ICTS Special Colloquium

Title : Averaging positive definite matrices

Speaker : Rajendra Bhatia, Indian Statistical Institute, Delhi

Date : Thursday, June 29, 2017

Time : 3:00 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bangalore

Abstract : Positive definite matrices are important in several areas. Density matrices in quantum theory, covariance matrices in statistics, diffusivity matrices in fluid flow, stiffness matrices in mechanics, kernels in machine learning are all positive definite matrices. In many problems a good notion of a mean of such matrices is needed. A "geometric" mean of two positive definite matrices was defined in the 1970's and much used in physics, electrical engineering and operator theory. The problem of developing a suitable theory for several matrices remained open for long. A satisfactory theory, linking the problem to Riemannian geometry, has been developed in the last few years. On the one hand elegant mathematical theorems have been established bringing together ideas from matrix analysis, Riemannian geometry and probability. On the other hand striking applications have been made in areas like image processing, radar data, MRI, brain-computer interface and machine learning. The talk will describe some of the main ideas.