FREDERICK UNIVERSITY CYPRUS

The **Computer Science and Engineering Department** of Frederick University, within the framework of the project "Development of New Conformal Prediction Methods with Applications in Medical Diagnosis" (**ASPIDA**) funded by RPF, invites you to the talk:

Conformal Predictors and their Applications in Medicine

By
Professor Alexander Gammerman
Computer Learning Research Centre
Royal Holloway, University of London

Frederick University (Nicosia Campus)
Seminar Room 2, 1st Floor, New Wing
Friday, June 20th, 4:00 pm

Abstract

Modern computer-aided diagnostic and treatment systems are required to process the huge amount of data available in many medical fields like microarrays, proteomics, and personalised medicine. These systems are not just medical catalogues, but decision-support, **decision-making systems**. Their aim is to develop logical and statistical engines to make diagnoses and find optimal treatments for individual patients. These systems should also be able to learn: they have to adjust their decision-making with clinical experience and use their own process to improve the diagnostics and treatment.

This talk describes a new set of machine learning algorithms called Conformal Predictors (CP) that could play major role as the engines for decision-making medical systems. We introduce the main ideas behind CPs and present two applications. The first one is an application to **abdominal pain** data with a large set of clinical symptoms. The other is an application of conformal predictors to **breast cancer diagnostics** using a modern proteomics mass spectrometry technique.

Unlike many conventional learning systems, our approach allows us not just to make diagnoses, but add valid measures of confidence in our predictions for individual patients.

We will also describe our current work on the application of this approach to the diagnosis of acute abdominal pain in childhood, in the project "Development of New Conformal Prediction Methods with Applications in Medical Diagnosis".

Short Biography

Professor Gammerman studied in Leningrad (now St Petersburg), was awarded his PhD in 1974, and then worked in several Research Institutes of the Academy of Science of the USSR. In 1983 he moved to Great Britain and worked first as a Lecturer and then as a Reader at Heriot-Watt University, Edinburgh. He was appointed to the established Chair in Computer Science at University of London (Royal Holloway and Bedford New College) in 1993 and served as Head of the Computer Science Department from 1995 until 2005. He is also the Director of the Computer Learning Research Centre at Royal Holloway, University of London.

Professor Gammerman is a Fellow of the Royal Statistical Society, Fellow of the Royal Society of Arts and Member of the British Computer Society. He chaired and participated in organising committees of many international conferences and workshops on Machine Learning and Bayesian methods in Europe, Russia and in the United States. He is also a member of the editorial board of the Law, Probability and Risk journal.

Professor Gammerman's current research interest lies in field of Algorithmic Randomness Theory and its applications to machine learning, the development of inductive/transductive confidence machines and intelligent data analysis. Areas in which these techniques have been applied include medical diagnosis, forensic science, genomics, environment and finance. Professor Gammerman has published over a hundred research papers and several books on computational learning and probabilistic reasoning.