Media Smart Systems and Emerging Technologies

PhD Fellowships
No. of Positions: Five (5) full-time fellowships
Positions Category: Fellowship contract
Location: RISE, Nicosia, Cyprus

DEADLINE for applications: 10/07/2019

The Research Centre on Interactive Media, Smart System and Emerging Technologies (RISE), announces five (5) PhD Fellowships under various Multidisciplinary Research Groups (MRGs). The Fellowships aim to encourage participation in RISE's Doctoral Training Program.

RISE is an equal opportunity employer. The positions are open to nationals of all EU countries. Applicants outside the EU may require a working VISA for Cyprus.

About RISE

RISE is a newly founded research centre in Cyprus aiming to become a centre of excellence empowering knowledge and technology transfer in the region. It is a joint venture between the Municipality of Nicosia, the Max Planck Institute for Informatics (Germany), the University College London (UK) and the three public universities of Cyprus - University of Cyprus, Cyprus University of Technology, and Open University of Cyprus. This project has received funding from the European Union's Horizon 2020 research and innovation programme H2020-WIDESPREAD-01-2016-2017 (Teaming Phase 2) under grant agreement No. 739578, as well as from the Cypriot Government, the local partners and other sponsors.

The research focus of RISE is on interactive media. Interactive media have become an integral part of our lives, changing the way that information is conveyed to the user and the ways users interact with devices, with other people, and with the world around them. Research in RISE integrates the Visual Sciences, Human Factors and Design, and Communications and Artificial Intelligence, in a tight synergy that provides a unique interdisciplinary research perspective that emphasizes an "Inspired by Humans, Designed for Humans" philosophy. RISE is designed to act as an integrator of academic research and industrial innovation, towards the sustainable fuelling of the scientific, technological, and economic growth of Cyprus and Europe. For more information about RISE, please visit www.rise.org.cy.

Overview of RISE's Doctoral Training Program

RISE's Doctoral Training Program (DTP) will kick off in 2019-2020 to provide the best possible experience of impactful collaboration, following best practices from across Europe. RISE's DTP is far more attractive as an engagement point than an individual supervisor or

small group in a University. The DTP experience will rely on a good cohort environment at RISE itself, but also on training the students to engage with the wider community and the partner institutions.

RISE's DTP includes an in-house program for supporting and guiding PhD students who will be registered at a University of the RISE consortium (University of Cyprus, Cyprus University of Technology or Open University of Cyprus). Scientific colloquia, mobility activities and visits, joint supervision of PhDs, and joint projects organized in collaboration with RISE's advanced partners (UCL and Max Planck) and other members of the RISE developing network will provide opportunities for training in research and innovation activities as well as knowledge transfer.

Indicative list of DTP courses:

1. Project Management
2. Innovation, Entrepreneurial and Intrapreneurial skills for Research Engineers
3. Product from Concept to Market
4. IP Protection Workshop: Key IP, commercialization, methods for Higher Education: licensing, spin-ins and spin-outs
5. Research Methods and Research Ethics
6. Science communication and dissemination
7. Grant-writing
8. Other seminars

The program will include a colloquium series in which there will be monthly presentations by PhD students in a closed and supportive environment. The format of the colloquium series will be mentoring oriented (e.g. PhD students share their work, their challenges, their concerns, they get peer feedback and guidance from senior researchers, they interact with post-doc researchers and they hear their stories and struggles).

Via RISE's DTP, one can experience a broad range of projects, activities and training possibilities. RISE will also facilitate the development and innovation of research ideas and outcomes. RISE DTP will aim to provide a direct link to the advance partners via short-term placements at their premises. RISE DTP will support PhD students' participation in conferences and study visits at established research centres across Europe.
RISE will award a certificate for the participation in the RISE DTP program.

RISE PhD Fellowships

In the academic year 2019-2020, RISE will offer up to five (5) PhD fellowships to encourage participation in RISE's DTP.

Fellowships will be for up to 3 years, during which the candidate needs to complete his/her PhD. The fellowship includes a monthly salary of €1.650 (€19.800 yearly) along with a tuition waiver for the Host University.

Fellowship and Participation in RISE's DTP require:

1. Register at one of the local partner Universities of Cyprus (i.e., Host University), under the supervision of a RISE academic. Note: Depending on the university of registration, the PhD student will have to follow the respective doctoral program with expectations and examination procedures. RISE will not interfere with the PhD requirements of the University where the PhD student is registered. The PhD degree will be awarded by the University the PhD student is registered at.
2. Spent 70-80% of their time at RISE Centre itself and 20-30% at the external partners. The costs for the placement at the external partners will be covered by RISE.
3. Complete a minimum of 4 courses or series of seminars offered by RISE's DTP in-house program, preferably during the first 2 years of their PhD. Note: These courses are independent of any coursework/seminar PhD requirements by the Host University. Yet, provided that the Host University/Department agrees, these courses may count towards the course requirements of the PhD program at the Host University.
4. Engage in year-round communication and dissemination activities of RISE (e.g. poster days, industry events)

RISE fellowship might be discontinued if the fellow does not adhere to the obligations of RISE's DTP.

Eligibility Criteria

Applicants must:

- Be 35 years of age or younger on the date of application
- Have a Bachelor's degree (4 years or 5 years program) in the area of concentration
- Have an MA/MSc in the area of concentration
- Have a proven record of high-achievement
- Have a PhD thesis proposal centred on the topic of interest from the composed list of RISE topics.
- Be fluent in written and verbal communication in English

Application Process

The application should be sent to research@rise.org.cy and should include:

1. The selected topic (one application for each topic, max 2 topics per applicant)
2. Full CV of the applicant
3. Full transcripts of all previous studies
4. English language degrees

5. A letter of interest or statement of purpose written in English, which describes 1) previous work performed in the topic under study 2) why the candidate wishes to undertake the specific studies (1000 words max).
6. A PhD thesis proposal centred on the topic of interest including initial research objectives (1000 words max). Note: A different application must be submitted for each topic of interest with a maximum of 2 applications per candidate.
7. Names and contact information of two referees. Note: Referees will be contacted by RISE to submit their letters, if the candidate is shortlisted.

DEADLINE for applications: 10/07/2019

List of Topics

1.Design for XR in Education

Short Description:
The candidate will conduct extensive research on how the body and gesture can be used to learn in immersive environments. The technology could be augmented, virtual, or mixed reality (now called XR) as well as haptics i.e., gloves, hacked controllers, or other tactile simulators, if they are used to further learning. Theory to frame the PhD work is primarily focused on the principles of embodied cognition meshed with XR to engage learners in formal and informal environments.

Candidates for this post should possess:

1. Postgraduate Degree of Master's level from accredited Universities in computer science (HCI focus) or ergonomics-related field (e.g. interface design, product design). Account will be taken of any relevant practical or work experience.
2. Very good knowledge of English language.
3. Ability to organize and carry out research work.

Preferred qualifications include:
Familiarity with human-computer interaction design, embodied learning and design theory, proficiency in the design and evaluation of advanced educational computing applications, which involve the collection and analysis of multimodal qualitative and quantitative data (e.g., learning analytics), experience with working in multidisciplinary teams and university/school partnerships.

Responsible MRG:
The successful candidates will be assigned to RISE's the Interactive Media and Education/Edutainment (EdMedia) MRG. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr. Andri Ioannou, Cyprus University of Technology, EdMedia MRG Team Leader

External Supervisor: Prof. Sara Price & Prof. Nadia Bianchi-Berthouze, University College London
Placement at the external partner (30%): University College London

For more information please contact:
Dr Andri Ioannou, RISE EdMedia MRG Team Leader, email: andri@cyprusinteractionlab.com or
Sara Price, University College London, email: sara.price@ucl.ac.uk
Nadia Bianchi-Berthouze, University College London, email: nadia.berthouze@ucl.ac.uk

2.Game Design for Multi-modal and Multi-sensory Learning

Short Description:
The candidate will conduct extensive research on how the design of serious games offers new opportunities for digital learning environments via multi-modal and multi-sensory forms of interaction through movement, tactile and auditory sensory experiences. In this PhD work, the design of the games will be analysed in relation to the learning experiences of young children. Theory to frame the PhD work is primarily focused on the principles of multimodal learning and game-based-learning.

Candidates for this post should possess:

1. Postgraduate Degree of Master's level from accredited Universities in computer science (HCI focus) or ergonomics-related field (e.g. interface design, game design). Account will be taken of any relevant practical or work experience.
2. Very good knowledge of English language.
3. Ability to organize and carry out research work.

Preferred qualifications include:
Familiarity with human-computer interaction design, multimodal learning and game-based-learning, proficiency in the design and evaluation of advanced educational computing applications, which involve the collection and analysis of multimodal qualitative and quantitative data (e.g., learning analytics), experience with working in multidisciplinary teams and university/school partnerships.

Responsible MRG
The successful candidates will be assigned to RISE's the Interactive Media and Education/Edutainment MRG. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr. Andri Ioannou, Cyprus University of Technology, EdMedia MRG Team Leader
External Supervisor: Prof. Sara Price & Prof. Nadia Bianchi-Berthouze, University College London

Placement at the external partner (30%): University College London

For more information please contact:
Dr Andri Ioannou, RISE EdMedia MRG Team Leader, email:
andri@cyprusinteractionlab.com or
Sara Price, University College London, email: sara.price@ucl.ac.uk
Nadia Bianchi-Berthouze, University College London, email: nadia.berthouze@ucl.ac.uk

3.Artificial Intelligence / Computational Cognition

Short Description:
These PhD posts are concerned with Artificial Intelligence / Computational Cognition, with interest in the following areas:

1. Collective Computation in Humans
2. Visual Simulator for Ant Movement
3. Electronic Brain on a Tablet Device
4. Extracting Common Sense from Text
5. Empirical Evaluation of Evolvability
6. Human-Inspired Story Comprehension
7. IDE for Describing Actions and Effects
8. Coaching of Computational Agents
9. Arguments from / to Natural Language
10. The Winograd Schema Challenge
11. Personalized Web-Search Engine
12. Making Self-Fulfilling Prophecies
13. Personalized Call-Handling Assistant
14. Argumentation in Social Networks
15. Preference Elicitation and Visualization
16. Concepts and Knowledge in Robots
17. Smart City / Smart Home Applications
18. User Profiling from Social Interactions

The successful candidates will develop novel tools and techniques that span the areas of Commonsense Reasoning, Formal Argumentation, Machine Learning, Preference Elicitation, Text and Story Comprehension, Robotic and Smart Devices, Cognitive Psychology, and Cognitive Science, to develop intelligent systems for real-life problems, so that the systems operate in a manner that is cognitively-compatible with human learning and reasoning processes.

Applicants are expected to submit a statement of purpose written in English, which specifies some of the topics above, and explains/describes (in about 500 words per topic) why they wish to undertake studies in that topic, their research objectives, and other relevant information.

Candidates for these topics should possess:

1. M.Sc. Degree from an accredited University in Computer Science, Artificial Intelligence, Machine Learning, Cognitive Systems, Cognitive Science, or related areas. Candidates with other backgrounds but with an otherwise solid profile may also be considered.
2. Very good knowledge of English, especially in reading technical / research articles.
3. Ability to organize and carry out research work within the scope of the relevant MRG.
4. Excellent programming skills, mathematical maturity, and ability to learn quickly.
5. An interest in Smart Personal Assistants or Human-Machine Cognition applications.

Responsible MRG:
Successful candidates will be assigned to SCRAT MRG (Socially-Competent Robotic and Agent Technologies). Successful candidates will be registered at the Open University of Cyprus, but will be based at RISE.

Supervisor from RISE: Dr. Loizos Michael, Open University of Cyprus, SCRAT MRG Team Leader
External Supervisors:
Distinguished Professor, Mary-Anne William, Director, Innovation and Enterprise Research Lab, Centre of Artificial Intelligence, University of Technology Sydney, Australia, Fellow, Stanford University, Co-Founder, AI Policy Hub.

Placement at the external partner (30%) [depends on topic and dates]: University of Technology Sydney, Australia / Stanford University, USA.

For more information please contact:
Associate Prof. Loizos Michael, OUC
Team Leader of SCRAT MRG
Pillar Leader of AI and Communications
email: loizos@ouc.ac.cy

4.Fairness, Accountability, Transparency and Trust (FAT*) in Socio-Technical Systems.

Short Description:
The PhD post is concerned with Fairness, Accountability, Transparency and Trust (FAT*) in Socio-Technical Systems. Topics of specific interest include but are not limited to:

1. FAT and its relationship to consumer trust in proprietary systems
2. Explainability and user understanding of black boxes
3. FAT and its relationship to user trust in medical applications

Increasingly, human decisions and actions are being replaced by algorithmic systems. While this increases efficiency in many applications, it also brings to the forefront the issue of *trust*. There is a large literature on autonomous systems and trust, and it is known that optimal use of a system happens when users place an appropriate level of trust in the system. However, modern socio-technical systems are often characterized by an opaque and/or proprietary nature; users are often called to place their trust in a system without having even a basic understanding its behaviours. We invite applications for doctoral thesis projects that shall investigate the complex relationship between algorithmic system transparency and user trust. Projects may focus on a particular type of system or domain; high-stakes domains such as medicine and security are of particular interest. It is expected that students will undertake empirical work, which will take a data science, social science or mixed methods approach.

Candidates for this post should possess:

1. Postgraduate Degree of Master's level from accredited Universities in Computer Science, Information Science, Data Science, Computational Social Science, or a related field.
2. Excellent communication skills in English.
3. Excellent knowledge of the methodologies needed to pursue the proposed research.
4. At least basic programming skills in R or Python.

Responsible MRG:
The successful candidates will be assigned to RISE's Transparency in Algorithms Group (TAG) MRG. The successful candidate will be registered at the Open University of Cyprus but will be based at RISE.

For more information please contact:
Dr. Jahna Otterbacher
Team Leader of TAG MRG at RISE
Assistant Professor at Open University of Cyprus
School of Pure and Applied Sciences
email: jahna.otterbacher@ouc.ac.cy

Supervisor from RISE: Dr. Jahna Otterbacher, Open University of Cyprus
External Supervisor: Prof. Paolo Rosso, Pattern Recognition and Human Language Technologies (PRHLT) Research Center , Universitat Politècnica de València, Spain
Placement at the external partner (20-30%): Universitat Politècnica de València, Spain

5.Social and Context-aware Multimedia Content Distribution in 5G Networks

Short Description:
The aim of this position is to exploit 5G dense networks and trends in using the network edge for caching and processing and support the QoS and QoE of Interactive Media and Emerging technologies. Within this scope, we will develop and integrate a framework for QoE-based dynamic adaptation of network and content. This includes the fusion of concepts from social network cascades and content dissemination, the increasing use of small high-speed cells for network communication, and the ability to group and predict users' and content's needs.

Candidates for the above posts should possess:

1. MSc in Computer Science, Computer Engineering, Electrical Engineering, Electronics Engineering, or related area.
2. Excellent knowledge of the English language.
3. Strong programming skills
4. Ability to organize and carry out research work and ability to learn quickly.

Preferred qualifications include:
Familiarity with mobile network architectures and protocols, especially 4G and 5G; proficiency in multimedia content management; and understanding of social or complex network analysis.

Responsible MRG:
The successful candidates will be assigned to RISE's the Smart Networked Systems (SNS) Multidisciplinary Research Group (MRG). The successful candidate will be registered at the University of Cyprus, Department of Computer Science.

Supervisor from RISE: Dr. Vasos Vassiliou, University of Cyprus
External Supervisor: Prof. Edmundo Monteiro, University of Coimbra, Portugal
Placement at the external partner (30%): University of Coimbra

For more information please contact:
Dr. Vasos Vassiliou
Assistant Professor, University of Cyprus
Team Leader of SNS MRG at RISE
email: vasosv@rise.org.cy
tel. 22892750

6. Reliability, Security and Resource Management for IoT Networks and Devices

Short Description:
The aim of this position is to create novel protocols and algorithms for the secure and

reliable operation of IoT networks. Work will include the development of new distributed and efficient algorithms tailored to the IoT environment and underlying network infrastructure that take into account the device mobility, their limited energy and computational power. More specifically, work will encompass one or more of the following: to design novel cross-layer security protocols, avoiding the incremental application of existing security technologies and work on recovery techniques that involve alternative path creation with static or mobile nodes. Work may leverage existing work on Lightweight Intrusion Detection for Wireless Sensor Networks and extend it, considering the characteristics of IoT networks, new attacks, new topologies, new classification algorithms, etc. Work may also take advantage of established algorithmic solutions in utilizing mobile nodes for alleviating congestion control and extend them to manage the reconfiguration of a network, after a fault.

Candidates for the above posts should possess:

1. MSc in Computer Science, Computer Engineering, Electrical Engineering, Electronics Engineering, or related area.
2. Excellent knowledge of the English language.
3. Strong programming skills
4. Ability to organize and carry out research work and ability to learn quickly.

Preferred qualifications include:
Familiarity with wireless sensor networks and IoT architectures and protocols, proficiency in embedded system programming, and understanding of security principles.

Responsible MRG:
The successful candidates will be assigned to RISE's the Smart Networked Systems (SNS) Multidisciplinary Research Group (MRG). The successful candidate will be registered at the University of Cyprus, Department of Computer Science.

Supervisor from RISE: Dr. Vasos Vassiliou, University of Cyprus
External Supervisor: Prof. Sotiris Nikoletseas, University of Patras, Greece
Placement at the external partner (30%): University of Patras

For more information please contact:
Dr. Vasos Vassiliou
Assistant Professor, University of Cyprus
Team Leader of SNS MRG at RISE
email: vasosv@rise.org.cy
tel. 22892750

7. VR based motor rehabilitation with smart monitoring for the progress

Short Description:
The work within this PhD thesis will be based on experimental studies investigating

interventions through VR applications to be developed. The aim is to find innovative ways contributing to people's physical well-being targeting motor rehabilitation of patients or/and to the physical condition improvement of non-patients. The identification of the exact target group (e.g. stroke patients, athletes, public) it will be part of the work of the PhD student after identifying the needs and potentials in the various groups. The goal of the thesis will be to push the capabilities of the VR systems beyond their current state of the art capabilities. Concepts such as neuro-plasticity, exergaming, embodiment illusion, placebo idea and others can be explored towards this end. For further enhancement, existing Machine Learning techniques can be integrated in the system/framework to be proposed and developed, allowing unsupervised monitoring of the participants' progress and enabling system's personalization/automatic adaptation.

Candidates for this post should possess:
1. Bachelor's degree and postgraduate degree of Master's level in a relevant field (e.g. Interactive Media, Computer Science, Information Technology, Computer Engineering, Neuroscience, Psychology) from an accredited institution
2. Strong computer programming skills and expertise with a game engine (e.g. Unity)
3. Expertise with Virtual and/or Augmented Reality technologies
4. Familiarisation with Interactive virtual environments, 3D modelling concepts and software
5. Experience in experimental research (related to VR)/ statistical analysis
6. An interest/knowledge in Neuroscience/Psychology aspects
7. At least very basic understanding of Machine Learning or Neural Networks concepts
8. Very good knowledge of English language.
9. Ability to organize and carry out research work.
10. Excellent computer skills and ability to learn quickly.

Preferred qualifications include:

1. Experience in biosingals' acquisition and biomeasurements' analysis

Responsible MRG:
The successful candidates will be assigned to RISE's the Virtual Reality for Well Being MRG and co-supervised with another MRG depending on the selected candidate. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr Despina Michael-Grigoriou, Assistant Professor, Cyprus University of Technology, Team Leader at RISE of the Virtual Reality for Well Being MRG & Leader of the Visual Sciences Research Pillar, RISE

External Supervisor: Prof Nadia Magnenat-Thalmann, Professor of Computer Graphics and Virtual Worlds, Founder and Director of MIRALab, University of Geneva & Director of the Institute for Media Innovation, Nanyang Technological University, Singapore
Placement at the external partner (30%): University of Geneva

For more information please contact:
Dr Despina Michael-Grigoriou
Assistant Professor, Cyprus University of Technology
Team Leader at RISE of the Virtual Reality for Well Being MRG
& Leader of the Visual Sciences Research Pillar, RISE
email: despina.grigoriou@cut.ac.cy

8. VR based mental / social well-being and assessment through bio-measurements

Short Description:
The work within this PhD thesis will be based on experimental studies investigating interventions through VR applications to be developed. The aim is to find innovative ways contributing to people's mental or social well-being. The goal of the thesis is to push the capabilities of the VR systems beyond their current state of the art capabilities. Concepts such as neuro-plasticity, exergaming, embodiment illusion, placebo idea and others can be explored towards this end. The assessment will be based on biosignals acquisitions and their analysis.

Candidates for this post should possess:
1. Bachelor's degree and postgraduate degree of Master's level in a relevant field (e.g. Interactive Media, Computer Science, Information Technology, Computer Engineering, Neuroscience, Psychology) from an accredited institution
2. Strong computer programming skills and expertise with a game engine (e.g. Unity)
3. Expertise with Virtual and/or Augmented Reality technologies
4. Familiarisation with Interactive virtual environments, 3D modelling concepts and softwares
5. Experience in experimental research (related to VR)/ statistical analysis
6. An interest/knowledge in Neuroscience/Psychology aspects
7. Experience in biosingals' acquisition and biomeasurements' analysis
8. Very good knowledge of English language.
9. Ability to organize and carry out research work.
10. Excellent computer skills and ability to learn quickly.

Responsible MRG:
The successful candidates will be assigned to RISE's the Virtual Reality for Well Being MRG and co-supervised with another MRG depending on the selected candidate. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr Despina Michael-Grigoriou, Assistant Professor, Cyprus

University of Technology, Team Leader at RISE of the Virtual Reality for Well Being MRG & Leader of the Visual Sciences Research Pillar, RISE
External Supervisor: Prof Nadia Magnenat-Thalmann, Professor of Computer Graphics and Virtual Worlds, Founder and Director of MIRALab, University of Geneva & Director of the Institute for Media Innovation, Nanyang Technological University, Singapore
Placement at the external partner (30%): University of Geneva

For more information please contact:
Dr Despina Michael-Grigoriou
Assistant Professor, Cyprus University of Technology
Team Leader at RISE of the Virtual Reality for Well Being MRG
& Leader of the Visual Sciences Research Pillar, RISE
email: despina.grigoriou@cut.ac.cy

9.First-Person Computer Vision Applications for Urban Environments

Short Description:
First-person vision is a sub-field of computer vision that deals with the analysis of images captured by wearable cameras. The task of analyzing images captured by wearable cameras faces various challenges rising from factors including, but not limited to, camera motion, lighting variation, variation of camera viewpoint and existence of occluded image structures. The aim of the project is both to address fundamental issues related to the analysis of images captured by wearable cameras and the development of an application that demonstrates the use of first-person vision in an urban environment. For example, the work may focus on indoors or outdoors applications related to navigation aids for the elderly, personal safety related applications or applications for enhancing user experience during sightseeing. It is expected that as part of the work, deep machine learning techniques will be utilized, along with other computer vision techniques.

Candidates for this post should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Electronic Engineering or any related field.
2. Excellent computer programming skills.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.

Additional Qualifications:
Prior experience in research activities (i.e. publication record, submitting research proposals, participating in research programs) and experience using computer vision libraries (i.e. OpenCV) and deep learning libraries (i.e. TensorFlow) will be considered as an additional qualification.

Responsible MRG
The successful candidates will be assigned to RISE's the Biometrics for Smart Human-centred Emerging Technologies (BIO-SCENT) MRG and co-supervised with another MRG

depending on the selected candidate. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Andreas Lanitis, Prof Cyprus University of Technology, Team Leader of BIO-SCENT MRG
External Supervisor: L.J. SPREEUWERS, University of Twente
Placement at the external partner (30%): University of Twente

For more information please contact:
Prof. Andreas Lanitis
Team Leader of BIO-SCENT MRG
email: andreas.lanitis@cut.ac.cy

10.Computer Vision for Food Safety and Circular Economy

Short Description:
Foodborne diseases are an important cause of morbidity and mortality. Moreover, chemical contaminants are responsible for long-term damage leading to chronic diseases such as cancer. Therefore, food inspection technologies are required in order to prevent such diseases, by ensuring safer food goods and processes. Hyperspectral imaging is a promising technology for food inspection. The goal is to use datasets based on hyperspectral imaging, as well as create new datasets, and apply computer vision-based analysis techniques trying to identify contaminants and bacteria that cause diseases. Another relevant application is circular economy. In this aspect, the focus is on food waste and how it can be harnessed via bioenergy or via upscaling to pharmaceutical, cosmetics and/or other products.

Candidates for the above posts & topics should possess:

1. MSc in Computer Science or Computer Engineering, or related area
2. Excellent knowledge of English
3. Good programming skills
4. Be able to organize and carry out research work
5. Ability to learn quickly and eagerness to try new emerging technologies, such as deep learning and hyperspectral imaging (see Topics 1 and 4), Geospatial Information Systems and remote satellite sensing (see Topic 2), machine learning, self-organizing maps and robotics (see Topic 3).

Responsible MRG:
The successful candidates will be assigned to SuPerWorld MRG. The successful candidates will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr. Andreas Kamilaris, SuPerWorld MRG Team Leader (with Prof. Andreas Lanitis, Cyprus University of Technology & BIO-SCENT MRG@RISE)

External Supervisor: Prof. Saskia van Ruth, Wageningen University, The Netherlands
Placement at the external partner (30%): Wageningen University, The Netherlands

For more information please contact:
Dr. Andreas Kamilaris
Assistant Professor, University of Twente
Team Leader of SuPerWorld MRG (Pervasive Real-World Computing for Sustainability)
email: a.kamilaris@utwente.nl

11.Geospatial Analysis for Disaster Prevention

Short Description:
Which are the risks of various European communities in possible disasters? What about wildfires and people living in the forest? What about tsunamis and people living at the sea side? Or flooding in areas near or below sea level? Are there evacuation and/or disaster response plans available? Which are the actual risks for the affected human population? The goal here is to perform geospatial analysis based on satellite data or aerial photos, addressing one or more of the above aspects, in different European regions. The outcome could be used for developing better risk indexes and assessment metrics, as well as insurance policies.

Candidates for the above posts & topics should possess:

1. MSc in Computer Science or Computer Engineering, or related area
2. Excellent knowledge of English
3. Good programming skills
4. Be able to organize and carry out research work
5. Ability to learn quickly and eagerness to try new emerging technologies, such as deep learning and hyperspectral imaging (see Topics 1 and 4), Geospatial Information Systems and remote satellite sensing (see Topic 2), machine learning, self-organizing maps and robotics (see Topic 3).

Responsible MRG:
The successful candidates will be assigned to SuPerWorld MRG. The successful candidates will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Andreas Kamilaris, SuPerWorld MRG Team Leader (with Prof. Vasos Vassiliou, University of Cyprus & SNS MRG@RISE)
External Supervisor: Prof. Benjamin Wagner vom Berg, University of Applied Science, Bremerhaven Germany
Placement at the external partner (30%): Bremerhaven University of Applied Science, Germany

For more information please contact:
Dr. Andreas Kamilaris

Assistant Professor, University of Twente
Team Leader of SuPerWorld MRG (Pervasive Real-World Computing for Sustainability)
email: a.kamilaris@utwente.nl

12.Modeling associative memory on robots for promoting social behavior

Short Description:
This project is about mimicking the way humans store information to their brain, associating this information with other memories and happenings in the past. For example, an image of some person eating an apple could associate this person with the fact that he likes fruits, particularly apples. In the future, if the same person expresses hunger, the robot might suggest eating an apple. Or when the robot recognizes an apple, it might remember this same person if not a stronger stimulus appears at its memory from another memory. Thus, this model can then be used to improve the social behavior of robots when interacting with humans. Basic research in new forms of neural and/or deep learning architectures and structures/formations might be required. Moreover, sentiment analysis is important in this context, to understand the emotional state of humans and how to act accordingly. Also, which other sensors (beside camera) can be used to recognize humans and infer their state or needs? How can we bridge together artificial intelligence technologies, such as deep learning, knowledge representation and intelligent decision making, together with brain cognition studies? A case study could be a real robot in old Nicosia, which assists tourists in their navigation, but also recognizes locals passing by. Another robot could be placed at the airport of Larnaca or Paphos, for passengers' assistance but also for reinforcing security. Part of this research will be performed at the Robotics and Mechatronics Lab of the University of Twente.

Candidates for the above posts & topics should possess:

1. MSc in Computer Science or Computer Engineering, or related area
2. Excellent knowledge of English
3. Good programming skills
4. Be able to organize and carry out research work
5. Ability to learn quickly and eagerness to try new emerging technologies, such as deep learning and hyperspectral imaging (see Topics 1 and 4), Geospatial Information Systems and remote satellite sensing (see Topic 2), machine learning, self-organizing maps and robotics (see Topic 3).

Responsible MRG:
The successful candidates will be assigned to SuPerWorld MRG. The successful candidates will be registered at the Open University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Andreas Kamilaris, SuPerWorld MRG Team Leader (with Associate Prof. Loizos Michael, Open University of Cyprus & SCRAT MRG@RISE)
External Supervisor: Prof. Stefano Stramigioli, University of Twente, The Netherlands

Placement at the external partner (30%): University of Twente, The Netherlands

For more information please contact:
Dr. Andreas Kamilaris
Assistant Professor, University of Twente
Team Leader of SuPerWorld MRG (Pervasive Real-World Computing for Sustainability)
email: a.kamilaris@utwente.nl

13.Museums, Technology and Contested History

Description:
The candidate will be expected to conduct extensive research on how museums or cultural sites address issues of difficult/contested history or heritage in their exhibition spaces and through their educational programmes with the help of technology. Accordingly, the candidate will be expected to develop an innovative application/installation focusing on one of these three thematic areas: (a) Cyprus Problem/bicommunal relations, (b) immigration in Cyprus, or (c) LGBTQI community in Cyprus. He/ She will contribute in suggesting ways and methods for the application of new learning scenarios and approaches in museums with the use of technology. Such a practical application will aim to help museums deal with these contested issues and help build social cohesion. The candidate will subsequently test the applications and do an extensive evaluation.

Candidates for this post should possess:

1. M.Sc. Degree from an accredited University on Computer Science, Artificial Intelligence, Machine Learning, or related areas. Candidates with other backgrounds but with an otherwise solid profile may also be considered.
2. Very good knowledge of English language.
3. Ability to organize and carry out research independently.
4. Excellent programming skills, mathematical maturity, and ability to learn quickly.

Experience with museums or other heritage sites will be considered an advantage. Prior experience in research activities (i.e. publication record, submitting research proposals, participating in research programs) or/and experience in programing will be considered an advantage.

Responsible MRG
The successful candidates will be assigned to RISE's Museum Lab MRG. The successful candidate will be registered at the Cyprus University of Technology but will be based at RISE.

Supervisor from RISE: Dr. Theopisti Stylianou-Lambert, Department of Multimedia and Graphic Arts, Cyprus University of Technology, Museum Lab MRG Team Leader
External Supervisor: Prof. Tsvi Kuflik, Professor of Information Systems, Information Systems Department, The University of Haifa, Israel

Placement at the external partner (30%): The University of Haifa, Israel

For more information please contact:
Dr. Theopisti Stylianou-Lambert, Cyprus University of Technology, Museum Lab MRG Team Leader
email: theopisti.stylianou@cut.ac.cy

14.Intelligent Virtual Reality System for Pain Management

Short Description:
Recent advances in Virtual Reality (VR) immersive technologies provide new methods and tools for the development of novel and promising applications mainly for neurological rehabilitation. VR interventions have several advantages and are rapidly gaining ground as popular applications for different disease conditions. Furthermore, the development of VR technologies in recent years have resulted in more accessible and less expensive solutions, which could still provide positive results. However, the full potential of VR applications in healthcare still remains to be explored. The purpose of this research work is to develop an innovative methodological framework for the development of emerging VR applications based on user interaction integration and tracking, biosignal analysis and intelligent decision making and personalization. It is expected that this framework will be exploited in the development and evaluation of VR applications in patients suffering with chronic pain management.

The research work will begin with a review of emerging VR technologies and applications in healthcare. Then the VR methodological framework will be developed based on user needs and experts' feedback, focusing in pain management. Emphasis will be placed in user interaction and patient empowerment. The patient will be tracked and monitored using different sensors and acquisition of different biosignals (like ECG, PPG, EMG and other). Real time sensing and biosignal analysis will be carried out to personalize the VR application to the physical and cognitive responses of the patient. This analysis will be based on intelligent decision making supporting decision explainability for both the patient and the health professional.

The proposed framework will be evaluated extensively in different clinical settings in chronic pain management to provide feedback and fine tuning of the aforementioned technological components.

Candidates for the above posts should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Computer Engineering or Electronic or Electrical Engineering or any related field.
2. Excellent computer programming skills, C/C++, Python.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.

5. Previous experiences in research activities is a plus, i.e., publications, research proposal writing.
6. Previous experiences in the use of deep-learning libraries, i.e., Tensorflow, Keras, Pytorch and Caffe is a plus.

Additional Qualifications:
Prior experience in research activities (i.e. publication record, submitting research proposals, participating in research programs) and experience in programming and deep learning libraries (i.e. TensorFlow) will be considered as an additional qualification.

Responsible MRG:
The successful candidates will be assigned to RISE's Smart, Ubiquitous and Participatory Technologies for Healthcare Innovation Biometrics MRG. The successful candidate will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Prof. Constantinos S. Pattichis, University of Cyprus, *Smart, Ubiquitous and Participatory Technologies for Healthcare Innovation* Team Leader
External Supervisor: Prof. Nicolai Petkov, University of Groningen,
Placement at the external partner (30%): University of Groningen

For more information please contact:
Prof. Constantinos S. Pattichis, University of Cyprus, *Smart, Ubiquitous and Participatory Technologies for Healthcare Innovation* Team Leader
email: pattichi@ucy.ac.cy

15.Color perception and High Dynamic Range Content management for complex multimedia systems with limited computational resources

Short Description:
The topic is concerned with Color perception and High Dynamic Range Content management for complex multimedia systems with limited computational resources, i.e., mobile phones, VR/AR headsets, e-watches, displays etc. The capability of our visual system to convey color information of the environment where we are interacting with is one of the most amazing and complex mechanisms that a human is experiencing in its daily life. However, to fully reproduce this experience is not an easy task. First only some aspects of the complete behavior of the human visual system are understood today. Second, nowadays we have available a large variety of digital color devices, i.e., mobile phones, High Dynamic Range displays, e-watches, SDR displays, projector systems, VR/AR headsets etc. with completely different characteristics. Third, the illumination conditions where images and video are often watched are not optimal. Fourth, these devices are equipped with different computational resources, e.g., e-watches and VR/AR sets have limited computational resources when compared to mobile phones and displays. This make very hard to convey similar visual experience to different users using different digital devices. This work will investigate this issue in its complexity, providing solutions to some of the aspects of how the color and high dynamic range content needs to be managed to

convey the most realistic visual experience even on devices with limited computational resources.

Candidates for the above posts should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Computer Engineering or Electronic or Electrical Engineering or any related field.
2. Excellent computer programming skills, C/C++, Python.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.
5. Previous experiences in research activities is a plus, i.e., publications, research proposal writing.
6. Previous experiences in the use of deep-learning libraries, i.e., Tensorflow, Keras, Pytorch and Caffe is a plus.

Responsible MRG:
The successful candidates will be assigned to RISE's MRG DeepCamera: The Next Generation of Image/Video Processing. The successful candidate will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Alessandro Artusi DeepCamera MRG Team Leader (with Prof Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Karol Myszkowski, Max Planck Institute
Placement at the external partner (30%): Max Planck Institute

For more information please contact:
Dr. Alessandro Artusi
Team Leader of MRG Deep Camera: The Next Generation of Image/Video Processing and MRG Real-time Populated Virtual Environment
email: artusialessandro4@gmail.com

16.Deep-learning approaches for designing objective metric that is capable to predict color distortions

Short Description:
The quality evaluation of image/video processing algorithms is an essential step that can be performed either through a user study or using an objective metric. The former is time demanding and often impractical due to the large number of users and images/videos required to guarantee the results to be statistically significant. This issue has partially been overtaken by limiting the application of user studies to a subset of all test conditions. In this way, user studies provide a ground-truth reference for the choice of the most appropriate complex objective metric from a large set of possible candidates. Although this helps to ease the tedious process of user studies, it does not cope with the fact that findings extracted during such studies are difficult to generalize. Notwithstanding this, the use of objective metrics is known to suffer from high computational complexity due to the simulation of complex aspects of the Human Visual System (HVS). Moreover, they are

capable to estimate the visual perception difference only in the luminanced domain. De facto, this precludes their usage in several quality assessment scenarios such as standardization, real-time quality assessment, deep-learning etc. This altogether motivates the need for more efficient (yet effective) computational metrics that is not only high computational efficient but also is capable to predict color distortions. To achieve this deep-learning approaches will be used supported by user subjective study.

Candidates for the above posts should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Computer Engineering or Electronic or Electrical Engineering or any related field.
2. Excellent computer programming skills, C/C++, Python.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.
5. Previous experiences in research activities is a plus, i.e., publications, research proposal writing.
6. Previous experiences in the use of deep-learning libraries, i.e., Tensorflow, Keras, Pytorch and Caffe is a plus.

Responsible MRG:
The successful candidates will be assigned to RISE's MRG DeepCamera: The Next Generation of Image/Video Processing. The successful candidate will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Alessandro Artusi DeepCamera MRG Team Leader (with Prof Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Karol Myszkowski, Max Planck Institute
Placement at the external partner (30%): Max Planck Institute

For more information please contact:
Dr. Alessandro Artusi and Prof. Yiorgos Chrysanthou
Team Leader of MRG Deep Camera: The Next Generation of Image/Video Processing and MRG Real-time Populated Virtual Environment
email: artusialessandro4@gmail.com, y.chrysanthou@rise.org.cy

17.Application of Generative Adversarial Network

Short Description:
The topic is concerned with Application of Generative Adversarial Network, i.e., noise removal such as haze or rain drops or other type of noise. Image capturing is an important step in the imaging pipeline and play a remarkable role in providing an input image with an acceptable level of quality that will not compromise the performances of existing computer vision and image processing tasks, i.e., classification, object detection, details extraction etc.
However, the quality of the captured image is not only compromised by noise generated by the acquisition device sensor, but also by the environment where the image is taken. Here

the environmental conditions, such as fog, rain drops, haze, illuminations conditions etc. may reduce the quality of the acquired image, i.e., reducing the visibility of objects, details etc. and consequently drastically compromising the recognition capabilities of computer vision and image processing tasks. In this work the use of generative adversarial networks will be investigated to remove environmental noise from the acquired image/video. The work will first deal with images and then will be extended to work on video where temporal coherence between frames need to be taken into account.

Candidates for the above posts should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Computer Engineering or Electronic or Electrical Engineering or any related field.
2. Excellent computer programming skills, C/C++, Python.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.
5. Previous experiences in research activities is a plus, i.e., publications, research proposal writing.
6. Previous experiences in the use of deep-learning libraries, i.e., Tensorflow, Keras, Pytorch and Caffe is a plus.

Responsible MRG:
The successful candidates will be assigned to RISE's MRG DeepCamera: The Next Generation of Image/Video Processing. The successful candidate will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Alessandro Artusi DeepCamera MRG Team Leader (with Prof Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Mateu Sbert, University of Girona
Placement at the external partner (30%): University of Girona

For more information please contact:
Dr. Alessandro Artusi
Team Leader of MRG Deep Camera: The Next Generation of Image/Video Processing and MRG Real-time Populated Virtual Environment
email: artusialessandro4@gmail.com

18.Adversarial Imaging

Short Description:
Adversarial imaging is a term used to identify strategy to subtly modifying images to make image-based deep-learning system to fail (adversarial attack). This work would like to investigate several strategies that can be used to reproduce adversarial images. Furthermore, statistical analysis applied on these images, will be employed to understand how to extend existing image based deep-learning systems to be able to identify these adversarial attacks.

Candidates should possess:
1. Postgraduate Degree of Master's level from accredited Universities in Computer Science or Multimedia or Computer Engineering or Electronic or Electrical Engineering or any related field.
2. Excellent computer programming skills, C/C++, Python.
3. Ability to organize and carry out research work independently.
4. Very good knowledge of English language.
5. Previous experiences in research activities is a plus, i.e., publications, research proposal writing.
6. Previous experiences in the use of deep-learning libraries, i.e., Tensorflow, Keras, Pytorch and Caffe is a plus.

Responsible MRG:
The successful candidates will be assigned to RISE's MRG DeepCamera: The Next Generation of Image/Video Processing. The successful candidate will be registered at the University of Cyprus but will be based at RISE.

Supervisor from RISE: Dr. Alessandro Artusi DeepCamera MRG Team Leader (with Prof Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Sumanta Pattanaik, University of Central Florida
Placement at the external partner (30%): University of Central Florida

For more information please contact:
Dr. Alessandro Artusi
Team Leader of MRG Deep Camera: The Next Generation of Image/Video Processing and MRG Real-time Populated Virtual Environment
email: artusialessandro4@gmail.com

19. Artist friendly methods to populate virtual environments

Short Description:
In this work we aim to develop techniques to design, control and simulate multiple characters with different behaviours that can be applied to different environments for various application domains. Designers should have maximum levels of control of the generated simulation results with minimal user intervention. Characters should *exhibit* both high level behaviours such as reasoning and path planning and low-level ones such as navigation with collision avoidance and individual character animations. Additionally, animated characters can be of different types such as virtual humans, vehicles and animals. We aim to have easy and efficient multi-character design and control using notions known to animators from existing tools such as copy-pasting, painting with strokes, blending, etc. Since people are accustomed to using examples in order to describe desired requirements, we are interested in investigating novel methods that take as input exemplars of animated scenes (e.g., people behaving as one expects in a shopping street) and then given a new environment, output semantically correct behaviours for the animated characters.

Candidates for these posts should possess:

1. MSc Degree from accredited Universities in Computer Science or Computer Engineering or Multimedia (with emphasis on Computer Graphics, Visual Computing, Game studies, Human Computer Interaction and/or Machine Learning).
2. Excellent programming skills, preferably in Object Oriented Programming Languages (C++/C#/Java) and/or Python.
3. Demonstrated excellence in algorithms and data structures.
4. Experience with game engines such as Unity, Unreal and Godot.
5. Previous experience with Machine Learning and Deep Learning, especially in libraries such as Tensorflow, Keras, Torch, Caffe and scikit-learn will be considered an advantage.
6. Very good knowledge of the English language.
7. Ability to organize and carry out research work independently.
8. Previous experience in research activities such as publications, research proposal writing will be considered an advantage.

Responsible MRG
The successful candidate will be registered at the University of Cyprus and assigned and based at the "V-EUPNEA: Living, Breathing Virtual Worlds" MRG of RISE.

Supervisor from RISE: Dr. Panayiotis Charalambous, V-EUPNEA MRG Team Leader (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Collaborator: Prof. Marie-Paul Cani, Ecole Polytechnique, France and Dr. Julien Pettré, Research Scientist, INRIA Rennes, France
Placement at the external partner (30%): INRIA Rennes, France

For more information please contact:
Dr. Panayiotis Charalambous, Team Leader of the V-EUPNEA: Living, Breathing Virtual Worlds MRG. email: totis@cs.ucy.ac.cy

20.Textual authoring of animated scenes

Short Description:
As the main goal of this work, we are interested in being able to generate and control the outcome of animated scenes by using textual descriptions. This will provide new intuitive ways to author animations and/or tell stories especially for non-expert users. We get inspiration for this work from a) text based graphic adventure games of the late 80s/early 90s and b) recent work on Deep Learning to synthesize images using textual descriptions. We will investigate some aspects of the domain that include: a) the scale of character control (individual characters, small groups and/or large crowds), b) the appearance of characters (size, gender, race, shape, clothes, etc), c) character behaviours and

interactions, d) environment control (e.g., placement of buildings, roads, shops, characters, fauna, weather control, etc.) and e) camera control (looking through a character's eyes, panning, zooming, following a character or interaction, etc).

Candidates for these posts should possess:

1. MSc Degree from accredited Universities in Computer Science or Computer Engineering (with emphasis on Computer Graphics, Visual Computing, Game studies and/or Machine Learning).
2. Excellent programming skills, preferably in Object Oriented Programming Languages (C++/C#/Java) and/or Python.
3. Demonstrated excellence in algorithms and data structures.
4. Experience with game engines such as Unity, Unreal and Godot.
5. Previous experience with Machine Learning and Deep Learning, especially in libraries such as Tensorflow, Keras, Torch, Caffe and scikit-learn will be considered an advantage.
6. Very good knowledge of the English language.
7. Ability to organize and carry out research work independently.
8. Previous experience in research activities such as publications, research proposal writing will be considered an advantage.

Responsible MRG
The successful candidate will be registered at the University of Cyprus and assigned and based at the "V-EUPNEA: Living, Breathing Virtual Worlds" MRG of RISE.

Supervisor from RISE: Dr. Panayiotis Charalambous, V-EUPNEA MRG Team Leader (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Collaborator: Prof. Marie-Paul Cani, Ecole Polytechnique, France and Dr. Julien Pettré, Research Scientist, INRIA Rennes, France
Placement at the external partner (30%): INRIA Rennes, France

For more information please contact:
Dr. Panayiotis Charalambous, Team Leader of the V-EUPNEA: Living, Breathing Virtual Worlds MRG. email: totis@cs.ucy.ac.cy

21.Data-Driven Traffic Animation

Short Description:
Several techniques have been proposed to simulate traffic in urban environments. Many of these rely on simplified models that neglect important features of real-world situations. As part of our quest of improving realism in both simulation and visual fidelity of animated scenes, we will investigate ways to animate and/or simulated traffic using data from various

sources such as cameras and GPS data. These will include methods such as Deep Learning (GANs, RNNs), Reinforcement Learning and Texture Synthesis. These kinds of simulations can then be used to improve the quality of animations for various applications such as movies, games and training environments for autonomous driving.

Candidates for these posts should possess:

1. MSc Degree from accredited Universities in Computer Science or Computer Engineering (with emphasis on Computer Graphics, Visual Computing, Game studies and/or Machine Learning).
2. Excellent programming skills, preferably in Object Oriented Programming Languages (C++/C#/Java) and/or Python.
3. Demonstrated excellence in algorithms and data structures.
4. Experience with game engines such as Unity, Unreal and Godot.
5. Previous experience with Machine Learning and Deep Learning, especially in libraries such as Tensorflow, Keras, Torch, Caffe and scikit-learn will be considered an advantage.
6. Very good knowledge of the English language.
7. Ability to organize and carry out research work independently.
8. Previous experience in research activities such as publications, research proposal writing will be considered an advantage.

Responsible MRG
The successful candidate will be registered at the University of Cyprus and assigned and based at the “V-EUPNEA: Living, Breathing Virtual Worlds” MRG of RISE.

Supervisor from RISE: Dr. Panayiotis Charalambous, V-EUPNEA MRG Team Leader (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Collaborator: Prof. Marie-Paul Cani, Ecole Polytechnique, France and Dr. Julien Pettré, Research Scientist, INRIA Rennes, France
Placement at the external partner (30%): INRIA Rennes, France

For more information please contact:
Dr. Panayiotis Charalambous, Team Leader of the V-EUPNEA: Living, Breathing Virtual Worlds MRG. email: totis@cs.ucy.ac.cy

22.Real-time understanding of large outdoor environments

Short Description:
One of the main research challenges in the area of autonomous navigation (e.g. self-driving cars), is the real-time processing and understanding of 3D point clouds captured by LiDAR (Light Detection And Ranging) sensors in outdoor environments. As a consequence, many types of deep neural network architectures have been proposed for processing such data (e.g. PointNet++, PointCNN, FrustumNet etc.), which offer good accuracy on benchmarks

but rarely offer real-time performance. The goal of this project is to develop architectures for real-time understanding of raw 3D point clouds of outdoor scenes, building upon existing top-performing neural network architectures.. The project involves evaluating existing methods on real-world autonomous vehicle benchmarks e.g. KITTI, collecting synthetic or real data for challenging scenarios, and developing novel architectures for real-time outdoor scene understanding.

Candidates should possess:

1. Undergraduate (BSc) and postgraduate degree (MSc or MPhil) in a relevant field (e.g. Computer Science, Computer Engineering, Information Technology) from an accredited institution, preferably with emphasis on Computer Graphics / Computer Vision / Machine Learning.
2. Strong coding skills in Python, Matlab, C++, C (experience with CUDA is an advantage).
3. Confidence in mathematics (e.g. linear algebra, geometry processing, probabilistic methods).
4. Proven experience with ML/DL frameworks e.g. TensorFlow, PyTorch, Keras, FastAI.
5. Knowledge of Conda package and environment management system, Docker or Kubernetes will be considered as an advantage.
6. Self-motivation, ability to work independently, and excellent problem-solving skills.
7. Prior publications in the area (desirable but not essential).
8. Very strong written and oral English language communication skills.

Responsible MRG
The successful candidates will be registered at the University of Cyprus but will be assigned to the Visual Computing Group based at RISE.

Supervisor from RISE: Dr Melinos Averkiou, Group Leader of the Visual Computing Group (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Matthias Niessner, Technical University of Munich
Placement at the external partner (30%): Technical University of Munich

For more information please contact:
Dr Melinos Averkiou, Group Leader of the Visual Computing Group.
Email: melinos.averkiou@gmail.com

23.Urban Semantic Understanding

Short Description:
Semantic understanding of urban data (e.g. buildings, streets, neighborhoods) is critical for urban sensing as well as many commercial applications such as accurate antenna placement for cellular networks, flood planning, and architectural urban visualisations.

Without knowing the surface properties of urban models it is impossible to calculate, for example the thermal properties of buildings or to simulate window-visibility. In this project the goal is to utilize deep neural network architectures to fuse and understand noisy urban data from multiple sources. It will study the space of urban sensors, their competencies, errors, and failure cases, resulting in a robust framework for semantic urban reconstruction. Unlike many rigid urban modeling pipelines the desired outcome is a system that is entirely modular in its selection of sensors, allowing the addition, or removal, of data sources to suit the many different situations facing real-world urban planners. The successful candidate will design and train novel deep neural networks on novel synthetic datasets, to fuse disparate data sources and create a semantically labelled 3D model of urban scale.

Candidates should possess:

1. Undergraduate (BSc) and postgraduate degree (MSc or MPhil) in a relevant field (e.g. Computer Science, Computer Engineering, Information Technology) from an accredited institution, preferably with emphasis on Computer Graphics / Computer Vision / Machine Learning.
2. Strong coding skills in Python, Matlab, C++, C (experience with CUDA is an advantage).
3. Confidence in mathematics (e.g. linear algebra, geometry processing, probabilistic methods).
4. Proven experience with ML/DL frameworks e.g. TensorFlow, PyTorch, Keras, FastAI.
5. Knowledge of Conda package and environment management system, Docker or Kubernetes will be considered as an advantage.
6. Self-motivation, ability to work independently, and excellent problem solving skills.
7. Prior publications in the area (desirable but not essential).
8. Very strong written and oral English language communication skills.

Responsible MRG
The successful candidates will be registered at the University of Cyprus but will be assigned to the Visual Computing Group based at RISE.

Supervisor from RISE: Dr Melinos Averkiou, Group Leader of the Visual Computing Group (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Niloy Mitra, University College London & Dr Tom Kelly, University of Leeds
Placement at the external partner (30%): University College London & University of Leeds

For more information please contact:
Dr Melinos Averkiou, Group Leader of the Visual Computing Group.
Email: melinos.averkiou@gmail.com

24.Object and Scene Synthesis via deep neural networks

Short Description:
Synthesizing 3D objects and 3D scenes has received a great deal of attention in recent years due to its applications in simulation, AI, robotics and 3D modelling. Recent work has taken advantage of deep generative networks such as variational autoencoders (VAEs) and generative adversarial networks (GANs) which have found great success in generating 2D images or mapping input to output images (e.g. for altering image style). Extending these ideas to work on 3D data is far from trivial, with very recent efforts focused on GANs operating on volumetric representations or latent-GANs operating on point cloud latent spaces learned by autoencoders. This project proposes applying architectures such as latent-GANs to the problem of 3D object and scene synthesis, tackling challenges such as increasing the realism of the synthesized output as well as the scalability of the proposed methods.

Candidates should possess:

1. Undergraduate (BSc) and postgraduate degree (MSc or MPhil) in a relevant field (e.g. Computer Science, Computer Engineering, Information Technology) from an accredited institution, preferably with emphasis on Computer Graphics / Computer Vision / Machine Learning.
2. Strong coding skills in Python, Matlab, C++, C (experience with CUDA is an advantage).
3. Confidence in mathematics (e.g. linear algebra, geometry processing, probabilistic methods).
4. Proven experience with ML/DL frameworks e.g. TensorFlow, PyTorch, Keras, FastAI.
5. Knowledge of Conda package and environment management system, Docker or Kubernetes will be considered as an advantage.
6. Self-motivation, ability to work independently, and excellent problem solving skills.
7. Prior publications in the area (desirable but not essential).
8. Very strong written and oral English language communication skills.

Responsible MRG
The successful candidates will be registered at the University of Cyprus but will be assigned to the Visual Computing Group based at RISE.

Supervisor from RISE: Dr Melinos Averkiou, Group Leader of the Visual Computing Group (with Prof. Yiorgos Chrysanthou, University of Cyprus & RISE)
External Supervisor: Prof. Daniel Cohen-Or, Tel-Aviv University
Placement at the external partner (30%): Tel-Aviv University

For more information please contact:
Dr Melinos Averkiou, Group Leader of the Visual Computing Group.
Email: melinos.averkiou@gmail.com