



CorteXlab: inauguration

Jean-Marie Gorce

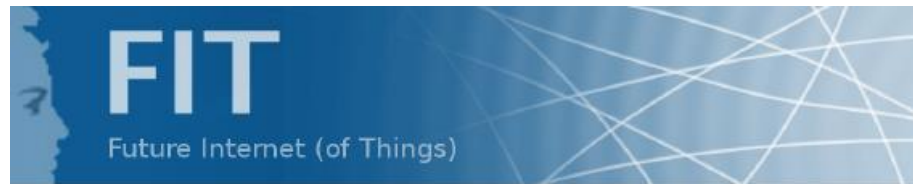
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CorteXlab inauguration
Tuesday, October 28, 2014



CorteXlab in a nutshell

A testbed of the Future Internet of Things (FIT) project



FIT is a national project in the program 'equipment of excellence' which aimed at :

Building a competitive and innovative experimental facility that brings France to the forefront of Future Internet research

Partners:



Introduction

CorteXlab is a 'big' equipment for experimental research but:

- What can we do with it? What for?
- What kind of results may we expect ?
- What next?

Theoretical AND experimental research



«Que touchant les choses que nos sens n'aperçoivent point, il suffit d'expliquer comment elles peuvent être ; et que c'est tout ce qu'Aristote a tâché de faire» **Descartes, Les principes de la philosophie, (1644), IV**

*About what we don't see (e.g. a watch mechanism),
We can only explain how they **MIGHT** work, that's the
only thing Aristote aimed to do.*



What about wireless communications ?

Who's who ?



What about wireless communications ?

He developed one of the first wireless communication system...



Claude Chappe,
1763-1805

which was : **on the visible light, coded, and multi-hop !**

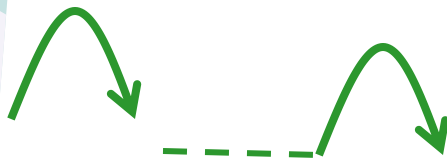
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Marcy sur Anse

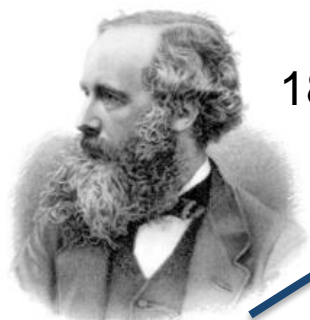


Sainte Foy lès Lyon

Grille des signaux de correspondance

1	26	47	72
2	27	48	73
3	28	49	74
4	29	50	75
5	30	51	76
6	31	52	77
7	32	53	78
8	33	54	79
9	34	55	80
10	35	56	81
11	36	57	82
12	37	58	83
13	38	59	84
14	39	60	85
15	40	61	86
16	41	62	87
17	42	63	88
18	43	64	89
19	44	65	90
20	45	66	91
21	46	67	92
22		68	93
23		69	94
24		70	95
25		71	96

What about radio communications ?



1864

James Clerk Maxwell
(1831-1879, UK)



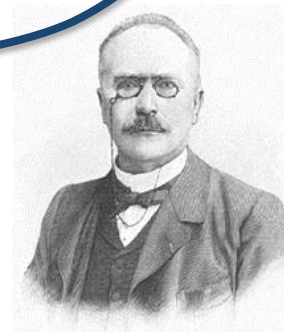
1886

Heinrich Rudolf Hertz
(1857-1894, DE)



1895

Guglielmo Marconi
(1874-1937, IT)



1890

Edouard Branly
(1844-1940, FR)

Which theoretical framework ?

EM theory

Information
theory

Queuing
theory

Random
matrices

Game
theory

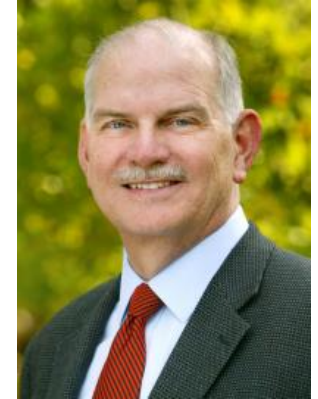
Stochastic
Geometry

Workshop program

- ❑ **Pr. H. Vincent Poor**, Princeton University, NJ, USA
Cooperation in Cognitive Radio Networks
- ❑ **Dr Hans-Peter Mayer**, Alcatel-Lucent, Stuttgart, Germany
5G - why and what ?
- ❑ **Pr. Merouane Debbah**, Huawei / Supelec, France
Scientific challenges of 5G

Cooperation in Cognitive Radio Networks

Professor H. Vincent Poor



H. Vincent Poor is the Michael Henry Strater University Professor at Princeton University, where he is also the dean of the School of Engineering and Applied Science. His research interests are primarily in the area of communications and related fields. He is a member of the U. S. National Academy of Engineering and the U.S. National Academy of Sciences, and a Foreign Member of the Royal Society of the UK. Other recent recognition of his work includes the 2014 URSI Booker Gold Medal and honorary doctorates from several universities in Europe and Asia.

5G - why and what ?

Dr. Hans-Peter Mayer



Hans-Peter Mayer is Head of Next Generation Wireless research within Bell Labs Wireless. After joining Alcatel-Lucent he worked on high-speed optoelectronic components. Between 1992 and 1995 he led the research and industrialization activity on 1.55 μ m DFB lasers for WDM and for 10 Gb/s systems, later including integrated and hybrid optoelectronics. From 1996 to 1999, Dr. Mayer has led the research on the early UMTS definition, followed by the realization of first UMTS, HSPA and LTE trial systems. Hans-Peter Mayer has led several research projects on LTE advanced.

Today he is driving Alcatel-Lucent's research efforts on 5G wireless systems, with involvement in the European METIS, 5GNOW and future projects in Horizon 2020.

Scientific challenges of 5G



Mérouane Debbah entered the Ecole Normale Supérieure de Cachan (France) in 1996. He worked for Motorola Labs (Saclay, France) from 1999-2002 and the Vienna Research Center for Telecommunications until 2003. From 2003 to 2007, he joined the Mobile Communications department of the Institut Eurecom (Sophia Antipolis, France) as an Assistant Professor. Since 2007, he is a Full Professor at Supelec (Gif-sur-Yvette, France). From 2007 to 2014, he was director of the Alcatel-Lucent Chair on Flexible Radio. Since 2014, he is Vice-President of the Huawei France R&D center and director of the Mathematical and Algorithmic Sciences Lab. His research interests are in information theory, signal processing and wireless communications.