



## Distinguished Lecture Series

# Detection Theory and Industrial Applications



12 May 2021 (Wednesday)  
4:00-5:00 p.m. GMT+8 (Hong Kong Time)



Online via Zoom  
(Meeting ID: 917 0834 7149)



## ABSTRACT

"Detection" is the most frequent request made by researchers, industrials, police, press, defense agencies, for exploiting images, images series, video, among other data. "Detection" means that an automatic decision must be made. A wrong decision may entail costs and false alerts if it is falsely positive, and worse costs, accidents and disasters if it is falsely negative. Therefore, "detection" requests a general mathematical theory to control the "number of false alarms" and give tight detection thresholds. This theory exists, it uses simple (but sometimes subtle) probability arguments, mixed with a fine control of image and video features. In this talk, I will describe the theory. I will illustrate it with a reinterpretation of classic examples, like roulette and birthdays in a class, then pass to a quick survey of real applications: detection of alignments, histogram modes, anomalies, image forgeries, clouds in satellite images, etc. Joint work with Rafael Grompone von Gioi.

Sponsored by:



Centre for Mathematical Imaging  
and Vision



Joint Research Institute for  
Applied Mathematics

## Professor Jean-Michel Morel

Centre Borelli, Ecole Normale Supérieure Paris-Saclay,  
Université Paris-Saclay

Jean-Michel Morel received the PhD degree in applied mathematics from University Pierre et Marie Curie, Paris, France in 1980. He has been Professor of Mathematics at the Ecole Normale Supérieure Paris-Saclay since 1997. His research is focused on the mathematical analysis of image processing and on detection theory in image series. He is a co-founder in 2011 of Image Processing on Line ([www.ipol.im](http://www.ipol.im)), the first journal publishing reproducible algorithms, software and online executable articles. He is a laureate of the 2013 Grand Prix INRIA – Académie des Sciences, 2015 CNRS innovation medal, 2015 IEEE Longuet-Higgins prize and is 2017 Doctor honoris causa of Universidad de la Republica, Montevideo.