Indo-French Seminar
Matrix Information Geometries

Thales Research & Technology and Ecole Polytechnique
PALAISEAU, FRANCE
23rd-25th February 2011
website : http://www.informationgeometry.org/MIG/

IFCPAR, Indo-French Centre for the Promotion of Advanced Research, (http://www.cefipra.org/home.htm) is a bilateral program of scientific cooperation between India and France under the Indian Department of Science and Technology and the French Ministry of Foreign Affairs.

This IFCPAR Seminar MIG "*Matrix Information Geometries*" is organized at Thales Research & Technology and at Ecole Polytechnique, from 23rd to 25th of February 2011, to promote collaborative research between scientists of the two countries in advanced areas of science & technology on :

- **Information Geometry**
- **Structured Matrix Geometry**

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The Centre IFCPAR organises this Indo-French seminar with the dual objective of sharing the state-of-the-art in the topic of *Information and Matrix Geometries* and to provide a forum for close interaction of the scientists of the two countries which could eventually lead to more long term collaborations, particularly, through collaborative research projects.

On the French side, this seminar is organized by members of Inter-disciplinary Leon Brillouin Seminar on "*Geometric Sciences of Information*" hosted by IRCAM (Prof. Arshia Cont) : http://www.informationgeometry.org/Seminar/seminarBrillouin.html

Indo-French Seminar MIG Steering Committee :

- F. BARBARESCO (THALES)
- F. NIELSEN (Ecole Polytechnique)
- R. BHATIA (Indian Statistical Institute, New Delhi)
- A. K. MISHRA (Indian Institute of Technology Guwahati)
- A. AMUDESWARI (Indo-French Centre for the Promotion of Advanced Research)

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MATRIX INFORMATION GEOMETRIES
Seminar Program

23rd of February at Thales Research & Technology Auditorium (Route Départementale 128, 91767 Palaiseau, 91.06 Bus from Massy-Palaiseau RER station) :

	Morning Opening Session :
Opening session with external attendees	▪ **09.00-09.15 Welcome Coffee** ▪ **09.15-09.35** Welcome by *François Le Chevalier* (VP, Scientific Director, Thales Air Operations), "Cooperation for better Innovation" ▪ **09.35-09.45** Opening by *Frédéric Barbaresco* (Thales Air Systems), "MIG Seminar Program presentation" ▪ **09.45-10.30** *Frank Nielsen* (Ecole Polytechnique & Sony CSL), " Computational Information Geometry on Matrix Manifolds" ▪ **10.30-11.00 Coffee Break** ▪ **11.00-11.45** *Rajendra Bhatia* (Indian Statistical Institute, New Delhi), "Matrix Inequalities" ▪ **11.45-12.30** *Pennec Xavier* (INRIA Sophia), "Geometry and Statistics for Computational Anatomy" ▪ **12.30-13.00 Scientific Debate** ▪ **13.00-14.00 Lunch Break**
	Afternoon session :
Opening session with external attendees	▪ **14.00-14.45** *Frédéric Barbaresco* (Thales Air Systems), "Fréchet Metric Space, Homogeneous Siegel Domains & Radar Matrix Signal Processing" ▪ **14.45-15.30** *Rajendra Bhatia* (Indian Statistical Institute, New Delhi), "Matrix Means" ▪ **15.30-16.00 Coffee Break** ▪ **16.00-16.15 Group Picture** ▪ **16.15-17.00** *Marc Arnaudon* & *Le Yang* (Poitiers university) "Stochastic Algorithms for Computing p-Means of Probability Measures" ▪ **17.00-17.30** *Zhongxun Liu & Frédéric Barbaresco* (Thales Air Systems), "Doppler Information Geometry for Wake Turbulence Monitoring" ▪ **17.30-18.00 Scientific Debate**

20.30 - Social Event : Diner in Paris Restaurant

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24th of February at Ecole Polytechnique, Amphi Becquerel (Route de Saclay, 91128 Palaiseau, 91.06 Bus from Massy-Palaiseau RER station) :

Morning Opening Session

- **09.00-09.30 Welcome Coffee**
- **09.30-10.15** *Olivier Schwander* (Ecole Polytechnique), "Exponential families and simplification of mixture models"
- **10.15-10.45 Coffee Break**
- **10.45-11.30** *Pierre Formont* (SUPELEC), *Ovarlez Jean-Philippe* (ONERA), *Pascal Frederic* (SUPELEC), *Gabriel Vasile* (GIPSA Lab) & *Laurent Ferro-Famil* (Rennes 1 University)," H/α Unsupervised Classication for Highly Textured Polinsar Images Using Information Geometry of Covariance Matrices"
- **11.30-12.15** *Trinath Kar* (The BuG Design), "On the computational Instability of the Matrizant analysis of the coupled waveguides and a solution to overcome"
- **12.15-12.45 Scientific Debate**
- **12.45-14.00 Lunch Break**

Afternoon Session

- **14.00-14.45** *Paul Byande* & *Michel Boyom* (Montpellier University), "Koszul-Vinberg cohomology in Information geometry"
- **14.45-15.30** *Priyanka Grover* (Indian Statistical Institute, Delhi), "Derivatives of Matrix Functions and their Norms"
- **15.30-16.00 Coffee Break**
- **16.00-16.45** *Silvere Bonnabel* (Ecole des Mines ParisTech), *Anne Collard* and *Rodolphe Sepulchre* (Liege University), "Geometric means of fixed rank positive semi-definite matrices"
- **16.45-17.30** *Jesus Angulo* (Ecole des Mines ParisTech), "Mathematical Morphology for Matrix-Valued Images"
- **17.30-18.15** *Richard Nock* (Martinique University), "Mining Matrix Data with Bregman Matrix Divergences"
- **18.15-18.30 Scientific Debate**

25th of February at Ecole Polytechnique, Amphi Becquerel (Route de Saclay, 91128 Palaiseau, 91.06 Bus from Massy-Palaiseau RER station) :

Morning Session

- **09.00-09.30 Welcome Coffee**
- **09.30-10.15** *Sukanta Pati* (Indian Institute of Technology Guwahati), "Laplacian Matrix of graph"
- **10.15-10.45 Coffee Break**
- **10.45-11.30** *Arshia Cont* & *Arnaud Dessein* (IRCAM), "Applications of Information Geometry to Audio Signal Processing"

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- **11.30-12.15** *Ganapathy Viswanath* (Honeywell Technologies, Bangalore), "Covariance Matrix Based Spectrum Sensing for Cognitive Radios"
- **12.15-12.45 Scientific Debate**
- **12.45-14.00 Lunch Break**

Afternoon Session

- **14.00-14.45** *Manas Kamal Bhuyan* (Indian Institute of Technology Guwahati), "Use of Matrix Information Theory in Video Surveillance"
- **14.45-15.30** *Snoussi Hichem* (UTT Troyes University) & *Cédric Richard* (Nice Sophia-Antipolis University), "Particle Filtering on Riemannian Manifolds. Application to Visual Tracking"
- **15.30-16.00 Coffee Break**
- **16.00-16.45** *Aurobinda Routray* & *Tapan Pradhan* (Indian Institute of Technology, Kharagpur), "Fast and Fixed-Point SVD Algorithm for Face and Eye Tracking"
- **16.45-18.00 Identification of long term collaborations through IFCPAR collaborative research projects.**