Geometric Science of Information
SEE/SMF GSI'17 Conference
Mines ParisTech

GSI'17 General Chairmen: Frédéric BARBARESCO*, Frank NIELSEN**

& Silvère BONNABEL***

(*) President of SEE ISIC Club (Ingéniérie des Systèmes d'Information de Communications)

(**) LIX Department, Ecole Polytechnique, (***) CAOR Lab, Mines ParisTech,

GSI'13 Mines ParisTech

Slides:
https://www.see.asso.fr/gsi2013

GSI'15 Ecole Polytechnique

Videos:
https://www.youtube.com/channel/UC5HHo1jbQXusNQzU1iekaGA
UNITWIN website (slides & videos):
http://forum.cs-dc.org/category/90/gsi2015

Roger Balian

Hirohiko Shima
Jean-Louis Koszul

GSI'13 Mines

GSI'15 Polytechnique

Charles-Michel
Marle

ORBITUARY

Michel Marie Deza

Marcel Berger

Michel Marie Deza died on 23 november 2016 in an accidental fire in his apartment in Paris. He was a Soviet and French mathematician, specializing in combinatorics, discrete geometry and graph theory. He was director of research at the French National Centre for Scientific Research (CNRS), the vice president of the European Academy of Sciences, a research professor at the Japan Advanced Institute of Science and Technology, and one of the three founding editors-in-chief of the European Journal of Combinatorics.
https://en.wikipedia.org/wiki/Michel_Deza
2012 video of Michel Marie Deza at IRCAM for Brillouin Seminar on « Geometric Science of Information »
http://archiprod-externe.ircam.fr/video/VI02027700-282.mp4
Michel Marie Deza is author of the SPRINGER book:
Encyclopedia of Distances, Authors: Deza, Michel Marie, Deza, Elena http://www.springer.com/us/book/9783662528433

Marcel Berger greatly contributed to mathematics, through his own publications, for example on holonomy groups, symmetric spaces, curvature pinching and the sphere theorem, spectral geometry or systolic geometry. His influence goes far beyond his research papers. His books and surveys have inspired not only his students, but a much broader audience. Important features of Marcel Berger's mathematical heritage are also his seminar and his influence on the round tables organized by his friend Arthur L. Besse. Marcel Berger's Riemannian geometry seminar held at the Universite Paris VII in the nineteen-seventies and eighties, hosted lectures by both reputable mathematicians and young researchers. For the participants, it was a unique place for lively and informal mathematical discussions and exchanges, as well as inspiration.
IHES Riemannian Geometry Past, Present and Future: an homage to Marcel Berger :https://indico.math.cnrs.fr/event/2432/
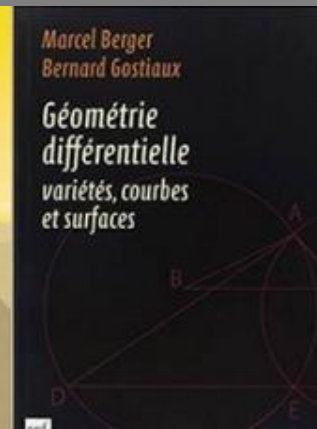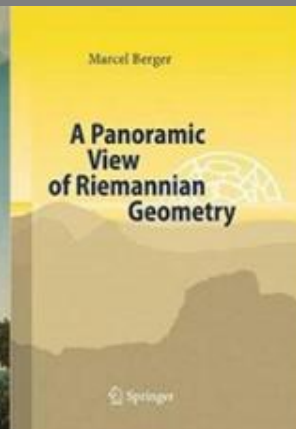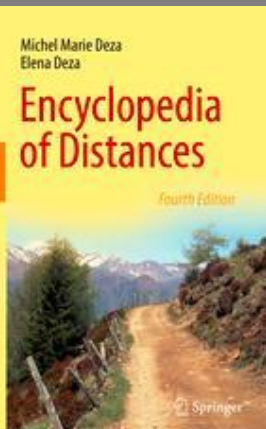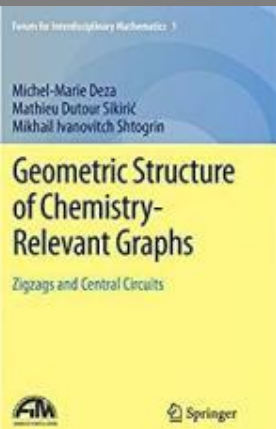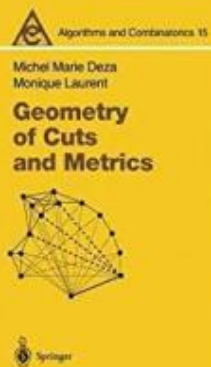
SEE at a glance

- Meeting place for science, industry and society
- An officialy recognised non-profit organisation
- About 2000 members and 5000 individuals involved
- Large participation from industry (~50%)
- 19 «Clubs techniques» and 12 «Groupes régionaux»
- Organizes conferences and seminars
- Initiates/attracts International Conferences in France
- Institutional French member of IFAC and IFIP
- Awards (Glavieux/Brillouin Prize, Général Ferrié Prize, Néel Prize, Jerphagnon Prize, Blanc-Lapierre Prize,Thévenin Prize), grades and medals (Blondel, Ampère)
- Publishes 3 periodical publications (REE, …) & 3 monographs each year
- Web: **http://www.see.asso.fr** and LinkedIn SEE group
- SEE Presidents: Louis de Broglie, Paul Langevin, …

Paul Langevin

Louis de Broglie

1883-2017: From SIE & SFE to SEE: 134 years of Sciences

Société de l'électricité, de l'électronique et des technologies de l'information et de la communication

**1881
Exposition Internationale d'Electricité**

**1883: SIE
Société Internationale des Electriciens**

**1886: SFE
Société Française des Electriciens**

**2013: SEE
17 rue de l'Amiral Hamelin
75783 Paris Cedex 16**

Mines ParisTech Graduade School
234 years of History

MINES ParisTech
1783 - 2008

THE ERA OF GLOBALIZATION

1300 students
of 50 nationalities,
260 research academics

ParisTech
INSTITUT DES SCIENCES ET TECHNOLOGIES
PARIS INSTITUTE OF TECHNOLOGY

GEM

Globalization of the higher education

INSTITUT CARNOT
M.I.N.E.S

2008 30% of civil engineer graduates are from outside France.

2005 Creation of the first industry chair. To date, 10 Chairs have been created or are under way.

1991 major alliances.

THE ERA OF PARTNERSHIP RESEARCH

Two Nobel laureates

Maurice Allais (Economics, 1988)
Georges Charpak (Physics, 1992)

ARMINES
Creation of Armines

1987 Creation of specialized Mastères.

1985 The School was granted the right to award doctorates.

1969 Creation by Pierre Lafitte of the Sophia Antipolis Technology Park.

1967 Training and partnership research provide the model for the School. Establishment of research centres at Fontainebleau and the Materials Centre on the Snecma premises at Corbeil.

THE ERA OF MAJOR INDUSTRIAL LABORATORIES

Outstanding scientific figures

(1878 - 1936) Conrad Schlumberger Energy, Geophysics
(1854 - 1912) Jules Henri Poincaré Mathematics, Physics
(1850 - 1936) Henry Le Chatelier Metallurgy, Chemistry

Mechanization and major industrial developments

1950 The School envisaged a more general approach to the training of engineers, adapted to the dynamics of the industrial world, and created its specialized module courses.

1946 Creation of the School's Foundation, FIMMM.

1942 The Metallurgy Laboratory at Saint-Germain-en-Laye was instituted at the initiative of Charles Crussard.

1904 Georges Charpy devised the impact tests known as "The Charpy test".

The School worked hand in hand with French industry: from mining to energy, transport....

THE TECHNICAL AND SOCIAL ERA

Le Play

1860 Le Play instituted the teaching of the social sciences which continues today to be an original feature of the School's training programme.

1849 Dual-feature training, both scientific and technical, with a view to the management of the mining and metallurgy industries.

1847 Distinction established between the Inspectors of Mines (the current Corps des Mines) and civil engineers.

1793 René Just Haüy discovered scientific mineralogy.

Création of the School

1783 Training "intelligent" managers capable of leading teams and possessing a global view of projects for the Kingdom's mines.

JOURNAL DES MINES DE LA RÉPUBLIQUE

PROGRAMME.

Ingénieur en chef Ingénieur Ingénieur-élève

Most Famous **MINEURS**
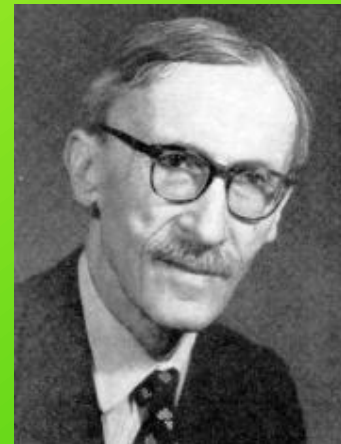

Joseph Bertrand   Gabriel Lamé   François Massieu   Henri Poincaré   Paul Levy

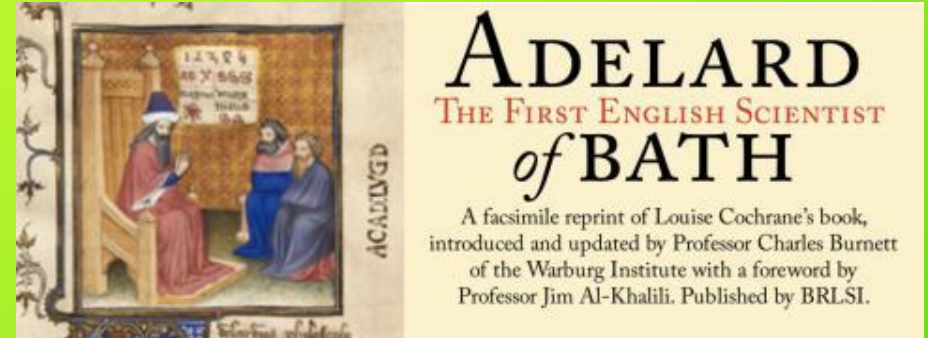Maurice Allais   Georges Matheron   Roger Balian   Charles-Michel Marle   Pierre Rouchon

GSI Logo: Adelard of Bath

ADELARD
THE FIRST ENGLISH SCIENTIST
of BATH

A facsimile reprint of Louise Cochrane's book, introduced and updated by Professor Charles Burnett of the Warburg Institute with a foreword by Professor Jim Al-Khalili. Published by BRLSI.

- He left England toward the end of the 11th century for Tours in France
- Adelard taught for a time at Laon, leaving Laon for travel no later than 1109.
- After Laon, he travelled to Southern Italy and Sicily no later than 1116.
- Adelard also travelled extensively throughout the "lands of the Crusades": Greece, West Asia, Sicily, Spain, and potentially Palestine.

The frontispiece of an Adelard of Bath Latin translation of Euclid's Elements, c. 1309–1316; the oldest surviving Latin translation of the Elements is a 12th-century translation by Adelard from an Arabic version

Adelard of Bath was the first to translate **Euclid's Elements in Latin**
Adelard of Bath has introduced the word « **Algorismus** » in Latin after his translation of Al Khuwarizmi

GSI'17 Banner

Euclide, Thales, Alexis Claude Clairaut, Adrien-Marie Legendre, Jean-Victor Poncelet, Gaston Darboux, Henri Poincaré, Elie Cartan, Maurice René Fréchet, Paulette Libermann, Jean Leray, Jean-Louis Koszul, Jacqueline Lelong-Ferrand, Jean-Marie Souriau, Roger Balian, Marcel Berger, Yvonne Choquet-Bruhat, Misha Gromov
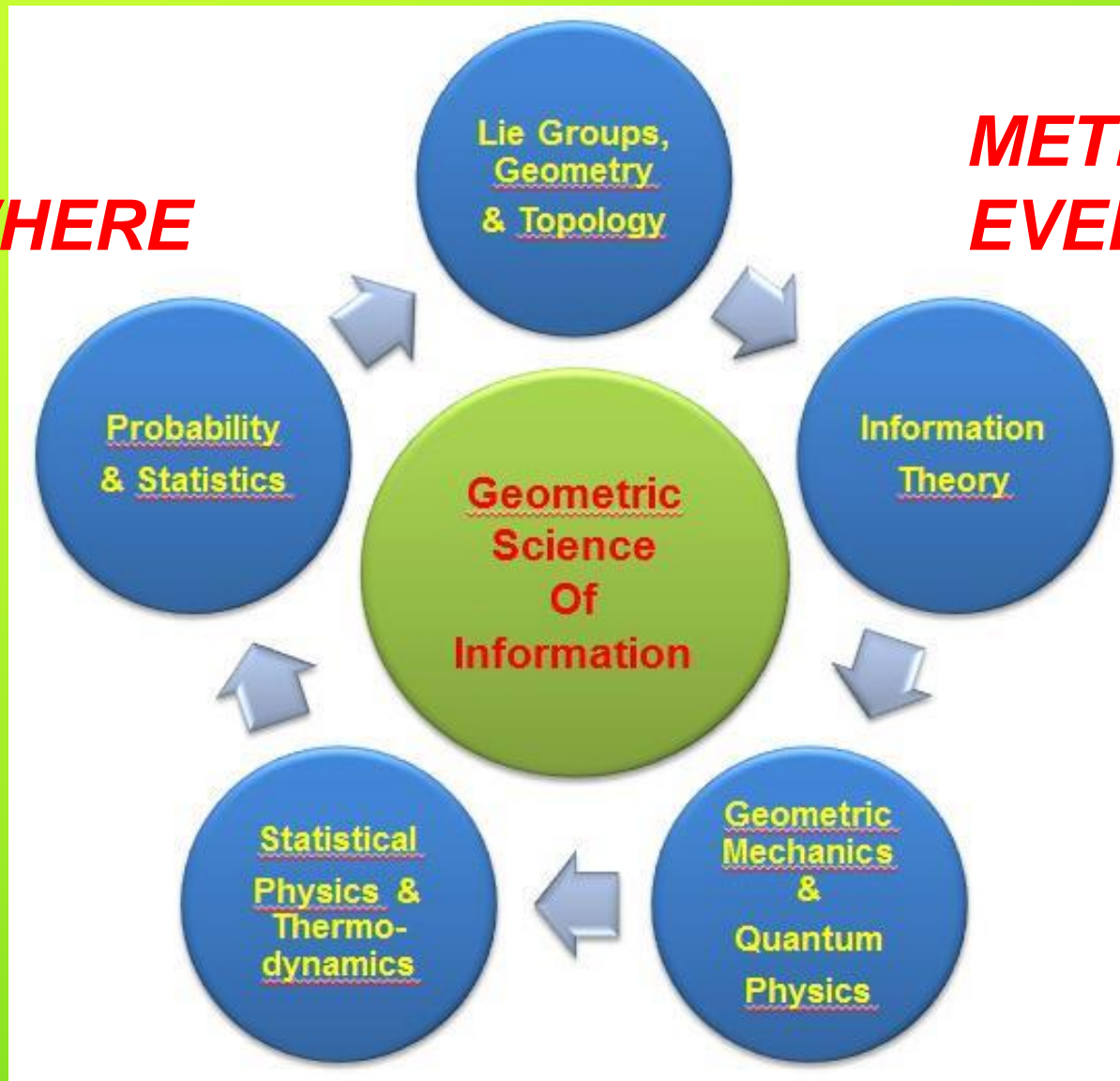
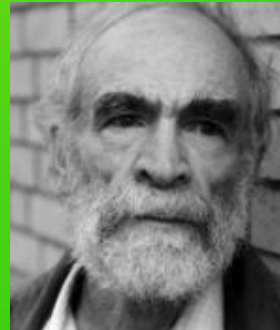# A new Grammar of Information

GROUP EVERYWHERE

METRIC EVERYWHERE

Elie Cartan

Henri Poincaré

Maurice Fréchet

Misha Gromov

Lie Groups, Geometry & Topology

Probability & Statistics

Geometric Science Of Information

Information Theory

Statistical Physics & Thermo-dynamics

Geometric Mechanics & Quantum Physics

"*Mathematics is the art of giving the same name to different things*" – Henri Poincaré

Elie Cartan: Group Everywhere
(Henri Poincaré review of Cartan's Works)

RAPPORT SUR LES TRAVAUX DE M. CARTAN

fait à la Faculté des Sciences de l'Université de Paris.

PAR

H. POINCARÉ.

Si alors on dépouille la théorie mathématique de ce qui n'y apparaît que comme un accident, c'est-à-dire de sa matière, il ne restera que l'essentiel, c'est-à-dire la forme; et cette forme, qui constitue pour ainsi dire le squelette solide de la théorie, ce sera la structure du groupe.

M. CARTAN a fait faire des progrès importants à nos connaissances sur trois de ces catégories, la 1ère la 3e et la 4e. Il s'est principalement placé au point de vue le plus abstrait de la structure, de la forme pure, indépendamment de la matière, c'est-à-dire, dans l'espèce, du nombre et du choix des variables indépendantes.

Conclusions.

On voit que les problèmes traités par M. CARTAN sont parmi les plus importants, les plus abstraits et les plus généraux dont s'occupent les Mathématiques; ainsi que nous l'avons dit, la théorie des groupes est, pour ainsi dire, la Mathématique entière, dépouillée de sa matière et réduite à une forme pure. Cet extrême degré d'abstraction a sans doute rendu mon exposé un peu aride; pour faire apprécier chacun des résultats, il m'aurait fallu pour ainsi dire lui restituer la matière dont il avait été dépouillé; mais cette restitution peut se faire de mille façons différentes; et c'est cette forme unique que l'on retrouve ainsi sous une foule de vêtements divers, qui constitue le lien commun entre des théories mathématiques qu'on s'étonne souvent de trouver si voisines.

"*the problems addressed by Elie Cartan are among the most important, most abstract and most general dealing with mathematics; group theory is, so to speak, the whole mathematics, stripped of its material and reduced to pure form. This extreme level of abstraction has probably made my presentation a little dry; to assess each of the results, I would have had virtually render him the material which he had been stripped; but this refund can be made in a thousand different ways; and this is the only form that can be found as well as a host of various garments, which is the common link between mathematical theories that are often surprised to find so near*"

H. Poincaré

Maurice Fréchet: Metric Everywhere

LES ESPACES ABSTRAITS TOPOLOGIQUEMENT AFFINES.

PAR

MAURICE FRÉCHET

à STRASBOURG.

Un grand nombre des propriétés topologiques de l'espace euclidien s'étendent immédiatement à tous les espaces où une définition de la limite étant donnée (qui est en général imposée par la nature des éléments ou points de l'espace et les applications qu'on a en vue), cette définition peut s'exprimer par l'intermédiaire d'une *distance*.[1] Nous entendons par là qu'à tout couple A, B d'éléments ou points de l'espace considéré correspond un nombre $(A, B) = (B, A) \geq 0$, qui n'est nul que si A et B ne sont pas distincts et qui satisfait aux deux conditions suivantes:

I. Pour trois points A, B, C arbitraires, on a toujours

$$(A, B) \leq (A, C) + (C, B).$$

II. La condition nécessaire et suffisante pour qu'une suite de points A_1, A_2, ... de cet espace tende vers le point A de cet espace est que la distance (A, A_n) tende vers zéro.

Un tel espace sera appelé un espace (D) (initiale de distance).[1] Dans le cas où l'on n'impose pas la condition I, (A, B) sera un écart[1] et l'espace sera un espace (E).[1]
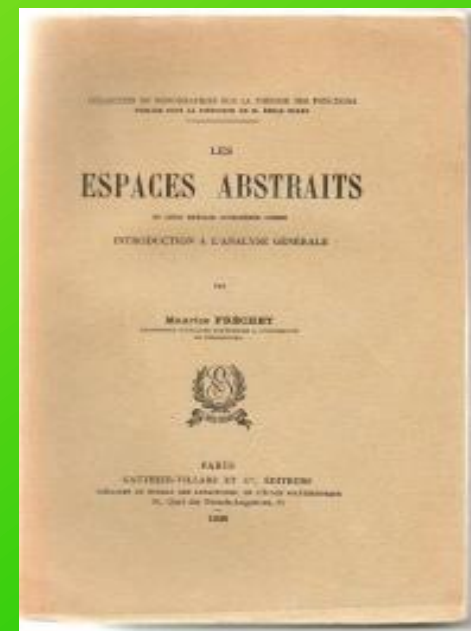
- Maurice Fréchet made major contributions to the topology of point sets and introduced the entire concept of metric spaces.
- His dissertation opened the entire field of functionals on metric spaces and introduced the notion of compactness.
- He has extended Probability in Metric space

LES ESPACES ABSTRAITS

1948 (Annales de l'IHP)
Les éléments aléatoires de nature quelconque
dans un espace distancié
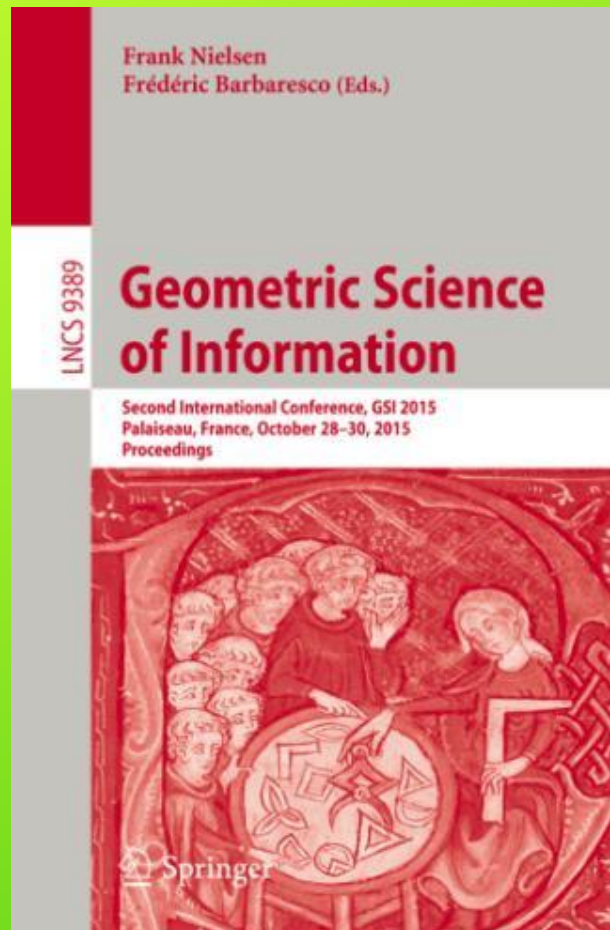Extension of Probability/Statistic in abstract/Metric space
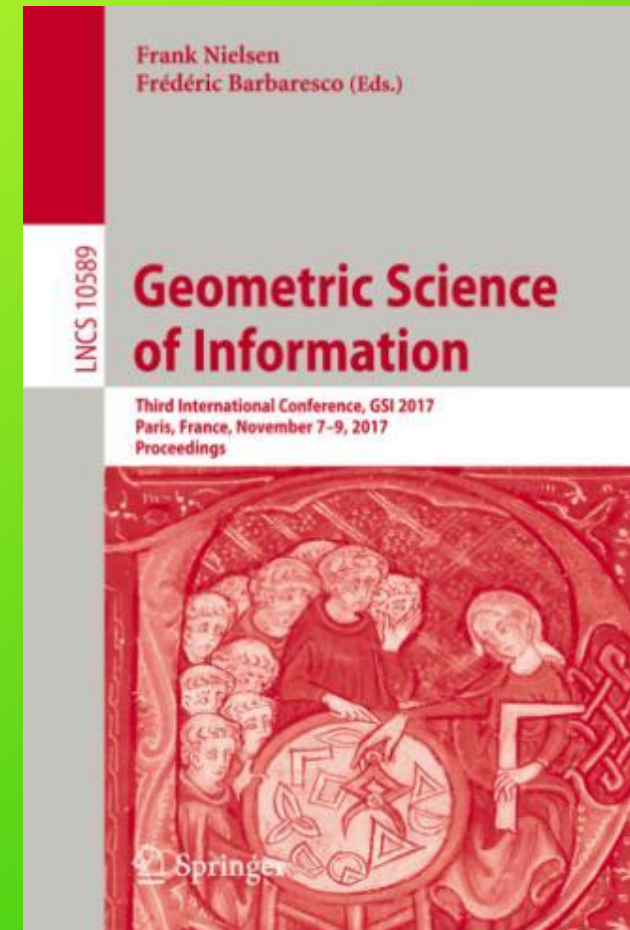
GSI SPRINGER PROCEEDINGS

Frank Nielsen
Frédéric Barbaresco (Eds.)

LNCS 10589

Geometric Science of Information

Third International Conference, GSI 2017
Paris, France, November 7–9, 2017
Proceedings

Frank Nielsen
Frédéric Barbaresco (Eds.)

LNCS 9389

Geometric Science of Information

Second International Conference, GSI 2015
Palaiseau, France, October 28–30, 2015
Proceedings

Springer

Frank Nielsen
Frédéric Barbaresco (Eds.)

LNCS 8085

Geometric Science of Information

First International Conference, GSI 2013
Paris, France, August 2013
Proceedings

Springer

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The Alan Turing Institute

THALES

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La référence aéronautique

IMAG

Scientific sponsors

Société Mathématique de France
SMF

Sponsors

SMAI

GdR MIA

GDR GeoSto

isis

MINES ParisTech

ÉCOLE POLYTECHNIQUE

Springer

PSL
RESEARCH UNIVERSITY PARIS

GSI'17 Program

- 145 attendees from 37 different countries (France 38%, Germany 9%, Japan 9%, Italy 8%, USA 6%, Belgium 4%, Brazil 3%, Russia 3%, UK 3%, NL 2%, DK 2%, SW 2%, …)

- 101 papers/talks on 3 days (rate: 89% based on 314 reviews)

- 1 Guest Honorary speaker
  - Jean-Michel BISMUT (Paris-Sud University): "The hypoelliptic Laplacian"
- 1 Invited Honorary speaker
  - Daniel BENNEQUIN (Paris-Diderot University): "Geometry and Vestibular Information"
- 3 keynote speakers
  - Alain TROUVE (ENS Paris-Saclay): "Hamiltonian modeling for shape evolution and Statistical modeling of shapes variability"
  - Mark GIROLAMI (Imperial College London): "Riemann Manifold Langevin and Hamiltonian Monte Carlo Methods"
  - Barbara TUMPACH (Lille University): "Riemannian metrics on shape spaces of curves and surfaces"
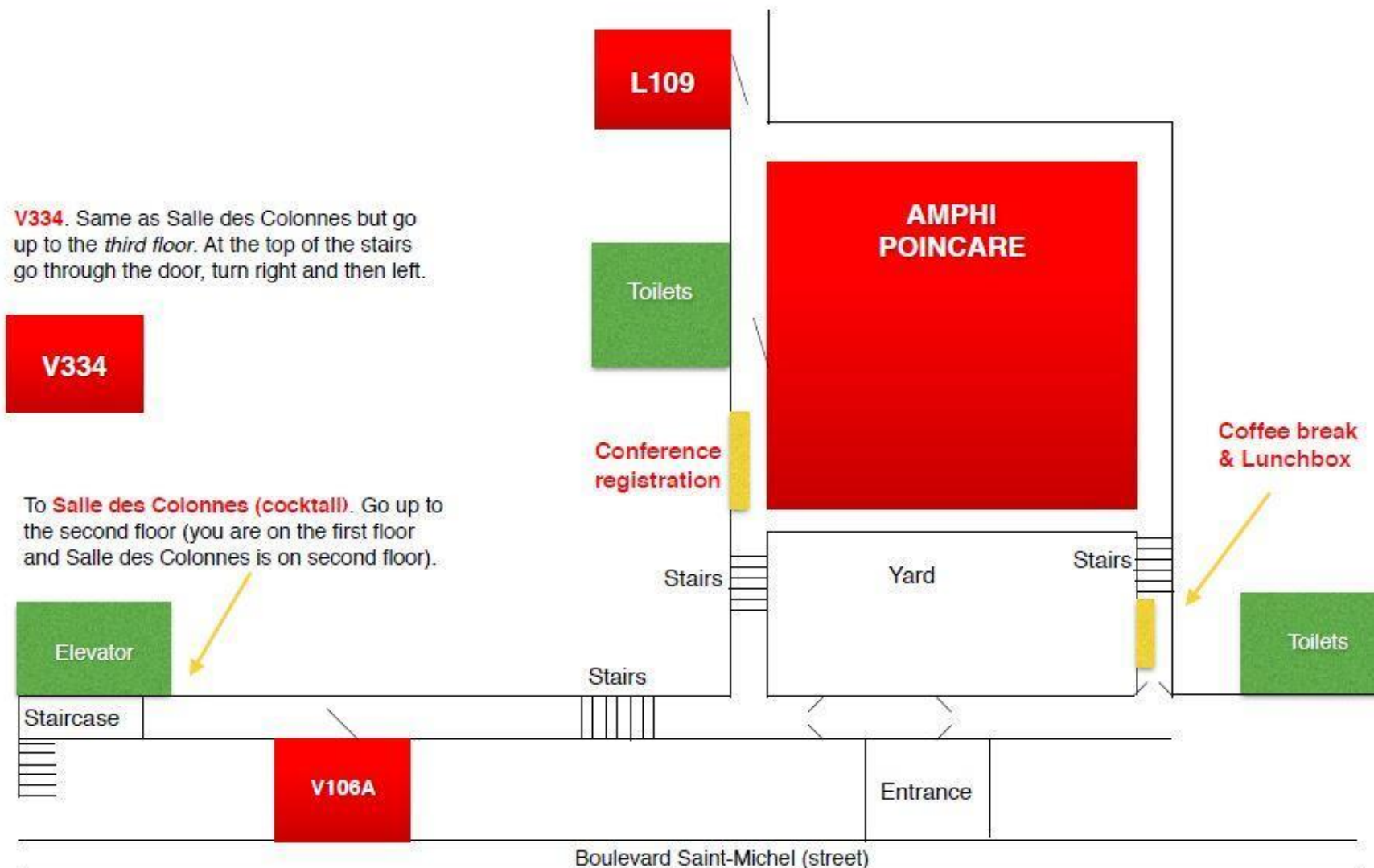
GSI'17: 19 sessions

- Computational Information Geometry
- Geometrical Structures of Thermodynamics
- Geometry of Tensor-Valued Data
- Probability on Riemannian Manifolds
- Information Structure in Neuroscience
- Geometric Mechanics & Robotics
- Optimization on Manifold
- Geometric Robotics & Tracking
- Probability Density Estimation
- Applications of Distance Geometry
- Statistics on non-linear data
- Shape Space
- Divergence Geometry
- Geodesic Methods with Constraints
- Optimal Transport & Applications
- Monotone Embedding in Information Geometry
- Non-parametric Information Geometry
- Optimal Transport & Applications
- Statistical Manifold & Hessian Information Geometry

GSI'17 Map

MAP OF THE CONFERENCE SITE

L109

V334. Same as Salle des Colonnes but go up to the *third floor*. At the top of the stairs go through the door, turn right and then left.

V334

AMPHI POINCARE

Toilets

Conference registration

Coffee break & Lunchbox

To **Salle des Colonnes (cocktail)**. Go up to the second floor (you are on the first floor and Salle des Colonnes is on second floor).

Elevator

Stairs

Yard

Stairs

Toilets

Staircase

Stairs

Entrance

V106A

Boulevard Saint-Michel (street)

GSI'17 Program

Tuesday November 7th

Time	ROOM POINCARE	ROOM V106 A	ROOM L109
08h - 08h30	Badge withdrawing		
	ROOM POINCARE		
08h30 - 09h00	Opening Session Frédéric Barbaresco, Frank Nielsen, Silvère Bonnabel		
09h00 - 10h00	Keynote Speaker Jean-Michel Bismut The hypoelliptic Laplacian		
10h00 - 10h30	Coffee Break		
	ROOM POINCARE	ROOM V106 A	ROOM L109
10h30 - 12h30	Computational Information Geometry (F. Nielsen/O. Schwander)	Geometrical Structures of Thermodynamics (F. Gay-Balmaz/F. Barbaresco)	Geometry of Tensor-Valued Data (J. Angulo/Y. Berthoumieu/ G. Verdoolaege/ A.M. Djafari)
12h30 - 13h30	Lunch Break		
	ROOM POINCARE		
13:30:00 - 15:30:00	Plenary Session "Probability on Riemannian Manifolds" (M. Arnaudon/A.-B. Cruzeiro)		
15h30 - 16h00	Coffee Break		
	ROOM POINCARE	ROOM V106 A	ROOM L109
16h00 - 18h00	Information Structure in Neuroscience (P. Baudot/D. Bennequin/S. Roy)	Geometric Mechanics & Robotics (G. de Saxcé/J. Bensoam/ J. Lerbet)	Optimization on Manifold (P.A. Absil/R. Sepulchre)
	ROOM POINCARE		
18h00 - 19h00	Keynote Speaker: Daniel Bennequin Geometry and Vestibular Information		
	ROOM SALLE DES COLONNES		
19h00 - 20h00	Welcome cocktail		

GSI'17 Program

| Time	ROOM POINCARE	ROOM V106 A	ROOM L109
08:30:00 - 09:00:00	Registration Desk		
	ROOM POINCARE		
09:00:00 - 10:00:00	Keynote Speaker Alain Trouvé Hamiltonian modeling for shape evolution and Statistical modeling of shapes variability		
10:00:00 - 10:30:00	Coffee Break		
	ROOM POINCARE	ROOM V106 A	ROOM L109
10:30:00 - 12:30:00	Geometric Robotics & Tracking (S. Bonnabel/A. Barrau)	Probability Density Estimation (S. Said/E. Chevallier)	Applications of Distance Geometry (A. Mucherino/D. Gonçalves)
12:30:00 - 13:30:00	Lunch Break		
	ROOM POINCARE		
13:30:00 - 15:10:00	Plenary Session "Statistics on non-linear data" (X. Pennec/S. Sommer)		
15:10:00 - 15:40:00	Coffee Break		
	ROOM POINCARE	ROOM V106 A	ROOM L109
15:40:00 - 17:20:00	Shape Space (S. Allasonnière/S. Durrleman/A. Trouvé)	Divergence Geometry (M. Broniatowski/I. Csiszar)	Geodesic Methods with Constraints (J.-M. Mirebeau/L. Cohen)
	ROOM POINCARE		
17:20:00 - 18:20:00	Keynote Speaker Mark Girolami Riemann Manifold Langevin and Hamiltonian Monte Carlo Methods		
18h20 - 19h05	Session "Gender Equality - Marie Curie 150th birthday : Women in Science" (Barbara Tumpach)		
20h15	Gala Dinner - Café LE PROCOPE		

GSI'17 Program

	V334		
09h30 - 10h00	Registration Desk		
	ROOM POINCARE	ROOM V106 A	ROOM L109
10h00 - 12h00	Optimal Transport & Applications (J.F. Marcotorchino/A. Galichon)	Monotone Embedding in Information Geometry (J. Zhang/ J. Naudts)	Non-parametric Information Geometry (N. Ay/J. Armstrong)
12h00 - 13h00	Lunch Break		
	ROOM POINCARE		
13h00 - 14h00	Keynote Speaker Barbara Tumpach Riemannian metrics on shape spaces of curves and surfaces		
14h00 - 14h30	Coffe Break		
	ROOM POINCARE	ROOM V106 A	ROOM L109
14h30 - 16h30	Optimal Transport & Applications (Q. Merigot/J. Bigot/B. Maury)		Statistical Manifold & Hessian Information Geometry (M. Boyom/H. Matsuzoe/ Hassan Shahid)
	ROOM POINCARE		
16h30 - 17h00	Closing session by Frédéric Barbaresco, Frank Nielsen and Silvère Bonnabel		

Guest Honorary speaker
Jean-Michel Bismut
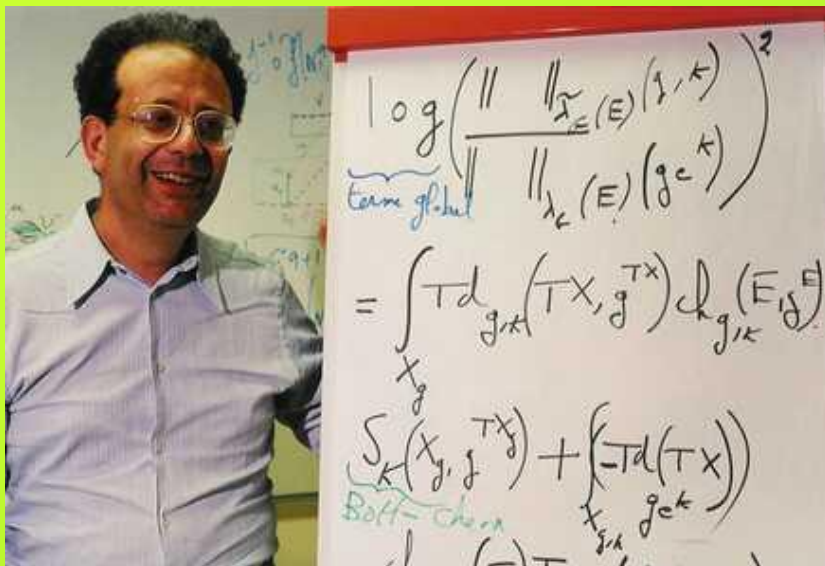
Jean-Michel Bismut (professor at Paris-Sud Orsay university, member of Académie des Sciences)
Jean-Michel Bismut was born in 1948 in Lisbon (Portugal). He studied at Ecole Polytechnique in 1967-1969, and he received his Doctorat d'Etat from Université Paris VI in 1973. He became a professor of Mathematics in Orsay in 1981. He was a plenary speaker at ICM-Berlin 1998, and a vice-president of International Mathematical Union from 2002 to 2006.
His research has been devoted to stochastic control, to the Malliavin calculus, to index theory, and its connections with spectral theory and number theory.

The hypoelliptic Laplacian

If X is a Riemannian manifold, the hypoelliptic Laplacian is a family of hypoelliptic operators acting on X , the total space of the tangent bundle of X , that interpolates between the ordinary Laplacian and the geodesic flow. The probabilistic counterpart is an interpolation between Brownian motion and geodesics.
In the talk, I will explain the construction of the hypoelliptic Laplacian, and describe some of its properties.

Invited Honorary speaker
Daniel Bennequin

Daniel Bennequin (Université Paris 7 - Institut Mathématique de Jussieu). Born 3 January 1952. Graduate from Ecole Normale Supérieure. PHD in 1982 with Alain Chenciner at Paris VII. Then Professor at Strasbourg University. Today Professor at Paris-Diderot University, and member of the IMJ. During the 1980's he was initiator of contact topology with Y.Eliashberg. During the 1990's, he worked on integrable systems and geometry of Mathematical Physics. Since 2000 he has been working in Neurosciences (mainly with A.Berthoz, C-d-F, and T.Flash, Weizmann Institute); he made contributions to the study of human movements duration, vestibular informatin flow and gaze functions during locomotion. His most recent publications are on information topology (with P.Baudot), psychic pain (with M.Bompard-Porte) and labyrinths (with R.David et al.).

Geometry and Vestibular Information

Every complex living entities, as plants, insects or vertebrates, possess visuo-vestibular systems which sense their own motion in space and are crucial for controling volontary movements and for understanding space. We will show how the Galilée group guides the visuo-vestibular information flows. Differential Geometry permits to understand the particular forms of the end vestibular organs, that are situated in the inner ear of mammals and birds, from a principle of energy minimization and information maximization. These forms correspond to the surfaces of divisors of real (resp. imaginary) twisted curves, for the epithelia which sense linear accelerations (resp. rotations) of the head. The Hodge-DeRham theory, applied to the labyrinths volume of vertebrates, permits to explain how a complex fluid movement is transformed in six solutions of ordinary second order differential equations, for registering the head rotations in space. Combined with an original and delicate method of analysis of the membranous tissues, invented by Romain David, this allows for the first time, to describe the precise relation between the structure and the function of the labyrinth.

Keynote speaker
Mark Girolami

Mark Girolami (Imperial College London - Department of Mathematics). Mark Girolami holds a Chair in Statistics in the Department of Mathematics of Imperial College London. He is an EPSRC Established Career Research Fellow (2012 - 2017) and previously an EPSRC Advanced Research Fellow (2007 - 2012). He is the Director of the Alan Turing Institute-Lloyds Register Foundation Programme on Data Centric Engineering and in 2011 was elected to the Fellowship of the Royal Society of Edinburgh when he was also awarded a Royal Society Wolfson Research Merit Award. He was one of the founding Executive Directors of the Alan Turing Institute for Data Science from 2015 to 2016. He has been nominated by the IMS to deliver a Medallion Lecture at JSM 2017 and has been invited to give a Forum Lecture at the European Meeting of Statisticians 2017. His paper on Riemann manifold Langevin and Hamiltonian Monte Carlo Methods was publicly read before the Royal Statistical Society and received the largest number of contributed discussions for any paper in the entire history of the society, discussants included Sir D.R. Cox and C.R. Rao.

Riemann Manifold Langevin and Hamiltonian Monte Carlo Methods

The talk considers Metropolis adjusted Langevin and Hamiltonian Monte Carlo sampling methods defined on the Riemann manifold to resolve the shortcomings of existing Monte Carlo algorithms when sampling from target densities that may be high dimensional and exhibit strong correlations. The methods provide fully automated adaptation mechanisms that circumvent the costly pilot runs that are required to tune proposal densities for Metropolis–Hastings or indeed Hamiltonian Monte Carlo and Metropolis adjusted Langevin algorithms. This allows for highly efficient sampling even in very high dimensions where different scalings may be required for the transient and stationary phases of the Markov chain. The methodology proposed exploits the Riemann geometry of the parameter space of statistical models and thus automatically adapts to the local structure when simulating paths across this manifold, providing highly efficient convergence and exploration of the target density. The performance of these Riemann manifold Monte Carlo methods is rigorously assessed by performing inference on logistic regression models, log-Gaussian Cox point processes, stochastic volatility models and Bayesian estimation of dynamic systems described by non-linear differential equations. Substantial improvements in the time-normalized effective sample size are reported when compared with sampling approaches.

Keynote speaker
Barbara Tumpach

Barbara Tumpach (Lille University/ Painlevé Laboratory)

Alice Barbara Tumpach is an Associate Professor in Mathematics (University Lille 1, France) and member of the Laboratoire Painlevé (Lille 1/CNRS UMR 8524), since 2007. She received a Ph.D degree in Mathematics in 2005 at the Ecole Polytechnique, Palaiseau, France. She spent two years at the Ecole Polytechnique Fédérale de Lausanne as a Post-Doc, and two years at the Pauli Institut in Vienna, Austria, as an invited researcher. Her research interests lie in the area of infinite-dimensional Geometry, Lie Groups and Functional Analysis. She gives Master courses on Lie groups and organizes conferences on infinite-dimensional geometry for the Federation of Mathematical Research of Nord-Pas-Calais, France. She also acts in videos for Exo7, available on youtube, where she explains basic notions of Linear Algebra.

Riemannian metrics on shape spaces of curves and surfaces

The aim of the talk is to give an overview of geometric tools used in Shape Analysis. We will see that we can interpret the Shape space of (unparameterized) curves (or surfaces) either as a quotient space or as a section of the Preshape space of parameterized curves (or surfaces). Starting from a diffeomorphism-invariant Riemannian metric on Preshape space, these two different interpretations lead to different Riemannian metrics on Shape space. Another possibility is to start with a degenerate Riemannian metric on Preshape space, with degeneracy along the orbits of the diffeomorphism group. This leads to a framework where the length of a path of curves (or surfaces) does not depend on the parameterizations of the curves (or surfaces) along the path. Of course the choice of the metrics has to be motivated either from the applications or from their mathematical behaviour. We will compare some natural metrics used in the litterature.

GSI'17 « Women in Science »

On the occasion of the 150th Marie Curie Birthday (November 7th 1867), Barbara Tumpach will animate a session "Women in Science", November 8th from 18h20 to 19h00 in Poincaré Amphi, with Nina Miolane and Alice Le Brigant.
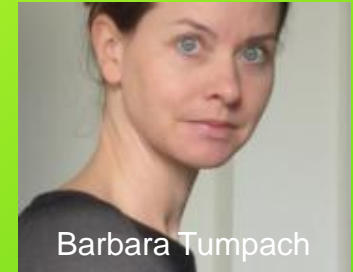
Barbara Tumpach

We have coupled this session with two other events, November 8th:
- during 10.00-1030 Coffee Break : Natacha Henri's book dedication on "Sisters in Science, Marie Curie and Bronia Dluska"
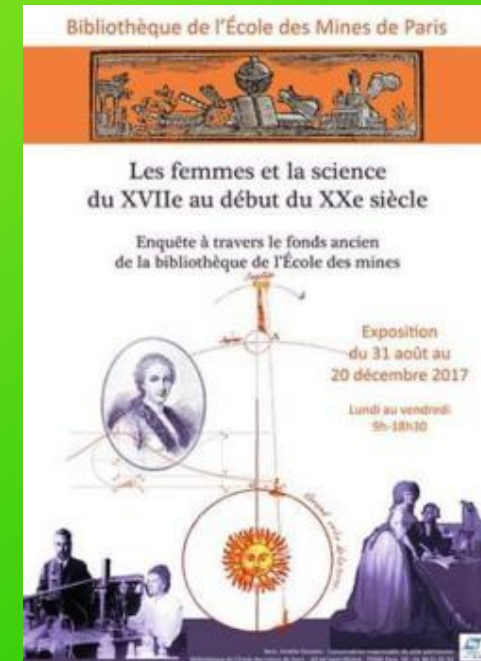https://www.youtube.com/watch?v=2JKHpgHHoAM
- during 12.30-13.30 Lunch break: exhibition on " Women and Science in the Heritage Funds" at the Ecole des Mines Library
http://www.mines-paristech.fr/Actualites/Exposition-Les-femmes-et-la-science/3086

10 minutes walk from Ecole des Mines, we invite you to visit "Marie Curie 150th Birthday Exhibition" at PANTHEON (that will start November 8th) and Curie Museum:
http://musee.curie.fr/visiter/evenements/marie-curie-150e-anniversaire

Nina Miolane   Alice Le Brigant

Bibliothèque de l'École des Mines de Paris

Les femmes et la science
du XVIIe au début du XXe siècle

Enquête à travers le fonds ancien
de la bibliothèque de l'École des mines

Exposition
du 31 août au
20 décembre 2017

Lundi au vendredi
9h-18h30

150th Marie Curie Birthday (November 7th 1867)

Les femmes et la science du XVIIe au début du XXe siècle

Enquête à travers le fonds ancien de la bibliothèque de l'École des mines de Paris

Exposition du 31 août au 20 décembre 2017

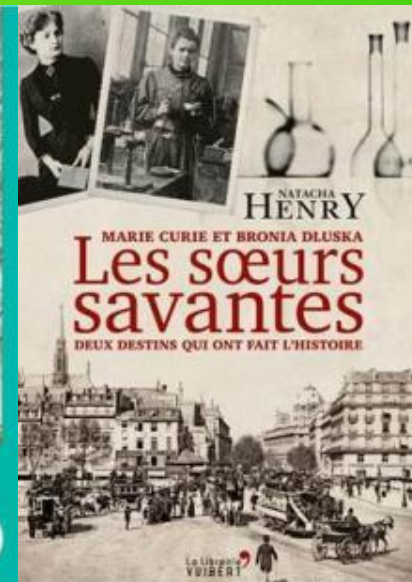For GSI'17, Exhibition visit November 8th during 12.30-13.30 Lunch break

Original edition of Marie Curie's thesis on radioactive substances of 1903

http://www.mines-paristech.fr/Actualites/Exposition-Les-femmes-et-la-science/3086

Mines Exhibition on " Women and Science in the Heritage Funds" at the Ecole des Mines Library

For GSI'17, Natacha Henri (Marie Curie Biographer) will dedicate her book on "Sisters in Science, Marie Curie and Bronia Dluska", November 8th during 10.00-1030 Coffee Break

https://www.youtube.com/watch?v=2JKHpgHHoAM

NATACHA HENRY

MARIE et BRONIA
LE PACTE DES SŒURS

LE DESTIN EXCEPTIONNEL DE MARIE CURIE

NATACHA HENRY
MARIE CURIE ET BRONIA DLUSKA
Les sœurs savantes
DEUX DESTINS QUI ONT FAIT L'HISTOIRE

Exhibition « Marie Curie a women in PANTHEON" (Panthéon, opening November 8th)

http://musee.curie.fr/visiter/evenements/marie-curie-150e-anniversaire

musée**CURIE**

MARIE CURIE
150 ANS
1867-2017

http://musee.curie.fr/
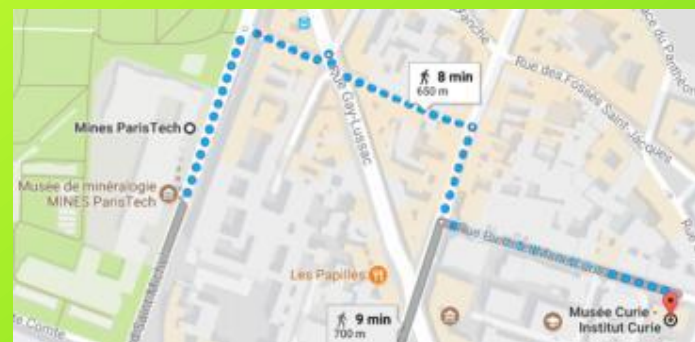
GSI'17 Gala Diner
Café LE PROCOPE since 1686
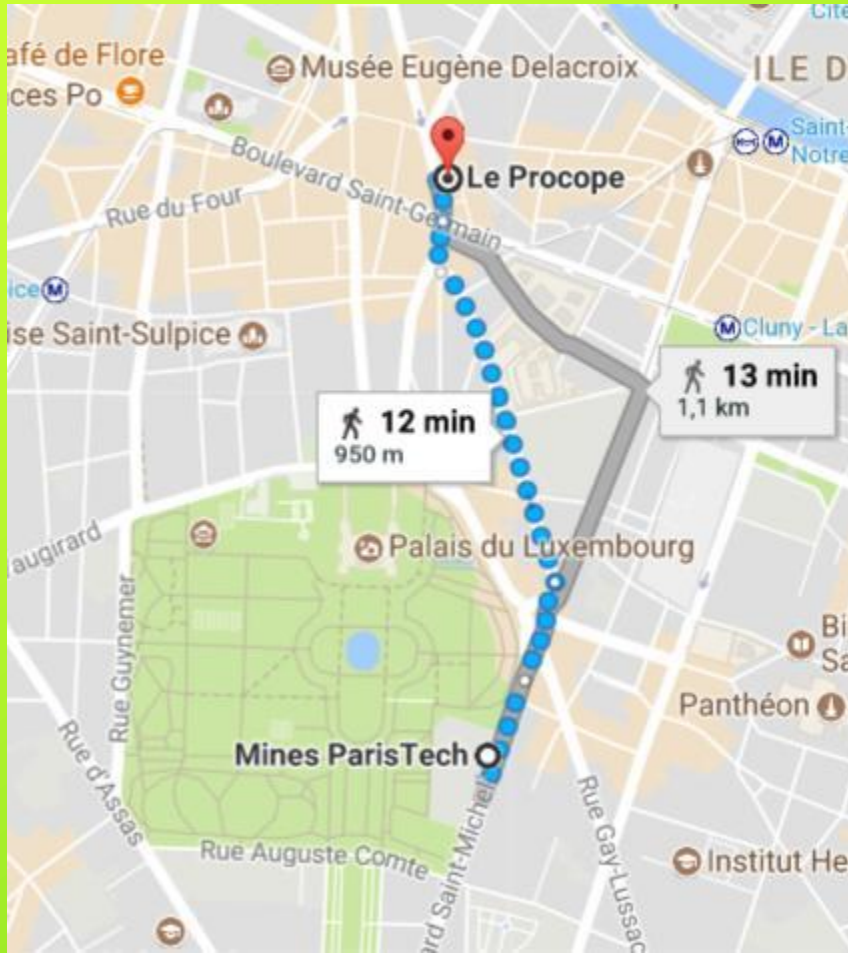
GSI'17 Gala Diner
Café LE PROCOPE since 1686

When the French comedy theatre was set up not far from the café in 1689, the Procope quickly became a place for the rendez-vous of literary and theatre critics, writers and philosophers.

It was also at the Procope where the idea to create an encyclopedia took place during a conversation between Diderot and d'Alembert. Meetings and exchanges between regulars such as Voltaire, Rousseau, etc. gave birth to the liberal and progressive ideas of the 18th century.

Cradle of the Diderot & d'Alembert Encyclopedia

Digital, Collaborative & Critical Edition of Diderot-d'Alembert Encyclopedia

http://www.academie-sciences.fr/fr/Transmettre-les-connaissances/le-comite-d-alembert.html

Édition Numérique Collaborative et CRitique de l'Encyclopédie
ou Dictionnaire raisonné des sciences, des arts et des métiers (1751-1772)

Présentation   Équipe   Politique éditoriale   Comité de lecture   Comité scientifique   Qui a fait quoi ?

INSTITUT DE FRANCE
Académie des sciences

DOCUMENTATION
générale sur
l'*Encyclopédie*

DESCRIPTION
matérielle de
l'exemplaire

ENCCRE

I II III IV V VI VII VIII IX X XI XII XIII XIV XV XVI XVII   I II III IV V VI VII VIII IX X XI
volumes de texte (1751 - 1765)   volumes de planches (1762 - 1772)

Recherche dans les titres des articles et des   Recherche par contributeur...   Recherche par domaine...   Recherche dans le texte...

http://enccre.academie-sciences.fr/encyclopedie/

Nov. 14th, D'Alembert : tricentenaire du mathématicien et philosophe des Lumières

http://www.academie-sciences.fr/fr/Colloques-conferences-et-debats/d-alembert-tricentenaire-du-mathematicien-et-philosophe-des-lumieres.html
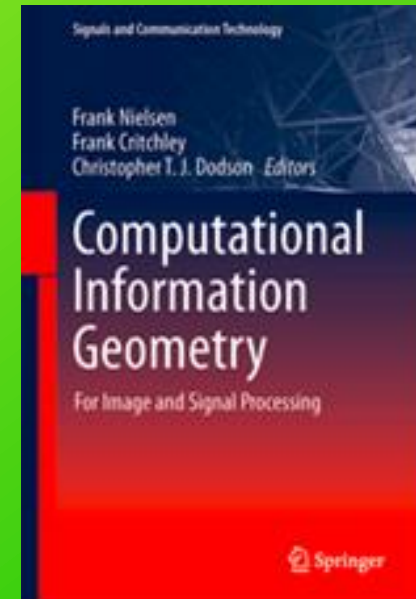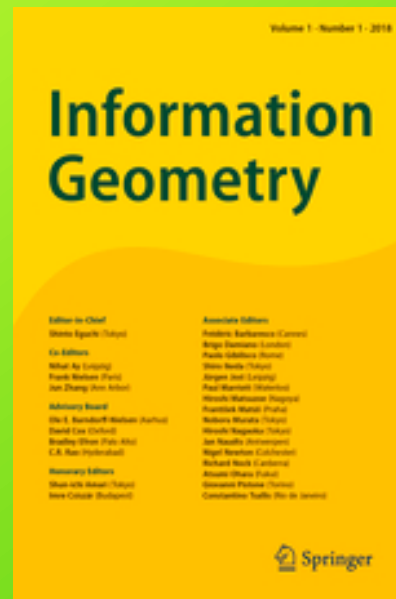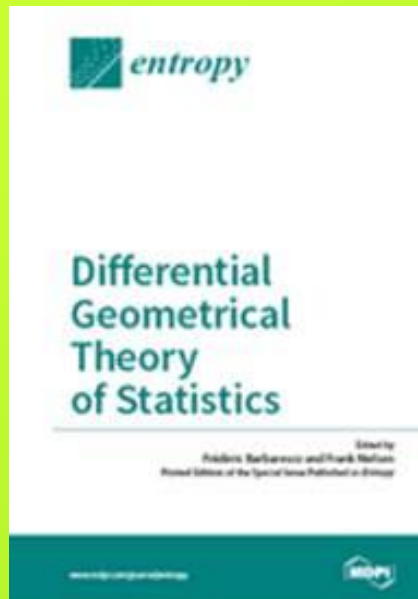

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Geometry in Diderot-d'Alembert Encyclopedia
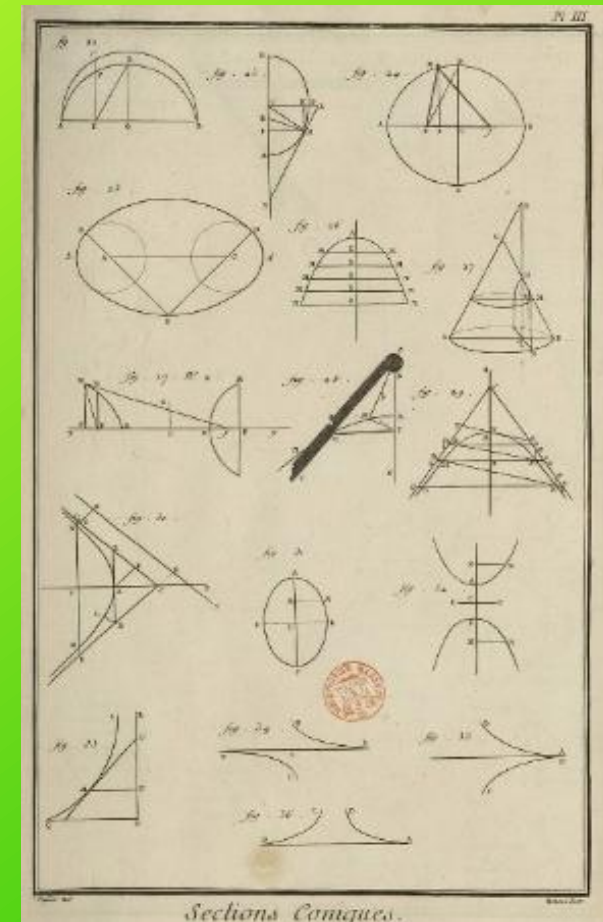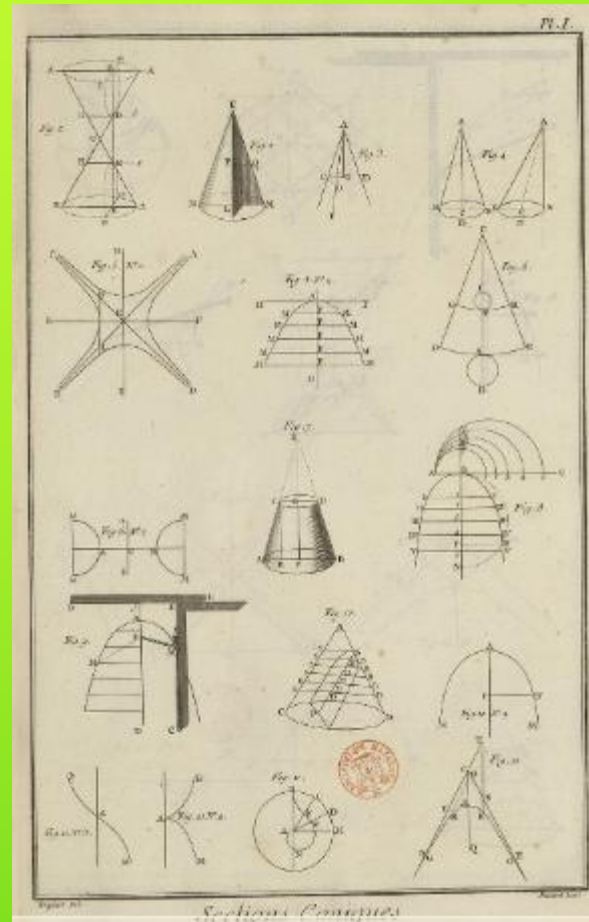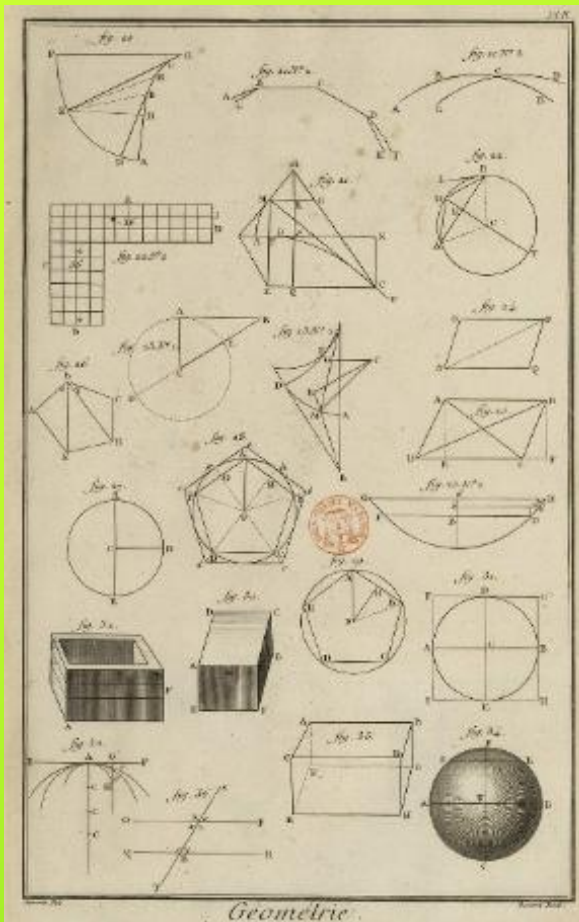
Last Publications

TGSI'17 Videos/slides available
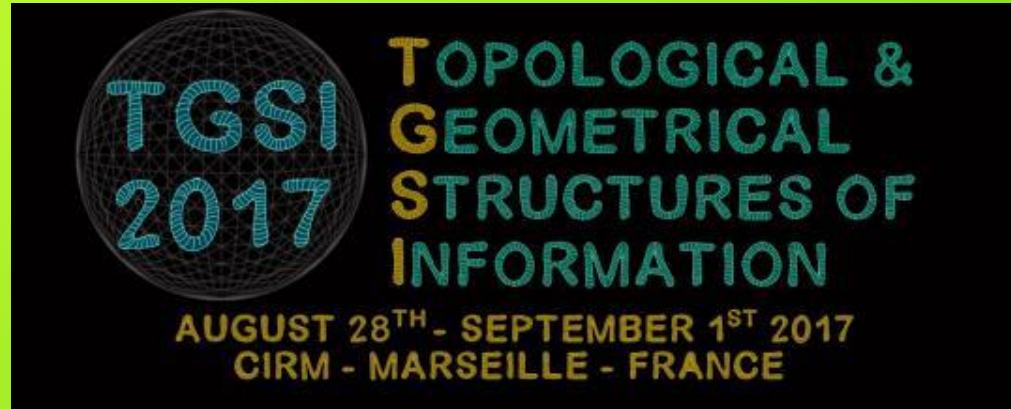
http://forum.cs-dc.org/category/94/tgsi2017

Special Issue "**Topological and Geometrical Structure of Information**", Selected Papers from CIRM conferences 2017"

http://www.mdpi.com/journal/entropy/special_issues/topological_geometrical_info

14–16 May 2018

From Physics to Information Sciences and Geometry

Barcelona, Spain

The main topics and sessions of the conference cover:

- Physics: classical Thermodynamics and Quantum
- Statistical physics and Bayesian computation
- Geometrical science of information, topology and metrics
- Maximum entropy principle and inference
- Kullback and Bayes or information theory and Bayesian inference
- Entropy in action (applications)

The inter-disciplinary nature of contributions from both theoretical and applied perspectives are very welcome, including papers addressing conceptual and methodological developments, as well as new applications of entropy and information theory.