



# The Chinese University of Hong Kong Shun Hing Institute of Advanced Engineering



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IEEE Signal Processing Society Hong Kong Chapter



## Distinguished Lecture Series 2011

### Robust Statistics for Signal Processing

by

## Professor Abdelhak Zoubir

Professor of Signal Processing and  
Head of Signal Processing Group

Technische Universität Darmstadt, Germany



**Date:** 21 September 2011, Wednesday

**Time:** 2:30 p.m. – 4:00 p.m.

**Venue:** Lecture Theatre, 9/F, William M.W. Mong Engineering Bldg, CUHK

#### Abstract

Robust statistics continue to gain importance due to an increase of impulsive measurement environments and outliers in practical engineering systems. Classical estimation or detection theory does not apply in such situations and robust statistical methods are sought for. The seminar aims at discussing the most fundamental concepts of robust statistics and at showing their power to solving signal processing problems. First, we highlight the motivation for using robust statistics in real-life situations and how robust statistics can be expected to remedy problems in such practical systems. We then introduce the qualitative and the quantitative definitions of robustness and treat Huber's robust M-estimator (ML-type estimator). We show how robust M-estimators for location and scale are constructed. We then discuss semi-parametric adaptive estimation and give examples of its use. The theoretical treatment is followed by an application of geolocation in Non-Line-of-Sight.

#### Biography of the Speaker

**Abdelhak M Zoubir** is a Fellow of the IEEE and IEEE Distinguished Lecturer (2010-2011). He received his Dr.-Ing. from Ruhr-Universität Bochum, Germany in 1992. He was with Queensland University of Technology, Australia from 1992-1998 where he was Associate Professor. In 1999, he joined Curtin University of Technology, Australia as a Professor of Telecommunications and was Interim Head of the School of Electrical & Computer Engineering from 2001 until 2003. In 2003, he moved to Technische Universität Darmstadt, Germany as Professor of Signal Processing and Head of the Signal Processing Group. His research interest lies in statistical methods for signal processing with emphasis on bootstrap techniques, robust detection and estimation and array processing applied to telecommunications, radar, sonar, car engine monitoring and biomedicine. He published over 300 journal and conference papers on these areas. Professor Zoubir was Technical Chair of the 11th IEEE Workshop on Statistical Signal Processing (SSP 2001), and General Co-Chair of the 3rd IEEE International Symposium on Signal Processing & Information Technology (ISSPIT 2003) and of the 5th IEEE Workshop on Sensor Array and Multi-channel Signal Processing (SAM 2008). Dr Zoubir was an Associate Editor of the IEEE Transactions on Signal Processing from 1999-2005 and he currently serves on the Editorial Boards of the EURASIP journals Signal Processing and the Journal on Advances in Signal Processing (JASP). Since 2009 he has been a Member of the Senior Editorial Board of the IEEE Journal on Selected Topics in Signal Processing. He is the Chair (2010-2011) of the IEEE SPS Signal Processing Theory and Methods and a Member of the IEEE SPS Technical Committee Sensor Array and Multi-channel Signal Processing (SAM) (since 2007). He was the Guest Co-Editor of 3 special issues in leading journals, one of which is on the bootstrap, published in the IEEE Signal Processing Magazine SI 24(4) in 2007. Recently, Dr Zoubir has been appointed Editor-in-Chief of the IEEE Signal Processing Magazine for 2012-2015.

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**ALL ARE WELCOME**

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*In case of questions, please contact Prof. Ken Ma at Tel: 3943 4350, E-mail: wkma@ee.edu.hk, or Ms Natalie Tsang at Tel: 3943 4351, E-mail: ltsang@shiae.cuhk.edu.hk*

*\* Light refreshment will be served at 2:15 p.m. before the lecture \**