



# *Program*

## 9<sup>th</sup> IFIP International Conference on Artificial Intelligence Applications and Innovations

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30 September – 2 October, 2013, Paphos, Cyprus



# **AIAI 2013**

**The 9<sup>th</sup> IFIP International Conference on  
Artificial Intelligence Applications and  
Innovations**

30 September – 2 October, 2013  
Azia Resort and Spa  
Paphos, Cyprus

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# Welcome to AIAI 2013

Welcome to the 9th IFIP International Conference on Artificial Intelligence Applications and Innovations (AIAI 2013), which is being held in Paphos, Cyprus, from September 30 to October 2, 2013. AIAI is the official conference of the IFIP Working Group 12.5 “Artificial Intelligence Applications” of the IFIP Technical Committee on Artificial Intelligence (TC12). IFIP was founded in 1960 under the auspices of UNESCO, following the first World Computer Congress, held in Paris the previous year. The first AIAI conference was held in Toulouse, France in 2004 and since then it has been held annually, offering scientists the chance to present different perspectives on how Artificial Intelligence (AI) may be applied and offer solutions to real-world problems.

The importance of Artificial Intelligence is underlined by the fact that it is nowadays being embraced by a vast majority of research fields across different disciplines, from Engineering Sciences to Economics and Medicine, as a means to tackle highly complicated and challenging computational as well as cognitive problems. Being one of the main streams of information processing, Artificial Intelligence may now offer solutions to such problems using advances and innovations from a wide range of sub-areas that induce thinking and reasoning in models and systems.

AIAI is a conference that grows in significance every year attracting researchers from different countries around the globe. It maintains high quality standards and welcomes research papers describing technical advances and engineering and industrial applications of Artificial Intelligence. AIAI is not confined to introducing how AI may be applied in real-world situations, but also includes innovative methods, techniques, tools and ideas of AI expressed at the algorithmic or systemic level.

In 2013 the AIAI conference is being organized and sponsored by IFIP, the Cyprus University of Technology and Frederick University, Cyprus. Additional sponsorship was also provided by Royal Holloway University of London, United Kingdom and by the Cyprus Tourism Organization. The conference is being held in the seaside city of Paphos, Cyprus, a city rich in history and culture.

A total of 70 papers have been accepted for presentation at the main event (26 papers) and the 8 workshops of the conference after being reviewed by at least two independent academic referees. The authors of these papers come from 24 different countries, namely: Belgium, Brazil, Canada, China, Cyprus, Egypt, France, Greece, Italy, Japan, Luxembourg, Morocco, Netherlands, Nigeria, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

In addition to the accepted papers, the technical program of the conference features a symposium titled “Measures of Complexity”, which is being organized to celebrate the 75th birthday of Professor Alexey Chervonenkis, one of the most important scholars in the field of pattern recognition and computational learning. The symposium includes talks by:

- Alexey Chervonenkis (Russian Academy of Sciences; Yandex, Russia; and Royal Holloway, University of London, United Kingdom)
- Vladimir Vapnik (NEC, USA and Royal Holloway, University of London, United Kingdom)
- Richard Dudley (MIT, USA)
- Bernhard Schölkopf (Max Planck Institute for Intelligent Systems, Germany)
- Leon Bottou (Microsoft Research, USA)
- Konstantin Vorontsov (Russian Academy of Sciences)
- Alex Gammerman (Royal Holloway, University of London, United Kingdom)
- Vladimir Vovk (Royal Holloway, University of London, United Kingdom)

Furthermore, a keynote lecture will be given by Tharam Dillon (La Trobe University, Australia) on “Trust, Reputation, and Risk in Cyber Physical Systems”.

A total of 8 workshops are included in the technical program of the conference, each related to a specific topic of interest within AI. These are:

- The 3rd Workshop on Artificial Intelligence Applications in Biomedicine (AIAB 2013) organized by Harris Papadopoulos (Frederick University, Cyprus), Efthymoulos Kyriacou (Frederick University, Cyprus), Ilias Maglogiannis (University of Piraeus, Greece) and George Anastassopoulos (Democritus University of Thrace, Greece).
- The 2nd Workshop on Conformal Prediction and its Applications (CoPA 2013) organized by Harris Papadopoulos (Frederick University, Cyprus), Alex Gammerman (Royal Holloway, University of London, United Kingdom) and Vladimir Vovk (Royal Holloway, University of London, United Kingdom).
- The 2nd Workshop on Intelligent Video-to-video Communications in Modern Smart Cities (IVC 2013) organized by Ioannis P. Chochliouros (Hellenic Telecommunications Organization – OTE, Greece), Latif Ladid (University of Luxemburg, Luxemburg), Vishanth Weerakkody (Brunel University, United Kingdom) and Ioannis M. Stephanakis (Hellenic Telecommunications Organization – OTE, Greece).
- The 2nd Workshop on Applying Computational Intelligence Techniques in Financial Time Series Forecasting and Trading (ACIFF 2013) organized by Spiridon D. Likothanassis (University of Patras, Greece), Efstratios F. Georgopoulos (Technological Educational Institute of Kalamata, Greece), Georgios Sermpinis (University of Glasgow, Scotland), Andreas S. Karathanasopoulos (London Metropolitan University, United Kingdom) and Konstantinos Theofilatos (University of Patras, Greece).
- The 1st Workshop on Fuzzy Cognitive Maps Theory and Applications (FCMTA 2013) organized by Elpiniki Papageorgiou (Technological Educational Institute of Lamia, Greece), Petros Groumpos (University of Patras, Greece), Nicos Mateou (Ministry of Defense, Cyprus) and Andreas S. Andreou (Cyprus University of Technology, Cyprus)

- The 1st Workshop on Learning strategies and data Processing in nonStationary environments (LEAPS 2013) organized by Giacomo Boracchi (Politecnico di Milano, Italy) and Manuel Roveri (Politecnico di Milano, Italy).
- The 1st Workshop on Computational Intelligence for Critical Infrastructure Systems (CICIS 2013) organized by Christos Panayiotou (KIOS/University of Cyprus, Cyprus), Antonis Hadjiantonis (KIOS/University of Cyprus, Cyprus), Demetrios Eliades (KIOS/University of Cyprus, Cyprus) and Andreas Constantinides (University of Cyprus and Frederick University, Cyprus).
- The 1st Workshop on Ethics and Philosophy in Artificial Intelligence (EPAI 2013) organized by Panayiotis Vlamos (Ionian University, Greece) and Athanasios Alexiou (Ionian University, Greece).

We would like to express our gratitude to everyone who has contributed to the success of the AIAI 2013 conference. In particular, we are grateful to Professors Alex Gammerman and Vladimir Vovk for the organization of the “Measures of Complexity” symposium. Special thanks to the symposium and keynote speakers for their inspiring talks. We would like to express our sincere gratitude to the organizers of the eight workshops for enriching this event with their interesting topics. We would also like to thank the members of the Organizing Committee for their great effort in the organization of the conference and the members of the Program Committee who did an excellent job in a timely manner during the review process. Special thanks are also due to Pantelis Yiasemis and Antonis Lambrou for helping us with the formatting of the final proceedings. We are grateful to the Cyprus University of Technology, Frederick University, Royal Holloway University of London (Computer Science Department) and the Cyprus Tourism Organization for their financial support. We also thank the conference secretariat, Tamasos Tours, for its important support in the organization of the conference. Finally, we would like to thank all authors for trusting our conference and contributing their work to it.

Harris Papadopoulos  
Andreas S. Andreou  
Lazaros Iliadis  
Ilias Maglogiannis





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## Organization

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Cyprus University of Technology, Cyprus  
Frederick University, Cyprus

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Vijay Rao  
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Kyriakos Sgarbas  
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Ioannis Stamelos  
Ioannis Stephanakis

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Zacharias Voulgaris  
Demosthenes Vouyioukas  
Vassilis Vassiliades  
Volodya Vovk  
Kostas Yialouris  
Peter Wt Yuen



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# **Measures of Complexity Symposium:**

In honour of the 75th birthday of Professor Alexey Chervonenkis

Wednesday, October 2<sup>nd</sup> 2013

## **A Brief Biography of Professor Alexey Chervonenkis**

Professor Alexey Chervonenkis has made a long and outstanding contribution to the area of pattern recognition and computational learning. His first book on Pattern Recognition was published in 1974 with Professor Vladimir Vapnik and he has become an established authority in the field. His most important contributions include: The derivation of the necessary and sufficient conditions for the uniform convergence of the frequency of an event to its probability over a class of events. A result that was later developed to the necessary and sufficient conditions for the uniform convergence of means to expectations. The introduction of a new characteristic of a class of sets, later called the VC-dimension. The development of a pattern recognition algorithm called “generalized portrait”, which was later further developed to the well-known Support Vector Machine. The development of principles and algorithms for choosing the optimal parameters depending on the available amount of empirical data and the complexity of the decision rule class for the problems of pattern recognition, ridge regression, kernel ridge regression and kriging. Some of these results served as the foundation for many machine learning algorithms.

Professor Chervonenkis obtained his Masters degree in Physics from the Moscow Physical and Technical Institute, Moscow, USSR in 1961 and his PhD in Physical and Mathematical Science from the Computer Centre of the Academy of Sciences of the USSR, Moscow, USSR in 1971. He is currently Head of the Applied Statistical Research Department at the Institute of Control Science, Russian Academy of Sciences. He is also Emeritus Professor at the Computer Learning Research Centre of Royal Holloway, University of London, United Kingdom where he has been working as a part-time professor since 2000. Additionally he is a part time Professor at the School of Data Analysis, Moscow, Russia since 2007 and a Scientific Consultant at Yandex, Russia since 2009. Between 1987 and 2005 he served as a Scientific Consultant at the Information Technologies in Geology and Mining (INTEGRA) company (Moscow, Russia). His research interests include the investigation of the properties of set classes and the application of machine learning algorithms to various problems. He has published three monographs and numerous manuscripts in journals and conferences.

## Invited Talks

### Professor Alexey Chervonenkis

Russian Academy of Sciences, Russia  
chervnks@ipu.ru

#### Title: Measures of Complexity

**Abstract.** Even long ago it was understood that the more is the complexity of a model, the larger should be the size of the learning set. It refers to the problem of function reconstruction based on empirical data, learning to pattern recognition or, in general, model construction using experimental measurements. Probably the first theoretical result here was Nikewest criterion (in Russia Kotelnikov theorem). It stated that, if one wants to reconstruct a continuous function on the basis of a set of measurements at discrete points, then the number of measurements should be proportional to the width of the function spectrum. It means that the spectrum width can serve as one of possible metrics of complexity.

In general, for the given amount of learning data one has to limit himself on a certain level of the model complexity depending on the data volume. But for practical implementation of this idea it is necessary to define general notion of complexity and the way to measure it numerically.

In my works with V. Vapnik we reduced the problem of a learning system ability to generalize data to the problem of the uniform convergence of frequencies to probabilities over a class of events (or means to expectations over a class of functions). If such convergence holds, then the system is able to be learned. But not on the contrary. It is possible that uniform convergence does not hold, but the system still has ability to learn.

Conditions of the uniform convergence are formulated in terms of index of evens class over a given sample, growth function and the so called VC-dimension or entropy. VC-dimension allows get estimates of uniform closeness of frequencies to probabilities, which does not depend on probability distribution over input space. Asymptotic entropy per symbol gives necessary and sufficient conditions of the uniform convergence, but they do depend on the probability distribution. In most important cases VC-dimension is equal or close to the number of unknown model parameters. Very important results in this field were gained by M.Talagan, Rademacher and others.

And still there are cases when a decision rule with large number of parameters is searched, but only a few number of examples is sufficient to find. Let us consider an example of two classes in  $n$ -dimensional Euclidean space. Each of the classes is formed by a ball having diameter  $D$ , and the distance between the centers of the balls is equal to  $R$ . If the ratio between the distance  $R$  and the diameter  $D$  is large enough then it is sufficient to show only two examples to reach 100% of correct answers. And it does not depend on the dimension of the space. A similar situation appears for recognition of two

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classes under supposition of feature independence (and some other conditions). Boosting algorithms construct very large formulas, and in spite of it they reach good results even for limited amount of learning data. All these facts force us to search new measures of complexity, which are not directly connected to the notion of uniform convergence. It seems that they should depend on the probability distribution. But that is the nature of things.

**Professor Richard M. Dudley**

MIT, USA  
rmd@math.mit.edu

**Title: From Classes of Sets to Classes of Functions**

**Abstract.** After some 19th century precursors, the 1968 announcement by A. Chervonenkis and V. N. Vapnik, on a kind of complexity of a class of sets, dramatically expanded the scope of laws of large numbers in probability theory. As they recognized, there were extensions to families of functions. It turned out to be possible to extend also the central limit theorem.

There have been numerous applications to statistics, not only to the original goal of learning theory. Some families of bounded rational functions of bounded degree can be used to give location vector and scatter matrices for observations from general distributions in Euclidean space which may not have finite means or variances.

**Professor Bernhard Schölkopf**

Max Planck Institute for Intelligent Systems, Germany  
bs@tuebingen.mpg.de

**Title: Causal Inference and Statistical Learning**

**Abstract.** Causal inference is an intriguing field examining causal structures by testing their statistical footprints. The talk introduces the main ideas of causal inference from the point of view of machine learning, and discusses implications of underlying causal structures for popular machine learning scenarios such as covariate shift and semi-supervised learning. It argues that causal knowledge may facilitate some approaches for a given problem, and rule out others.

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**Professor Leon Bottou**  
Microsoft, USA  
leon@bottou.org

**Title: About the Origins of the Vapnik Chervonenkis Lemma**

**Abstract.** Whereas the law of large numbers tells how to estimate the probability of a single event, the uniform law of large numbers explains how to simultaneously estimate the probabilities of an infinite family of events. The passage from the simple law to the uniform law relies on a remarkable combinatorial lemma that seems to have appeared quasi simultaneously in several countries. This short talk presents some material I have collected about the history of this earth shattering result.

**Professor Konstantin Vorontsov**  
Russian Academy of Sciences, Russia  
k.v.vorontsov@gmail.com

**Title: Combinatorial Theory of Overfitting**  
**How Connectivity and Splitting Reduces the Local Complexity**

**Abstract.** Overfitting is one of the most challenging problems in Statistical Learning Theory. Classical approaches recommend to restrict complexity of the search space of classifiers. Recent approaches benefit from more refined analysis of a localized part of the search space. Combinatorial theory of overfitting is a new developing approach that gives tight data dependent bounds on the probability of overfitting. It requires detailed representation of the search space in a form of a directed acyclic graph. The size of the graph is usually enormous, however the bound can be effectively estimated by walking through its small localized part that contains best classifiers. We use such estimate as a features selection criterion to learn base classifiers in simple voting ensemble. Unlike boosting, bagging, random forests etc. which learn big ensembles of weak classifiers we learn small ensembles of strong classifiers. Particularly we use two types of base classifiers: low dimensional linear classifiers and conjunction rules. Some experimental results on UCI data sets are also reported.



# Keynote Lecture

**Professor Tharam Dillon**

La Trobe University, Australia

## **Title: Trust, Reputation, and Risk in Cyber Physical Systems**

Monday, September 30<sup>th</sup>, 09:15-10:15

### **Brief Biography:**

Professor Tharam S. Dillon is internationally recognized for his research on Semantic Web, Web services, knowledge discovery, data mining, neural networks, intelligent systems, object-oriented systems, communications, fault tolerant systems, and distributed protocol engineering. He is Chair of the IFIP International Task Force WG2.12/124 on Semantic Web and Web Semantics, and the IEEE/IES Technical Committee on Industrial Informatics. He has published 12 books, 650 research papers as book chapters, in journals, and in international conferences. His research has received over 3000 citations with a Hurst index of 25 (source: Google Scholar).

Professor Dillon is an expert in Web Service Architecture, Semantic Grid, Ontologies, XML Modeling, Modeling the Reliability of Computer Systems, Object Component based Conceptual Modeling and Design, Knowledge Discovery and Trust in Service Oriented Environments as well as Validation of complex state based systems including protocols using high level Petri nets. He has also been active in the field of XML based systems for over the last 9 years. He has recently given keynote speeches at major IEEE and IFIP conferences on (1) Reference Architecture for Web Services, (2) Semantic Grid Services, (3) Biomedical Ontologies, (4) Ontologies for Software Engineering, and (5) Mining Substructures in Protein. Professor Dillon has a strong track record of working on ontologies and web semantics. His previous work in Software Engineering includes Object Oriented Conceptual Modelling, Modelling the Dynamics of Software using Coloured Petri nets, SE methodology for Developing Composite Web Services and SOA architectures. He has also developed important algorithms for data mining of complex structures including tree structured data and sequence data. He has also proposed the use of Web 2.0 and social networking in conjunction with ontologies, web services and agents.

Professor Dillon's research has made significant contributions to a number of application areas including bioinformatics, logistics, banking and finance, electrical power systems, telecommunication and management.

**Abstract.** Cyber Physical Systems (CPS) involve the connections of real world objects into networked information systems including the web. It utilises the framework and architecture for such CPS systems based on the Web of Things previously developed by the authors. This talk discusses the provision of Trust, Reputation and determination of Risk for such CPS systems.

## Workshops

### **3rd Workshop on Artificial Intelligence Applications in Biomedicine (AIAB 2013)**

Recent technological advances in computer science and biomedicine facilitated the development of complex biomedical systems including sophisticated medical imaging, signal processing systems and computer based decision support tools, assisting diagnosis for better delivery of health care services. Meanwhile, applications of Machine Learning, Neural Computing, Expert Systems, Fuzzy Logic and Evolutionary Computing in biomedicine are continuously emerging. Therefore AI tools and techniques are a vital part of modern computer based systems that handle medical data. The aim of this workshop is to serve as a forum for the presentation of new and ongoing work and the exchange of ideas between researchers interested in the application of AI in any aspect of biomedicine and electronic healthcare.

#### **Workshop Chairs:**

Harris Papadopoulos, Frederick University, Cyprus

Efthyvoulos Kyriacou, Frederick University, Cyprus

Ilias Maglogiannis, University of Central Greece, Greece

George Anastassopoulos, Democritus University of Thrace, Greece

### **2nd Workshop on Conformal Prediction and its Applications (CoPA 2013)**

Quantifying the uncertainty of the predictions produced by classification and regression techniques is an important problem in the field of Machine Learning. Conformal Prediction is a recently developed framework for complementing the predictions of Machine Learning algorithms with reliable measures of confidence. The methods developed based on this framework produce well-calibrated confidence measures for individual examples without assuming anything more than that the data are generated independently by the same probability distribution (i.i.d.).

Since its development the framework has been combined with many popular techniques, such as Support Vector Machines, k-Nearest Neighbours, Neural Networks, Ridge Regression etc., and has been successfully applied to many challenging real world problems, such as the early detection of ovarian cancer, the classification of leukaemia subtypes, the diagnosis of acute abdominal pain, the assessment of stroke risk, the recognition of hypoxia in electroencephalograms (EEGs), the prediction of plant promoters, the prediction of network traffic demand, the estimation of effort for software projects and the backcalculation of non-linear pavement layer moduli. The framework has also been extended to additional problem settings such as semi-supervised learning, anomaly detection, feature selection, outlier detection, change detection in streams and active learning.

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This workshop serves as a forum for the presentation of new and ongoing work and the exchange of ideas between researchers on any aspect of Conformal Prediction and its applications. The workshop welcomes submissions introducing further developments and extensions of the Conformal Prediction framework and describing its application to interesting problems of any field.

**Workshop Chairs:**

Harris Papadopoulos, Frederick University, Cyprus

Alexander Gammerman, Royal Holloway, University of London, United Kingdom

Vladimir Vovk, Royal Holloway, University of London, United Kingdom

**Honorary Chairs:**

Vladimir Vapnik, NEC, USA and Royal Holloway, University of London, United Kingdom

Alexei Chervonenkis, Russian Academy of Sciences, Russia and Royal Holloway, University of London, United Kingdom

**2nd Workshop on Intelligent Video-to-video Communications in  
Modern Smart Cities  
(IVC 2013)**

The Digital Agenda for Europe intends to sustain fast and ultrafast Internet access as well as the development and operation of several “open platforms” capable of providing new and innovative products and related services in the framework of Future Internet (FI). In the present context, both citizens and legal entities (organizations, enterprises-companies, (state) authorities, etc.) in urban environment are facing with a multiplicity of challenges that appropriate investments -or properly selective initiatives- in pioneering ICT-based solutions can help “to address and to promote innovative responses”, especially those based on user-driven initiatives. Of particular importance become various activities aiming to develop modern solutions or facilities/services of higher quality in communications that should make a beneficial and really effective use of the wider context of the Internet of the Future. Until today, user-driven open innovation methodologies have proven that they can drastically improve the efficiency of the innovation process by bridging between R&D and market entry supporting better and faster take-up of R&D results. In this scope, they are very rapidly becoming the new mainstream method of innovating. Living Labs are specific examples of such open innovation environments in real-life settings, in which user-driven innovation is fully integrated within the co-creation process of new services, products and societal infrastructures.

Cities (or urban areas) are continuously faced with major challenges that require investment in innovative solutions (particularly the ICT-based ones) to improve the quality and efficiency of their infrastructures and services offered. Some anticipate and

are “leaders” in adopting smarter development models and may perform a kind of pioneering role in engaging the user in the expected innovation process. Building upon existing user-driven innovation initiatives in Europe, the critical aim is to ensure a wider implementation of open platforms for the provision of Internet-enabled services in cities and thus to include an active involvement of citizens. These platforms should be able to develop “innovation ecosystems” accelerating the move towards “smart” cities” and providing a wide range of opportunities for new, higher quality, and sustainable services for citizens and businesses as well. In fact, this also delimits the essential framework that is actually taken into account the LiveCity PSP-ICT Project (GA No.297291) effort aiming, among other issues, to the development and the operation of suitable applied initiatives (through pilot actions) with the aim of accelerating the uptake of innovative Internet-based technologies and services in cities. These apply user-driven open innovation methodologies across networks of smart cities and may combine: (i) User-driven open innovation; (ii) Connected smart cities, and; (iii) Internet-based services.

The essential aim of the LiveCity Project effort is to empower the citizens of a city to interact with each other in a more productive, efficient and socially useful way, by using high quality video-to-video (v2v) over the Internet. LiveCity proposes v2v applications for a range of user communities in five European cities. The capabilities of modern wireline and 4G wireless networks like IMS (IP Multimedia Subsystem) and LTE networks, issues related to inelastic traffic forwarding, QoS mechanisms, intelligent agents and architectures for optimal service delivery are “key issues” to be investigated. The intended priority is to be given around structuring several essential well defined scenarios and/or use-cases, as below:

- City Emergency (hospital emergency, pilot activity using live high-quality video-to-video between ambulance and hospital and study of key performance indicators)
- City eHealth (patient monitoring and/or treatment for pre- and/or post-surgical control video-to-video between patients and medical centre(s), in order to remotely support the safe tele-monitoring activities.
- Municipal Services (video-to-video for public administration and public information services, carbon footprint).
- City Education (video-to-video networks between city schools in order to enhance education and to support real interactivity).
- City Experiences (tourism, cultural and city marketing information, usage of video-to-video between museums and/or involved cultural institutes).

#### **Workshop Chairs:**

Ioannis P. Chochliouros, Research Programs Section, Hellenic Telecommunications Organizations (OTE) S.A, Greece

Latif Ladid, President, IPv6 Forum & Senior Researcher, SnT, University of Luxemburg, Luxemburg

Vishanth Weerakkody, Brunel University, United Kingdom

Ioannis M. Stephanakis, Hellenic Telecommunications Organizations (OTE) S.A, Greece

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## **2nd Workshop on Applying Computational Intelligence Techniques in Financial Time Series Forecasting and Trading (ACIFF2013)**

Computational Intelligence – a sub-branch of Artificial Intelligence – studies are primarily inspired by the laws of nature and adaptive mechanisms in order to enable or facilitate intelligent behavior in changing complex environments. These mechanisms include these Artificial Intelligence paradigms that exhibit an ability to learn and adapt to new situations, to generalize, abstract and discover new knowledge. The following paradigms are commonly associated with Computational Intelligence: artificial neural networks, evolutionary computation, swarm intelligence, artificial immune systems, and fuzzy systems. Individual techniques from these Computational Intelligence paradigms, as well as combinations (hybrid methods) of these paradigms, have been applied successfully to solve a variety of real world problems. In particular, these techniques have been widely applied to time series prediction, financial forecasting and trading.

The aim of this workshop is to serve as an interdisciplinary forum for bringing together specialists from the scientific areas of Computer Engineering, Finance and Operational Research. The focus of this workshop is on current technological advances and challenges about the applications of computational intelligence techniques in financial time-series forecasting and trading.

Therefore, this workshop includes papers introducing and implementing Computational Intelligent techniques to address various modeling and predicting financial applications and provides a medium for the exchange of ideas between theoreticians and practitioners.

### **Workshop Chairs:**

Spiridon D. Likothanassis, University of Patras, Greece

Efstratios F. Georgopoulos, Technological Educational Institute of Kalamata, Greece

Georgios Sermpinis, University of Glasgow, Scotland

Andreas S. Karathanasopoulos, London Metropolitan University, United Kingdom

Konstantinos Theofilatos, University of Patras, Greece

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## **1st Workshop on Fuzzy Cognitive Maps Theory and Applications (FCMTA 2013)**

The FCMTA workshop focuses on theoretical and applied research related to Fuzzy Cognitive Maps. The aim of the workshop is to host research papers that present advances to the underlying theory of FCM and describe novel applications of FCM models that enable the analysis and modelling of different problems in a very broad range of fields, such as Engineering, Economics, Medicine, Manufacturing, Energy, Environment, Transportation, Agriculture, Sociology and Psychology.

Fuzzy Cognitive Maps may be considered nowadays as one of the most active fields in the area of Artificial and Computational Intelligence. On the one hand the comprehensible and relatively straightforward process for constructing a model based on FCM, and on the other their ability to embed knowledge of practically any form or from any source makes their utilisation very appealing, not only for studying a certain problem but also for estimating future outcomes and simulation analysis. Many of today's challenging problems can be analyzed and studied using Fuzzy Cognitive Maps.

### **Workshop Chairs:**

Elpiniki Papageorgiou, Technological Educational Institute of Lamia, Greece

Petros Groumpos, University of Patras, Greece

Nicos Mateou, Ministry of Defense, Cyprus

Andreas Andreou, Cyprus University of Technology, Cyprus

## **1st Workshop on Learning strategies and data Processing in nonStationary environments (LEAPS 2013)**

Most machine learning techniques assume, either explicitly or implicitly, that the data-generating process is stationary. This assumption guarantees that the model learnt during the initial training phase remains valid over time and that its performance is in line with our expectations. Unfortunately, this assumption does not truly hold in the real world representing, in many cases, a simplistic approximation of the reality.

Data from real-world scenarios are often affected by nonstationarities and, during operational life, their describing model (or distribution) diverges from the one that yielded the training set. Among the causes generating nonstationarity we mention natural (and unknown) evolutions of the data-generating process, faults/aging affecting sensing and processing devices and model bias introduced by a poor training set. Learning-based systems have to be up-to-date to be effective, thereby requiring adaptation mechanisms to deal with nonstationary environments.

In machine learning nonstationarity is referred to as concept drift and several techniques to detect and adapt to concept drift have been presented in different application domains e.g., fraud detection in electronic transactions, sensor networks, intelligent vehicles and recommender systems. Other relevant scenarios are classification systems designed to cope with concept drift, such as those addressing email/spam filtering, internet events log analysis, stock market forecasting, context-aware and ubiquitous computing.

The workshop focuses on intelligent solutions to analyze/process data acquired in nonstationary environments. Original contributions in the field of fault detection and diagnosis, as well as cognitive approaches for learning characteristics of the process to handle nonstationarity are particularly welcome.

**Workshop Chairs:**

Giacomo Boracchi, Politecnico di Milano, Italy

Manuel Roveri, Politecnico di Milano, Italy

**1st Workshop on Computational Intelligence for  
Critical Infrastructure Systems  
(CICIS 2013)**

According to the European Commission (2008/114/EC), Critical Infrastructures are those assets and systems in a country that are essential for certain vital societal functions, such as health, safety, security, economic or social well-being of the people, and the disruption or destruction of which could have significant impact on the country due to the failure to maintain those functions. In some cases, a disruption of some critical infrastructure could affect more than one country. In general, the following sectors are usually considered as part of the Critical Infrastructures: 1) energy and networks, 2) communications and information technology, 3) finance, 4) healthcare, 5) food, 6) water, 7) transport, 8) production, storage and transport of dangerous goods, 9) government.

The key challenges in Critical Infrastructures is a) the efficient operation, which relates to improving the system performance, and b) their security, which relates to monitoring the system for early event (or attack) detection and taking the appropriate actions to mitigate the issue. Critical Infrastructures are usually extremely complex large-scale systems with interoperabilities with other critical infrastructures, with large quantities of data for some states and no information for some other states. For both challenges, efficient operation and security, new technologies and algorithms need to be developed, for analyzing large quantities of data, which are available within the Critical Infrastructure, estimating what is not known, and make sense out of the uncertainties, noise and sensor faults.

In recent years, Computational and Artificial Intelligence tools are frequently used to address the most challenging problems in the Critical Infrastructure field, such as in forecasting, optimization, control, fault event diagnosis and accommodation. Various methodologies have been utilized for solving these problems, such as Neural Networks,

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Fuzzy Systems, Evolutionary Computation, Swarm Optimization, Expert Systems, Machine Learning, Data Mining, Semantics, and Artificial Immune Systems.

This workshop aims to provide a forum for researchers in Critical Infrastructures operation and security to review current trends and to discuss how Computational and Artificial Intelligence can be applied to solve the most challenging problems in the field.

**Workshop Chairs:**

Christos Panayiotou, KIOS/University of Cyprus, Cyprus

Antonis Hadjiantonis, KIOS/University of Cyprus, Cyprus

Demetrios Eliades, KIOS/University of Cyprus, Cyprus

Andreas Constantinides, University of Cyprus and Frederick University, Cyprus

### **1st Workshop on Ethics and Philosophy in Artificial Intelligence (EPAI 2013)**

The ethics of Artificial Intelligence is the part of the ethics of technology specific to robots and other artificially intelligent products like computer software or cultural creations. According to scientists, Artificial Intelligence applications can use and manipulate the scientific knowledge in a more efficient way but without philanthropic values and friendliness their impact is not efficient enough. Additionally, any ethical considerations of innovating technologies have to be philosophical discussed and explained to the social target groups.

While Super Intelligence should be comprehensible to the public, including activities that benefit society and environment, Artificial Intelligence applications should respect the right for access to information, having the best scientific standards and encouraging creativity, flexibility and innovation.

Obviously the upcoming digital era is mainly characterized from the potential possibility of machines and computers to become self-sufficient and able to make their own decisions. Therefore, even though this level of artificial autonomy is yet unlikely, scientists and philosophers are encouraged to study at early stage any social side effects of innovating Artificial Technologies.

**Workshop Chairs:**

Panayiotis Vlamos, Department of Informatics, Ionian University, Greece

Athanasios Alexiou, Department of Informatics, Ionian University, Greece



## Program at a glance

Monday 30 <sup>th</sup> September 2013	
8:00-9:00	<i>Registration</i>
9:00-9:15	<b>Welcome Address</b>
9:15-10:15	<b>Invited talk by Professor Tharam Dillon</b>
10:20-11:20	<b>Workshop: AIAB (Part 1)</b> <b>Workshop: CICIS</b>
11:20-11:50	<i>Coffee Break</i>
11:50-13:10	<b>Session 1: Data Mining</b> <b>Session 2: Robotics</b>
13:10-14:30	<i>Lunch</i>
14:30-15:50	<b>Session 3: Problem Solving, Planning and Scheduling</b> <b>Session 4: Medical Informatics and Biomedical Engineering</b>
15:55-16:55	<b>Session 5: Modeling and Decision Support Systems</b> <b>Workshop: EPAI</b>
16:55-17:30	<i>Coffee Break</i>
17:30-19:10	<b>Workshop: LEAPS</b> <b>Workshop: FCMTA (Part 1)</b>

Tuesday 1 <sup>st</sup> October 2013	
8:00-9:00	<i>Registration</i>
9:00-10:40	<b>Workshop: AIAB (Part 2)</b> <b>Workshop: FCMTA (Part 2)</b>
10:40-11:10	<i>Coffee Break</i>
11:10-12:30	<b>Workshop: CoPA (Part 1)</b> <b>Workshop: IVC</b>
12:30-13:50	<i>Lunch</i>
13:50-15:10	<b>Session 6: Intelligent Signal and Image Processing</b> <b>Session 7: Fuzzy Logic Techniques</b>

15:30-20:30	<b>Excursion to Kourion Archaeological Site</b>
20:30	<b>Conference Dinner</b>

<b>Wednesday 2<sup>nd</sup> October 2013</b>	
8:00-9:00	<i>Registration</i>
9:00-10:45	<b>Measures of Complexity Symposium: Session 1</b>
10:45-11:15	<i>Coffee Break</i>
11:15-13:20	<b>Measures of Complexity Symposium: Session 2</b>
13:20-14:30	<i>Lunch</i>
14:30-16:10	<b>Measures of Complexity Symposium: Session 3</b>
16:10-16:40	<i>Coffee Break</i>
16:40-18:40	<b>Workshop: CoPA (Part 2)</b> <b>Workshop: ACIFF</b>
18:40-19:00	<b>Closing Session</b>

# Detailed Program

**Monday 30<sup>th</sup> September 2013**

**8:00 – 9:00 Registration**

**9:00 – 9:15 Welcome Address**

**9:15 – 10:15 Invited Talk**

**Professor Tharam Dillon**

*Trust, Reputation, and Risk in Cyber Physical Systems*

Room: Akamas A

Chair: Ilias Maglogiannis

**10:20 – 11:20 AIAB (Part 1) and CICIS Workshops**

**AIAB Workshop (Part 1): Artificial Intelligence Applications in Biomedicine**

Room: Akamas A

Chair: Harris Papadopoulos

**Ultrasound Intima-Media Thickness and Diameter Measurements of the Common Carotid Artery in Patients with Renal Failure Disease**  
*Christos Loizou, Eleni Anastasiou, Takis Kasparis, Theodoros Lazarou, Marios Pantziaris and Constandinos Pattichis*

**On Centered and Compact Signal and Image Derivatives for Feature Extraction**

*Konstantinos Delibasis, Aristides Kechriniotis and Ilias Maglogiannis*

**Breast Cancer Detection in Mammogram Medical Images with Data Mining Techniques**

*Konstantinos Kontos and Manolis Maragoudakis*

**CICIS Workshop: Computational Intelligence for Critical Infrastructure Systems**

Room: Lara A/B

Chair: Demetrios Eliades

**Exploring Semantic Mediation Techniques in Feedback Control Architectures**  
*Georgios M. Milis, Christos G. Panayiotou and Marios M. Polycarpou*

**Systems Engineering for Assessment of Virtual Power System Implementations**  
*Slobodan Lukovic and Igor Kaitovic*

**Design of Attack-aware WDM Networks using a Meta-Heuristic Algorithm**  
*Konstantinos Manousakis and Georgios Ellinas*

**11:20 – 11:50 Coffee Break**

**11:50 – 13:10 Sessions 1 and 2**

**Session 1: Data Mining**

Room: Akamas A

Chair: Manolis Maragoudakis

**Designing a Support Tool for Creative Advertising by Mining Collaboratively Tagged Ad Video Content: The Architecture of PromONTotion**

*Katia Lida Kermanidis, Manolis Maragoudakis, Spyros Vosinakis and Nikos Exadaktylos*

**Voting Advice Applications: Missing Value Estimation using Matrix Factorization and Collaborative Filtering**

*Marilena Agathokleous and Nicolas Tsapatsoulis*

**A Personalized Location-aware Multi-Criteria Recommender System**

*Salvador Valencia and Herna Viktor*

**A Dynamic Web Recommender System Using Hard and Fuzzy K-Modes Clustering**

*Panayiotis Christodoulou, Marios Lestas and Andreas Andreou*

**Session 2: Robotics**

Room: Lara A/B

Chair: Efi Papatheocharous

**Robots that Stimulate Autonomy**

*Matthijs Pontier and Guy Widdershoven*

**Simulation of a Motivated Learning Agent**

*Janusz A. Starzyk, James Graham and Leszek Puzio*

**Autonomous Navigation Applying Dynamic-Fuzzy Cognitive Maps and Fuzzy Logic**

*Márcio Mendonça, Ivan Rossato Chrun, Lúcia Valéria Ramos De Arruda and Elpiniki Papageorgiou*

**13:10 – 14:30 Lunch**

**14:30 – 15:50 Sessions 3 and 4**

**Session 3: Problem Solving, Planning and Scheduling**

Room: Akamas A

Chair: Constantinos Stylianou

**Task Allocation Strategy Based on Variances in Bids  
for Large-Scale Multi-Agent Systems**

*Toshiharu Sugawara*

**Autonomic System Architecture: an Automated Planning Perspective**

*Falilat Jimoh, Lukas Chrpá and Mauro Vallati*

**MOEA/D for a Tri-Objective Vehicle Routing Problem**

*Andreas Konstantinidis, Savvas Pericleous and Christoforos Charalambous*

**Automatic Exercise Generation in Euclidean Geometry**

*Andreas Papasalouros*

**Session 4: Medical Informatics and Biomedical Engineering**

Room: Lara A/B

Chair: Aristotelis Chatziioannou

**Exploiting Machine Learning for Predicting Nodal Status  
in Prostate Cancer Patients**

*Mauro Vallati, Berardino De Bari, Roberto Gatta, Michela Buglione, Stefano Maria Magrini, Barbara Alicja Jereczek-Fossa and Filippo Bertoni*

**Autoregressive Model Order Estimation Criteria for  
Monitoring Awareness During Anaesthesia**

*Nicoletta Nicolaou and Julius Georgiou*

**A Machine-Learning Approach for the Prediction of Enzymatic Activity of  
Proteins in Metagenomic Samples**

*Theodoros Koutsandreas, Eleftherios Pilalis and Aristotelis Chatziioannou*

**Automated Scientific Assistant for Cancer and Chemoprevention**

*Antonis Kakas, Sotiris Lazarou, Christiana Neophytou and Andreas Constantinou*

**15:55 – 16:55 Session 5 and EPAI Workshop**

**Session 5: Modeling and Decision Support Systems**

Room: Akamas A  
Chair: Nikos Mateou

**A Cloud Adoption Decision Support Model Using Influence Diagrams**  
*Andreas Christoforou and Andreas Andreou*

**Human-Like Agents for a Smartphone First Person Shooter Game using  
Crowdsourced Data**

*Christoforos Kronis, Andreas Konstantinidis and Harris Papadopoulos*

**Developing an Electron Density Profiler over Europe based on  
Space Radio Occultation Measurements**

*Haris Haralambous and Harris Papadopoulos*

**EPAI Workshop: Ethics and Philosophy in Artificial Intelligence**

Room: Lara A/B  
Chair: Athanasios Alexiou

**Exploring Artificial Intelligence Utilizing BioArt**  
*Panagiota Simou, Konstantinos Tiligadis and Athanasios Alexiou*

**Can Machines Make Ethical Decisions?**  
*Iordanis Kavathatzopoulos and Ryoko Asai*

**Ethical Issues in Neuroinformatics**  
*Athanasios Alexiou, Georgia Theocharopoulou and Panayiotis Vlamos*

**16:55 – 17:30 Coffee Break**

**17:30 – 19:10 LEAPS and FCMTA (Part 1) Workshops**

**LEAPS Workshop: Learning Strategies and Data Processing in Nonstationary Environments**

Room: Akamas A

Chair: Giacomo Boracchi

**A Matlab-CONTAM Toolbox for Contaminant Event Monitoring in Intelligent Buildings**

*Michalis Michaelides, Demetrios Eliades, Marinos Christodoulou, Marios Kyriakou, Christos Panayiotou and Marios Polycarpou*

**A Hierarchy of Change-Point Methods for Estimating the Time Instant of Leakages in Water Distribution Networks**

*Giacomo Boracchi, Vicenc Puig and Manuel Roveri*

**EWMA based Two-Stage Dataset Shift-Detection in Non-Stationary Environments**

*Haider Raza, Girijesh Prasad and Yuhua Li*

**NEVE: A Neuro-Evolutionary Ensemble for Adaptive Learning**

*Tatiana Escovedo, Andre Cruz, Marley Vellasco and Adriano Soares Koshiyama*

**Investigation of Expert Addition Criteria for Dynamically Changing Online Ensemble Classifiers with Multiple Adaptive Mechanisms**

*Rashid Bakirov and Bogdan Gabrys*

**FCMTA Workshop (Part 1): Fuzzy Cognitive Maps Theory and Applications**

Room: Lara A/B

Chair: Elpiniki Papageorgiou

**Particle Swarm Optimization Approach for Fuzzy Cognitive Maps Applied to Autism Classification**

*Panagiotis Oikonomou and Elpiniki Papageorgiou*

**Fuzzy Cognitive Maps with Rough Concepts**

*Maikel León*

**Intelligent Systems Applied to the Control of an Industrial Mixer**

*Marcio Mendonça, Douglas Matsumoto, Lucia Valeria Ramos Arruda and Elpiniki Papageorgiou*

**Training Fuzzy Cognitive Maps using Gradient-based Supervised Learning**

*Michal Gregor and Peter Groumpos*

**Tuesday 1<sup>st</sup> October 2013**

**8:00 – 9:00 Registration**

**9:00 – 10:40 AIAB (Part 2) and FCMTA (Part 2) Workshops**

**AIAB Workshop (Part 2): Artificial Intelligence Applications in Biomedicine**

Room: Akamas A

Chair: Efthymou Kyriacou

**Texture Analysis in Ultrasound Images of Carotid Plaque Components of Asymptomatic and Symptomatic Subjects**

*Christos Loizou, Marios Pantzaris, Marilena Theofilou, Takis Kasparis and Efthymou Kyriacou*

**Gene Prioritization for Inference of Robust Composite Diagnostic Signatures in the Case of Melanoma**

*Ioannis Valavanis, Konstantinos Moutselos, Ilias Maglogiannis and Aristotelis Chatziioannou*

**Integrated System for the Complete Segmentation of the Common Carotid Artery Bifurcation in Ultrasound Images**

*Christos Loizou, Takis Kasparis, Christina Spyrou and Marios Pantzaris*

**Diagnostic Feature Extraction on Osteoporosis Clinical Data Using Genetic Algorithms**

*George Anastassopoulos, Adam Adamopoulos, Georgios Drosos, Konstantinos Kazakos and Harris Papadopoulos*

**FCMTA Workshop (Part 2): Fuzzy Cognitive Maps Theory and Applications**

Room: Lara A/B

Chair: Elpiniki Papageorgiou

**An Approach to Hotel Services Dynamic Pricing based on the Delphi Method and Fuzzy Cognitive Maps**

*Dimitris Kardaras, Xenia Mamakou, Bill Karakostas and George Gkourakouks*

**Self-Tuning PI Controllers via Fuzzy Cognitive Maps**

*Engin Yesil, M. Furkan Dodurka, Ahmet Sakalli, Cihan Ozturk and Cagri Guzay*

**The Relevance of Fuzzy Cognitive Mapping Approaches for Assessing Adaptive Capacity and Resilience in Social-Ecological Systems**

*Frédéric M. Vanwindekens, Didier Stilmant and Philippe V. Baret*

**Concept by Concept Learning of Fuzzy Cognitive Maps**

*M. Furkan Dodurka, Engin Yesil, Cihan Ozturk, Ahmet Sakalli and Cagri Guzay*



**A Fuzzy Cognitive Map Model for Estimating the Repercussions of Greek PSI on Cypriot Bank Branches in Greece**

*Maria Papaioannou, Christos Schizas and Costas Neocleous*

**10:40 – 11:10 Coffee Break**

**11:10 – 12:30 CoPA (Part 1) and IVC Workshops**

**CoPA Workshop (Part 1): Conformal Prediction and its Applications**

Room: Akamas A

Chair: Harris Papadopoulos

**PyCP: An Open-Source Conformal Predictions Toolkit**

*Vineeth Balasubramanian, Aaron Baker, Matthew Yanez, Shayok Chakraborty and Panchanathan Sethuraman*

**Enhanced Conformal Predictors for Indoor Localisation Based on Fingerprinting Method**

*Khuong An Nguyen and Zhiyuan Luo*

**Defensive Forecasting for Conformal Bounded Regression**

*Iliia Nouretdinov and Alexander Lebedev*

**Osteoporosis Risk Assessment with Well-calibrated Probabilistic Outputs**

*Antonis Lambrou, Harris Papadopoulos and Alexander Gammerman*

**IVC Workshop: Intelligent Video-to-video Communications in Modern Smart Cities**

Room: Lara A/B

Chairs: Vishanth Weerakkody and Ioannis M. Stephanakis

**Tutamen: An Integrated Personal Mobile and Adaptable Video Platform for Health and Protection**

*Joao Goncalves, David Palma, Lu\is Cordeiro, Paulo Simoes, Edmundo Monteiro, Panagis Magdalinos and Ioannis Chochliouros*

**Defining Key Performance Indicators for Evaluating the Use of High Definition Video-to-Video Services in eHealth**

*Andreea Molnar and Vishanth Weerakkody*

**A Novel Rate-Distortion Method In 3D Video Capturing In The Context of High Efficiency Video Coding (HEVC) In Intelligent Communications**

*Ioannis M. Stephanakis, Ioannis Chochliouros, Anastasios Dagiuklas and George C. Anastassopoulos*

**(Semi-) Pervasive Gaming Educational and Entertainment Facilities via Interactive Video-to-Video Communication over the Internet, for Museum Exhibits**  
*Ioannis Chochliouros, Anastasia Spiliopoulou, Kelly Georgiadou, Evangelos Sfakianakis, Rod McCall, Andrei Popleteev, Tigran Avanesov, Ioannis Stephanakis and Tomas Kamarauskas*

**12:30 – 13:50 Lunch**

**13:50 – 15:10 Sessions 6 and 7**

**Session 6: Intelligent Signal and Image Processing**

Room: Akamas A

Chair: Ilias Maglogiannis

**A Long-range Self-similarity Approach to Segmenting DJ Mixed Music Streams**  
*Tim Scarfe, Wouter Koolen and Yuri Kalnishkan*

**Real Time Indoor Robot Localization using RGB Video from a Stationary Fisheye Camera**  
*Konstantinos Delibasis, Vasilios Plagianakos and Ilias Maglogiannis*

**Artificial Neural Networks Approach for Classification of Hyperspectral and Lidar Data**  
*Paris Giampouras, Eleni Charou and Anastasios Kesidis*

**A linear Multi-Layer Perceptron for Identifying Harmonic Contents of Biomedical Signals**  
*Thien Minh Nguyen and Patrice Wira*

**Session 7: Fuzzy Logic Techniques**

Room: Lara A/B

Chair: Lazaros Iliadis

**Fuzzy Equivalence Relation based Clustering and its use to Restructuring Websites' Hyperlinks and Web Pages**  
*Dimitris Kardaras, Xenia Mamakou and Bill Karakostas*

**Fuzzy Classification of Cyprus Urban Centers based on Particulate Matter Concentrations**  
*Nicky Gkaretsa, Lazaros Iliadis, Stephanos Spartalis and Antonios Kalampakas*

**Modeling Health Diseases using Competitive Fuzzy Cognitive Maps**  
*Antigoni Anninou, Peter Groumpos and Panagiotis Polychronopoulos*

**15:30 – 20:30 Excursion to Kourion Archaeological Site**

**20:30 Conference Dinner**

**Wednesday 2<sup>nd</sup> October 2013**

**8:00 – 9:00 Registration**

**9:00 – 16:10 Measures of Complexity Symposium**

**9:00 – 10:45 Session 1**

Room: Akamas A

Chair: Alexander Gammerman

**9:00 – 9:20 Symposium Opening**

*Alexander Gammerman*

**9:20 – 9:55 A sketched history of Vapnik–Chervonenkis combinatorics, 1826–1974**

*Richard Dudley*

**9:55 – 10:45 Causal Inference and Statistical Learning**

*Bernhard Schölkopf*

**10:45 – 11:15 Coffee Break**

**11:15 – 13:20 Session 2**

Room: Akamas A

Chair: Vladimir Vovk

**11:15 – 11:50 From Classes of Sets to Classes of Functions**

*Richard Dudley*

**11:50 – 12:30 About the Origins of the Vapnik Chervonenkis Lemma**

*Leon Bottou*

**12:30 – 13:20 Combinatorial Theory of Overfitting:  
How Connectivity and Splitting Reduces the Local Complexity**

*Konstantin Vorontsov*

**13:20 – 14:30 Lunch**

**14:30 – 16:10 Session 3**

Room: Akamas A

Chair: Richard Dudley

**14:30 – 15:20 Measures of Complexity**

*Alexey Chervonenkis*

**15:20 – 15:50 Title TBA**

*Vladimir Vapnik*

**15:50 – 16:10 Symposium Closing**

*Vladimir Vovk*

**16:10 – 16:40 Coffee Break**

**16:40 – 18:40 CoPA (Part 2) and ACIFF Workshops**

**CoPA Workshop (Part 2): Conformal Prediction and its Applications**

Room: Akamas A

Chair: Harris Papadopoulos

**Transductive Conformal Predictors**

*Vladimir Vovk*

**Conformal Prediction under Hypergraphical Models**

*Valentina Fedorova, Alex Gammerman, Ilia Nouretdinov and Vladimir Vovk*

**Learning by Conformal Predictors with Additional Information**

*Meng Yang, Ilia Nouretdinov and Zhiyuan Luo*

**Conformity-based Transfer AdaBoost Algorithm**

*Shuang Zhou, Evgueni Smirnov, Haitham Bou Ammar and Ralf Peeters*

**Local Clustering Conformal Predictor for Imbalanced Data Classification**

*Huazhen Wang, Yewang Chen, Zhigang Chen and Fan Yang*

**High Learning Rate Venn Machines from Scratch for the Prediction  
of Disruptions in Nuclear Fusion Experiments**

*Jesús Vega*

**ACIFF Workshop: Applying Computational Intelligence Techniques in Financial  
Time Series Forecasting and Trading**

Room: Lara A/B

Chair: Spiridon Likothanassis

**Modeling and Trading FTSE100 Index Using a Novel Sliding Window Approach  
Which Combines Adaptive Differential Evolution and Support Vector Regression**

*Konstantinos Theofilatos, Andreas Karathanasopoulos, Peter Middleton, Efstratios  
Georgopoulos and Spiros Likothanassis*

**Gene Expression Programming and Trading Strategies**

*Georgios Sermpinis, Anastasia Fountouli, Andreas Karathanasopoulos and  
Konstantinos Theofilatos*

**Kalman Filter and SVR Combinations in Forecasting US Unemployment**

*Georgios Sermpinis, Charalampos Stasinakis and Andreas Karathanasopoulos*

**18:40 – 19:00 Closing Session**

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## Social Event

### Excursion to Kourion Theatre & Conference Dinner

We leave the hotel and drive to the ancient city of Kourion **and** the magnificent and imposing Greco-Roman Amphitheatre and the Baths and the Complex of Eustolios.

The Theatre, which can seat around 3500 people and offers impressive view to the sea, was originally built in the 2nd century B.C. but what is preserved today dates to the Roman period with 2nd and 3rd century A.D. additions and restorations.

The complex of Eustolios is situated next to the theatre. The building, which is not preserved today, was the residence of a rich inhabitant of the town and dates to the end of the 4th century-early 5th century A.D. It consisted of many rooms surrounding two courtyards and a bath establishment, while the group of mosaic pavements, which cover the majority of the building, are of particular interest.

Our next stop is Aphrodite's Rock, the birthplace of Aphrodite. According to mythology Aphrodite, the goddess of love and beauty, rose from the waves in this beautiful spot.

We continue our excursion to Kato Pafos where some free time will be given at the picturesque Harbour by the Pafos Castle before we go to a local Tavern for the Conference Dinner.

*Departure from Hotel: **October 1st, 15:15***

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## **General Information**

### **Registration**

Registration takes place every day of the conference (30<sup>th</sup> September - 2<sup>nd</sup> October) 8:00am - 9:00am.

### **Phone country code**

For Cyprus it is +357.

### **Getting around**

Public transportation includes buses. There are no railways in Cyprus. Car hire is the easiest (but the most expensive) way to get around the island. Cypriots drive on the left side of the road. Shared taxi services run every half-hour or so from 06:00 or 07:00 in the morning, but terminate at 17:00 or 18:00 on the dot. You can book a taxi to pick you up from anywhere and ask to be dropped off anywhere within city limits. Intercity buses ("green buses") are reliable, comfortable and comparatively cheap, but they do not run very frequently, so plan ahead.

### **Electricity**

The Cyprus operates on a 230 V/50 Hz electrical system using the BS-1363 3-pin British plugs. Europlug adapters are widely available in local stores.

### **Currency**

Cyprus has the euro (EUR, €) as its sole currency.

### **Time**

Cyprus is located in the Eastern European Time (EST). During the conference the summer Daylight Saving Time is in effect: UTC +3 hours or GMT +2 hours.

### **Information for Presenters**

The allocated presentation time (including time for questions) is 15-20 minutes. Presenters need to be considerate to other speakers and keep to the allowed time.

Presenters can use laptops placed in each presentation room. It is kindly requested that during the conference, and at any time convenient but before their presentation, they go to the room in which they will be presenting and place their presentation files onto the conference laptop computer. If any help is needed please ask for it from the technical staff in each room. Presenters are asked also to test their files to make sure they run as expected.



