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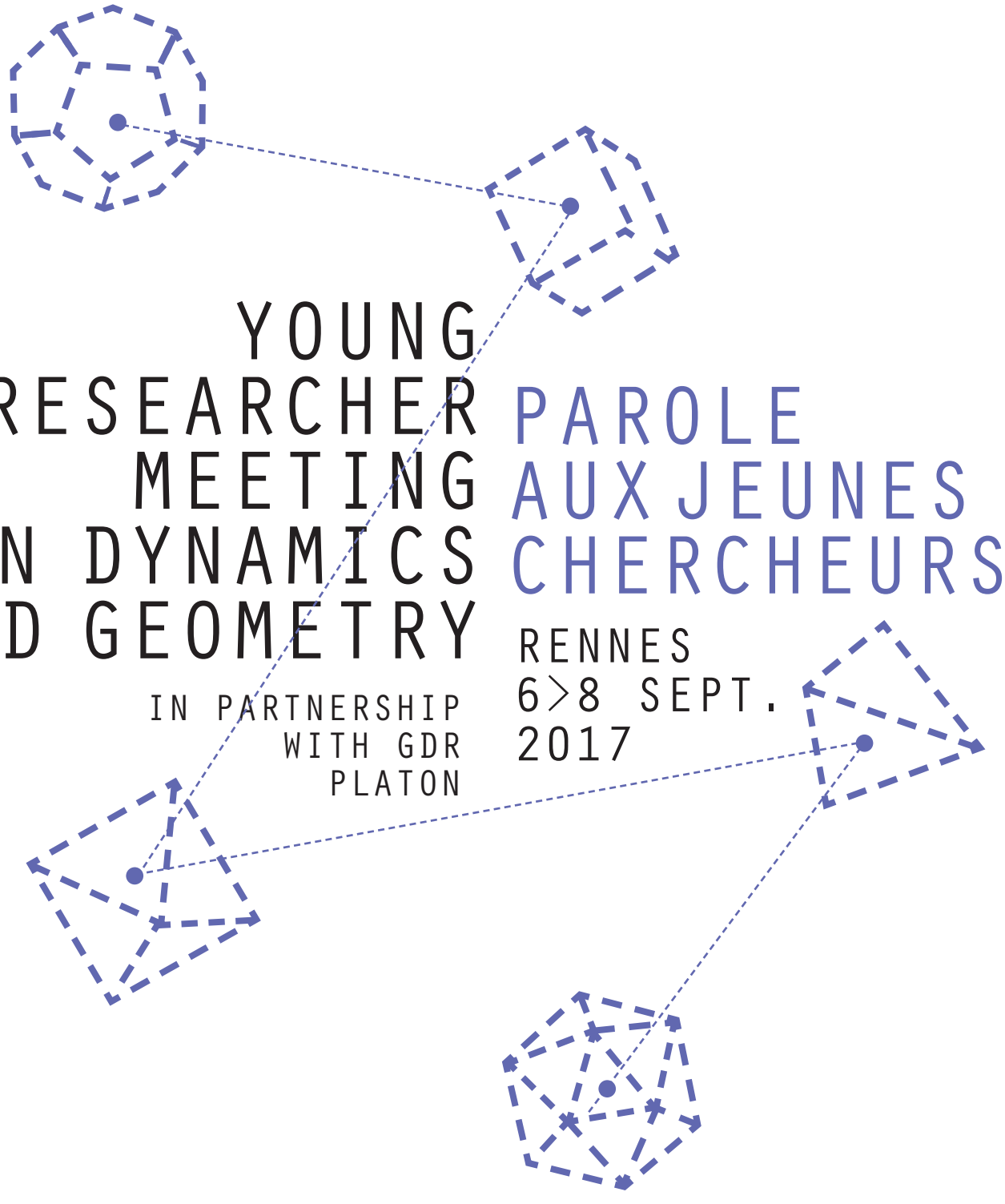

YOUNG RESEARCHER MEETING IN DYNAMICS AND GEOMETRY

PAROLE AUX JEUNES CHERCHEURS

IN PARTNERSHIP WITH GDR PLATON

RENNES
6>8 SEPT.
2017

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Conference « Young researchers in geometry and dynamics »

Rennes, 6-8 september 2017

Programme / Schedule

Mercredi 6 septembre / Wednesday, 6th september

13h 30: *Café, accueil / Welcome, coffee*

14h-14h50: Adam

15h10-16h: Dang Bac

16h-17h: *Thé et postères / Tea and posters*

17h-17h50: Boulanger.

Jeudi 7 septembre / Thursday 7th september

9h-9h50: Cerrochi,

Pause Café / Coffee break

10h20-11h10: Pieroni,

11h30-12h20: Belarif,

Déjeuner au Diapason / Lunch at the Diapason cafeteria

14h20-15h10: Dufloux,

15h30-16h20: Selley,

Thé / Tea

16h50-17h40: Yassine,

19h30: Diner de la conférence / Conference dinner, Restaurant La Fabrique

Vendredi 8 septembre / Friday 8th september

9h30-10h20: Cumplido,

Pause café / Coffee break

10h50-11h40: He,

Déjeuner au Diapason / Lunch at the Diapason cafeteria

13h30-14h20: Fraczyk,

14h40-15h30: Lacoste,

Thé / Tea

Résumés / Abstracts

- Alexander Adam *Resonances for Anosov diffeomorphism*

The deterministic chaotic behavior of an invertible map T is appropriately described by the existence of expanding and contracting directions of the differential of T. A special class of such maps consist in Anosov diffeomorphisms. Every 2-by-2 hyperbolic matrix M with integer entries induces such a diffeomorphism on the 2-torus. For all pairs of real-analytic functions on the 2-torus, one defines a correlation function for T which captures the asymptotic independence of such a pair under the evolution T^n as n tends to infinity. What is the rate of convergence of the correlation as n tends to infinity, for instance what is its decay rate? The resonances for T are the poles of the Z-transform of the meromorphic continued correlation function. The decay rate is well-understood if T=M. There are no non-trivial resonances of M. In this talk, I consider small real-analytic perturbations T of M where at least one non-trivial resonance of T appears. This affects the decay rate of the correlation.

- Kamel Belarif *Genericity of weak mixing in negative curvature*

Let M be a manifold with pinched negative sectional curvature. We show that, when M is geometrically finite and the geodesic flow on T^1M is topologically mixing, the set of mixing invariant measures is dense in the set P(T^1M) of invariant probability measures. This implies that the set of weak-mixing measures which are invariant by the geodesic flow is a dense G-delta subset of P(T^1M). We also show how to extend these results to geometrically infinite manifolds with cusps or with constant negative curvature.

- Adrien Boulanger *Cascades in affine interval exchanges*

Avec un échange d'intervalle affine donné vient naturellement une famille de telles dynamiques indexées par le cercle. En effet, la pré-composition par une rotation de l'application initiale définit un autre échange d'intervalle affine. On étudiera cette famille de dynamiques dans un cas particulier à travers la géométrie de la surface affine associée et son groupe de transformation affine.

An affine interval exchange (AIE) is a piecewise affine map from the circle to itself. Such a map defines a dynamical systems over the circle by iterating it. With an AIE comes naturally a family of AIE indexed by the circle: they are defined by pre-composing the initial AIE by a rotation. The presentation will focus on the study of possible dynamical behaviors of such a family of AIE through a peculiar example.

- Filippo Cerocchi *Rigidity and finiteness for compact 3-manifolds with bounded entropy*

We present some local topological rigidity results for the set S of non-geometric, compact -- with possibly empty boundary and no spherical boundary components --, orientable Riemannian 3-manifolds having torsionfree fundamental group, with bounded entropy and diameter. By "local", we mean that we consider S endowed with the Gromov-Hausdorff-topology. We shall provide examples to show the necessity of the assumptions and discuss some open problems. Moreover, we shall give a proof of the finiteness of the homeomorphism types of the manifolds in S. These are joint works with A. Sambusetti (Rome, Sapienza).

- Maria Cumplido Cabello *Loxodromic actions of Artin-Tits groups*

Artin-Tits groups act on a certain delta-hyperbolic complex, called the ``additional length complex". For an element of the group, acting loxodromically on this complex is a property analogous to the property of being pseudo-Anosov for elements of mapping class groups. A well-known conjecture about mapping class groups claims that "most elements" of the mapping class group of a surface are pseudo-Anosov. In fact, we can prove that a positive proportion is pseudo-Anosov.

By analogy, we conjecture that ``most'' elements of Artin-Tits groups act loxodromically. More precisely, in the Cayley graph of a subgroup G of an Artin-Tits group, the proportion of loxodromically acting elements in a ball of large radius should tend to one as the radius tends to infinity. We will give a condition guaranteeing that this proportion stays away from zero. This condition is satisfied e.g. for Artin-Tits groups of spherical type, their pure subgroups and some of their commutator subgroups.

- N'Guyen-Bac Dang *Degrees of iterates of rational maps*

In this talk, I will explain what is a rational map, how to define its k-degrees, and I will study the k-degrees of its iterates. I will explain how the study of the growth of these sequences of numbers helps in understanding the dynamics of these maps.

- Laurent Dufloux *Hausdorff dimension of limit sets at the boundary of complex hyperbolic planes*

Consider the standard contact structure on the 3-sphere. The associated subriemannian metric has dimension 4. The Gromov comparison problem asks about how the Hausdorff dimension with respect to this subriemannian metric is related tothe Hausdorff dimension with respect to the usual (Riemannian) metric. We will look at this problem in the case of limit sets of discrete groups of complex hyperbolic isometries.

- Mikolaj Fraczyk *Mod p homology growth of locally symmetric spaces*

  I will talk about the growth of the dimension of mod-p homology groups of locally symmetric spaces. Let G be a higher rank Lie group and X its symmetric space and let L be a lattice in G. Results on the rank gradient by Abert, Gelander and Nikolov imply that if L is right angled then for every sequence of subgroups (L_n) of L, the dimensions of the homology groups H_1(X/L_n,Z/pZ) grow sublinearly in the volume of X/L_n. In the special case p=2, I showed that the same statement holds for any sequence of lattices L_n with volume escaping to infinity (even if they are pairwise non-commensurable).

- Weikun He *Sum-product estimates and equidistribution of toral automorphisms*

Bourgain's sum-product theorem is a metric version of ErdÅ‘s-SzemerÃ©di sum-product theorem. It asserts that a typical set of real numbers grows fast under addition and multiplication. We will present a generalisation of Bourgain's theorem to matrix algebras and discuss how it is motivated by a ergodic problem, namely, quantitative equidistributions of orbits on the d-dimensional torus under sub-semigroups of SL(d,Z).

- Cyril Lacoste *Dimension rigidity of lattices in semisimple Lie groups*

We study actions of discrete groups on classifying spaces (or classifying spaces for proper actions). For instance the hyperbolic plane is a classifying space for proper actions of the group PSL(2,Z) (but not of minimal dimension). Such spaces can be used to compute the cohomology of the group, so we want them to have the lowest possible dimension. This leads us to the definitons of the (proper) geometric dimension and the (virtual) cohomological dimension. These two dimensions are not always equal, we will see it is the case for a lattice in the group of isometries G of a symmetric space of non-compact type without Euclidean factors (such a group is a semisimple Lie group but not necessarily connected). This result has an important consequence called "dimension rigidity", that is, the two dimensions are still equal for a group commensurable to a lattice of G.

- Erika Pieroni *Minimal Entropy of 3-manifolds*

We present the solution of the minimal entropy problem for non-geometric, closed, orientable 3-manifolds (that is, those manifolds which do not admit a com- plete metric locally isometric to one of the eight 3-dimensional model geometries). Together with the results of Besson-Courtois-Gallot for locally symmetric spaces and the work of Soma, Gromov et.al. on the simplicial volume of 3-manifolds and its relation with

entropy, this gives a complete picture of the minimal entropy prob- lem for all closed, orientable 3-manifolds. Our work strongly builds on Souto's PhD work (unpublished), filling some gaps in the proof and completing the picture in the case of non-prime manifolds. In detail, we show that the minimal entropy is ad- ditive with respect to the prime decomposition and that for an irreducible manifold X it coincides with the sum of the volume entropies of all the JSJ components of hyperbolic type, each endowed with its complete, hyperbolic metric of nite volume. For the lower bound of MinEnt(X), we adapt Besson-Courtois-Gallot's barycenter method following Souto's ideas; then, we show how this lower bound is realized by producing a sequence of Riemannian metrics gk on X whose volume-entropies tend to

- Fanni M. Selley *Ergodicity breaking in mean-field coupled map systems*

Coupled map systems are simple models of a finite or infinite network of interacting units. The dynamics of the compound system is given by the composition of the (typically chaotic) individual dynamics and a coupling map representing the characteristics of the interaction. The coupling map usually includes a parameter s in [0,1], representing the strength of interaction. The main interest in such models lies in the emergence of bifurcations when s is varied. We first introduce our results for small finite systems. Then we initiate a new point of view which focuses on the evolution of distributions and allows to incorporate the investigation of a continuum of sites.

- Nasab Yassine *Quantitative recurrence of one-dimensional dynamical systems preserving an infinite measure*

We are interested in the asymptotic behaviour of the first return time of the orbits of a dynamical system into a small neighbourhood of their starting points. We study this quantity in the context of dynamical systems preserving an infinite measure. More precisely, we consider the case of Z-extensions of subshifts of finite type. We also consider a toy probabilistic model in order to enlighten the strategy of our proofs.

Informations pratiques / Practical informations

Les exposés auront lieu dans la salle 04-06 de l'IRMAR. / Talks will take place in the room 04-06 of the math department, building 22-23.

The IRMAR Insitute is located in the north-east of the city within the Beaulieu campus.

The bus is probably the most practical way to reach the IRMAR. Rennes has a large bus network (see here) and the bus ticket (1.50 euros in the subway stations or directly to the bus driver) can be used during one hour. From the city centre you need to take either bus C4, C6, 40Ex or 41Ex and stop at **Tournebride** or **Restaurant Universitaire**.

You can find a map of the campus here.

https://www.univ-rennes1.fr/files/documents/plan_a4_rentree_sept_2016.pdf

See the website https://www.lebesgue.fr/fr/content/sem2017-platon-info for more informations.

Accomodation

Most participants have a room at the **Cité internationale** in the center of Rennes, or at the **cité universitaire de l'INSA ,** near the campus.

The « Cité internationale » is 5 minutes walk away from the train station. It is 5 min walk to the bus stop C4 at République. It is open 24 hours a day, and if you stay there, you received specific instructions from them.

The « Cité universitaire de l'INSA » is located near the Campus of Beaulieu (bus C4, stop IUT, buildings 13 to 15, see the map at the end).

→ If you arrive on wednesday, 6th september, you will receive your keys and precise indications during the welcome coffee at 1.30 pm in the math building.

→ If you arrive on tuesday, 5th september, you can receive your keys in the office of Emmanuelle Guiot, just on the right at the entrance of the math building, between 4 pm and 4.45 pm.

If you arrive later on tuesday or another day, please contact Barbara Schapira (+33) 6 52 30 10 27 or barbara.schapira@univ-rennes1.fr as soon as possible.

Participants who are lodged at the INSA will have a breakfast offered wednesday, thursday and friday morning at the cafeteria close to the math department, building 27 at 8:00 a.m.

Meals

Lunches are offered at the cafeteria « Le Diapason », building 36 on the campus map.

The conference dinner will take place at « La Fabrique », 4 rue St Georges, near the « place du Parlement » in the historical center. (Tel 02 99 77 29 18).

Wifi

The network eduroam is available on the campus. Please contact us if you need help.

Contact

The organizers are Françoise Dal'bo, Frédéric Paulin, Barbara Schapira, Damien Thomine.
You can contact us by email.
If necessary, for administrative questions, you can also contact Xhensila Lachambre (xhensila.lachambre@univ-rennes1.fr) or Emmanuelle Guiot emmanuelle.guiot@univ-rennes1.fr

Liste des participant-e-s / List of participants

Adam	Alexander	Université Pierre et Marie Currie
Barbot	Thierry	Uiversité d'Avignon
Belarif	Kamel	UBO
Bellis	Alexandre	Rennes 1
Benard	Timothée	Paris 6
Blayac	Pierre-Louis	UPMC
Boulanger	Adrien	Paris 6
Cerocchi	Filippo	Max-Planck-Institut für Mathematik, Bonn
Cornulier	Yves	Université Paris Sud
Coudene	Yves	universite de Brest
Cumplido	María	Université Rennes 1/ Universidad de Sevilla
Dal'Bo	Francoise	Rennes1
Dang	Nguyen-Bac	CMLS-Université Paris Saclay
Dang	Nguyen-Thi	Université de Rennes 1
Diaw	Adjaratou Arame	université de Rennes 1
Dougall	Rhiannon	University of Warwick
Dufloux	Laurent	Oulu University
Dussaule	Matthieu	Nantes
Fraczyk	Mikolaj	Université Paris Sud
Gilles	Alexis	Côte d'azur
Glorieux	Olivier	Université du Luxembourg
Gordenko	Anna	Université Rennes 1
He	Weikun	Université Paris-Sud
Jézéquel	Malo	Université Paris-Sud
Kleptsyn	Victor	Université Rennes 1, IRMAR
Labeni	Hicham	Université Cergy-Pontoise
Lacoste	Cyril	Université Rennes 1
Ledrappier	François	Paris 6
Marquis	Ludovic	Université de Rennes 1
Martin-Baillon	Florestan	Université Cergy-Pontoise
Mincsovicsné Sélley	Fanni	Budapest University of Technology
Mion-Mouton	Martin	Strasbourg
Nkunzimana	Rénovat	Université Cheikh Anta Diop de Dakar (Sénégal)
Norberto Matos De Almeida	Uirá	Universidade de São Paulo
Obata	Davi	Université Paris-Sud (Orsay)
Pallier	Gabriel	Université Paris-Sud
Paulin	Frédéric	Université Paris-Sud
Pieroni	Erika	Università degli studi di Roma "La Sapienza"
Schapira	Barbara	Rennes 1
Sy	Fatimata	Cheikh Anta Diop de Dakar
Tapie	Samuel	Université de Nantes
Thiandoum	Adama	Université Cheikh Anta Diop de Dakar
Thomine	Damien	Paris-Sud
Trujillo	Frank	Univeriste Paris Diderot
Vernicos	Constantin	Université de Montpellier
Yassine	Nasab	Université de Bretagne Occidentale

GdR Platon 3341

QUELQUES CONSEILS AUX DOCTORANTS

OBLIGATOIRE : un site internet personnel universitaire (pas sur facebook ni sur LinkedIn !), même si on n'a pas encore d'article à y déposer.
Utile : créer une fiche MARS sur le site de l'Opération Postes.

Mettre ses articles sur HAL (avec extraction automatique sur arXiv), ou une notice bibliographique sur HAL si article déjà déposé sur arXiv.

Date limite de soutenance de thèse pour la qualification 2018 : **13 décembre 2017**.
ATTENTION : procédures parfois en 2 temps : pré-inscription puis envoi du dossier. Pour la qualification : pré-inscription avant le **24 octobre** !
Consulter le site officiel du ministère (le portail Galaxie) et Opération Postes pour les dates.

Associations de doctorants

— Confédération des jeunes chercheurs
`jeunes-chercheurs.org`

— Agir pour les doctorants et les jeunes docteurs
`addoc.asso.u-psud.fr`

— Association Bernard Gregory `intelliagence.fr`

L'intelli'agence
www.intelliagence.fr

Candidatures post-doc et ATER :

Attention, si vous voulez effectuer un post-doc l'année universitaire suivant votre thèse (que ce soit à partir d'octobre si vous avez soutenu avant septembre ou à partir de janvier ou février si vous soutenez par exemple en décembre), il faut parfois candidater longtemps à l'avance. C'est souvent le cas pour les Etats-Unis (s'y prendre typiquement avant novembre de votre troisième année de thèse) et pour quelques fondations, dont FMSP et FMJH.

Quelques sites où des offres de post-doc sont disponibles :

— Opération Postes
`postes.smai.emath.fr/postdoc/`
Sont aussi indiqués sur le site d'Opération Postes des postes d'agrégés préparateurs, d'ATER, etc.
— FMJH : Programme international Post-Doc FMJH et LMH et Lecteurs Hadamard
— FSMP : `sciencesmaths-paris.fr`
— IHES : Bourses IPDE
— CEMPI : `math.univ-lille1.fr/cempi`
— Site américain : MathJobs (attention aux dates limites aux Etats-Unis d'Amérique, elles sont souvent vers novembre de l'année précédente)
— Site européen (EMS) : euro-math-soc.eu (rubrique "Jobs")
— Site anglais : jobs.ac.uk (rubrique "Academic jobs")

Les candidatures aux postes d'ATER sont en général à effectuer en mai, mais cela dépend de chaque université, se renseigner à partir de janvier.

Candidatures à des emplois extra-académiques

Pour des offres d'emploi, voir par exemple le site de l'APEC et le site Offres d'emplois, salons de recrutement de l'université Paris-Saclay.
Pour des offres d'emploi en entreprise et dans des start-up, il est particulièrement recommandé de consulter le site d'offres d'emploi `jobs.eu-maths-in.eu` de l'Agence pour les mathématiques en interaction avec l'entreprise et la société AMIES.

Forum Emploi Math (AMIES) : **13 décembre 2017**, Cité des Sciences, La Villette, Paris. `forum-emploi-maths.org/`

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Lecture Halls

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D
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Cafétéria

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Plate-Forme Technologique
GCM - Génie Civil & Mécanique
Mechanics & Civil Engineering Technology Platform

9
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GCM - Génie Civil & Mécanique
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12
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Courrier

15
Résidence
CÉZEMBRE
Ouest INSA - Junior Entreprise

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Résidence
LES GLÉNAN

17
Halle Francis Querné

18
Département
INFO
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IRISA-INSA

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Library

20
Espaces verts

22
Serres

23
Cafétéria étudiants
Foyer
Students' Cafeteria & Hall

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Station de vélos Star
Abris vélos
Stationnements
Stationnements réservés
Voiture électrique
Espaces verts
Défibrillateurs

INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES RENNES

Institut Universitaire de Technologie (IUT)

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- 3E, 3T • Département génie civil, CNAM
- 4A, 4E • Administration chimie, Département chimie
- 5E, 5T • Département GMP
- 6E, 6T • Département GEII
- 8A • Départements carrières sociales et GEA
- 8B • Bibliothèque Paul Le Bohec • Salle Condorcet

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- 2A • Appariteurs zone Sud • Amphis A, B, C, D, E, Louis-Antoine • Hall des examens
- 2B • TP informatique
- 3 • TP zoologie
- 4 • TP botanique • Collections et musée de zoologie
- 5 • TP géologie, électronique • Collections et musée de géologie
- 5A • Salle d'enseignement, IUT GEA
- 6 • TP physique, électronique
- 7 • TP chimie
- 8A • IUT Carrières sociales, GEA • Salle d'examen • SMUT, action sociale
- 8B • Bibliothèque Paul Le Bohec, • Salle Condorcet
- 9A • Pôle images et réseaux • Salle immersive INRIA • Salle visioconférence (PNRB)
- 9B • Pôle Numérique Rennes Beaulieu (PNRB), SUPTICE
- 10 ABC • Institut des Sciences Chimiques de Rennes (ISCR)
- 10B • Amphi Daniel Grandjean • IPR- mécanique
- 11 ABCE • Institut de Physique de Rennes (IPR)
- 11A • CRMPO
- 11 BCD • IETR (électronique)
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- 12 ABCEFG • IRISA, INRIA (informatique), • Amphi G (INRIA)
- 12D • ISTIC (UFR), amphi P, DSI,
- 13 • UFR SVE, IGDR
- 14A, B • OSUR, ECOBIO, Géosciences

- 15 • Géosciences Rennes, OSUR
- 16 • Pôle mécanique
- 19 • Local colis
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- 23 • IRMAR (Mathématiques)
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