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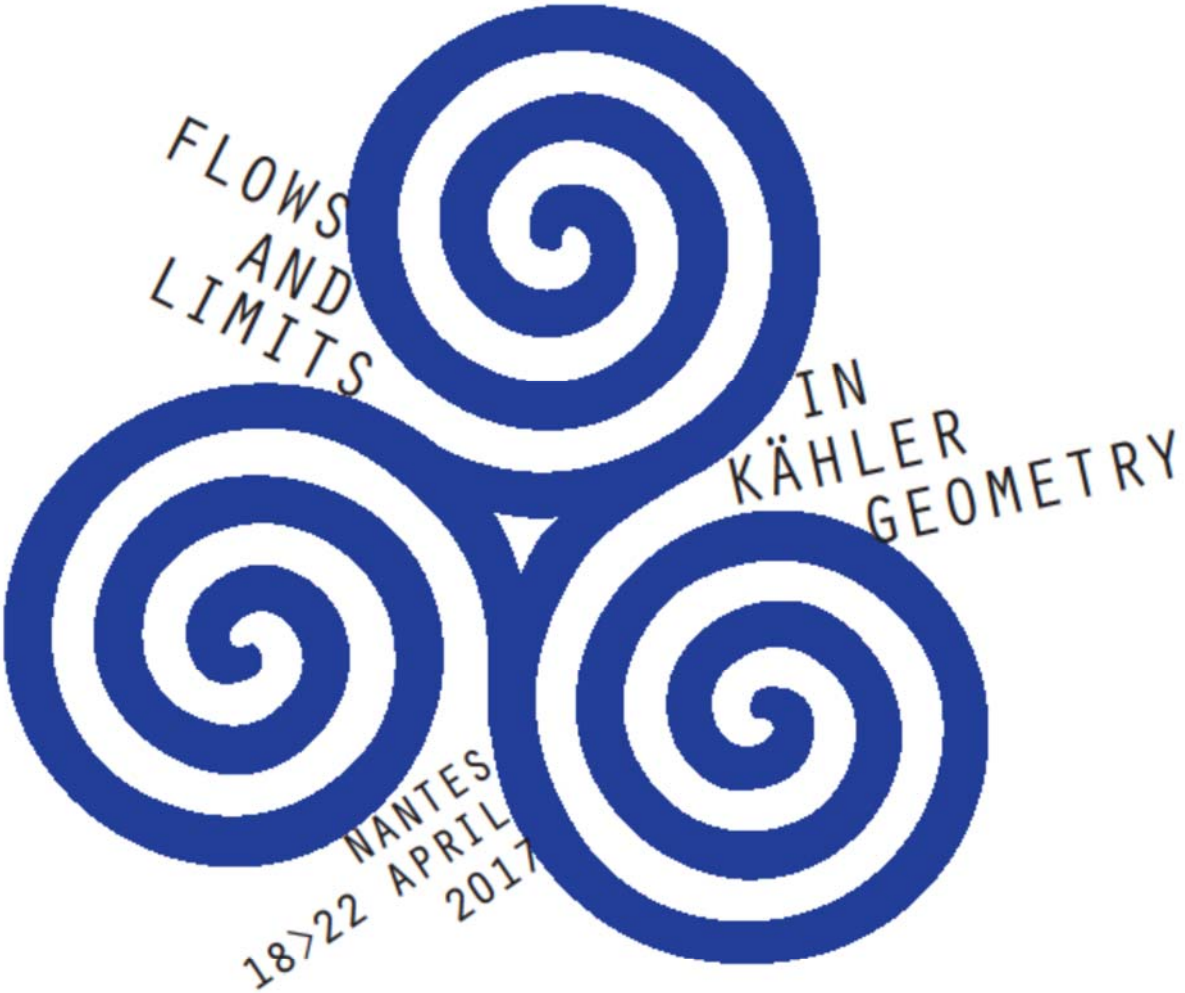
CENTRE DE MATHÉMATIQUES



SPEAKERS

BO BERNDTSSON
CHALMERS UNIVERSITY

HANS JOACHIM HEIN
FORDHAM UNIVERSITY

VALENTINO TOSATTI
NORTHWESTERN UNIVERSITY

JEFF VIACLOVSKY
WISCONSIN UNIVERSITY

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LABORATOIRE DE MATHÉMATIQUES DE BRETAGNE ATLANTIQUE
LABORATOIRE ANGEVIN DE RECHERCHE EN MATHÉMATIQUES

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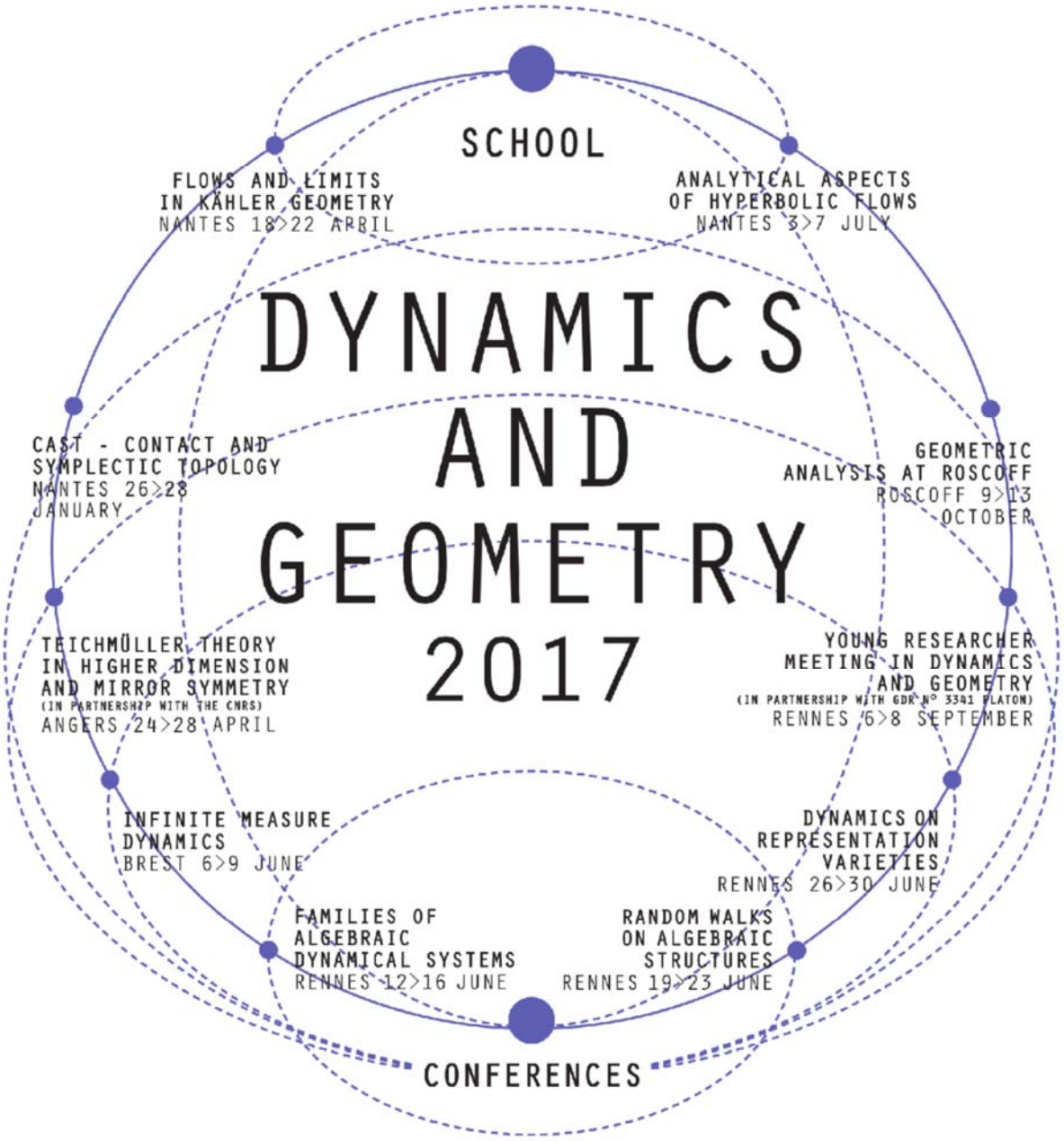

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Coming to the Campus

From downtown: At the station "Commerce" take the tramway line 2 in the direction of "Orvault-Grand Val". Get off at the station "Michelet Sciences". The cost of an one-hour-valid ticket is 1,60 Euros and there are some vending machines at each stop. You can also buy a book of 10 tickets which costs 14,70 Euros.

From the train station: Upon your arrival at the main station (La Gare), take the north exit (Sortie nord) and walk in the direction of the tramway stop "La Gare" which is in front of the main entrance of the station. Take the tramway line 1 in the direction of "François Mitterrand", get off at "Commerce" then take the tramway line 2 in the direction of "Orvault-Grand Val" and get off at "Michelet Sciences". The cost of an one-hour-valid ticket is 1,60 Euros and there are some vending machines at each stop. You can also buy a book of 10 tickets which costs 14,70 Euros.

Once on the campus: Walk to building 34 where the conference will take place (see map 2).

Attention: The vending machines may not take non-France issued credit/Banking cards. Almost certainly, they will not take US issued credit/ATM cards.
For detailed bus and tramway schedules please visit **TAN** (http://www.tan.fr).

From the Nantes-Atlantique airport (http://www.nantes.aeroport.fr):

By bus: You can get to the city center by the airport shuttle bus (TAN AIR Shuttle) in 20 minutes. The final stop of the shuttle is "Commerce" and there is one bus every 30 minutes. From there you can take the tramway line 2 in the direction of "Orvault Grand Val" and get off at "Michelet Sciences". The cost of an one-hour-valid ticket is 8,50 Euros, valid for tramway and bus.

By taxi: At the main entrance of the Hall 4 you will find a taxi shelter where you can call for a taxi to pick you up.

Accommodation

The speakers of the conference will be accomodated in the hotel « Voltaire».

10 Rue Gresset
44000 Nantes
Phone +33 (0)2 40 73 31 04

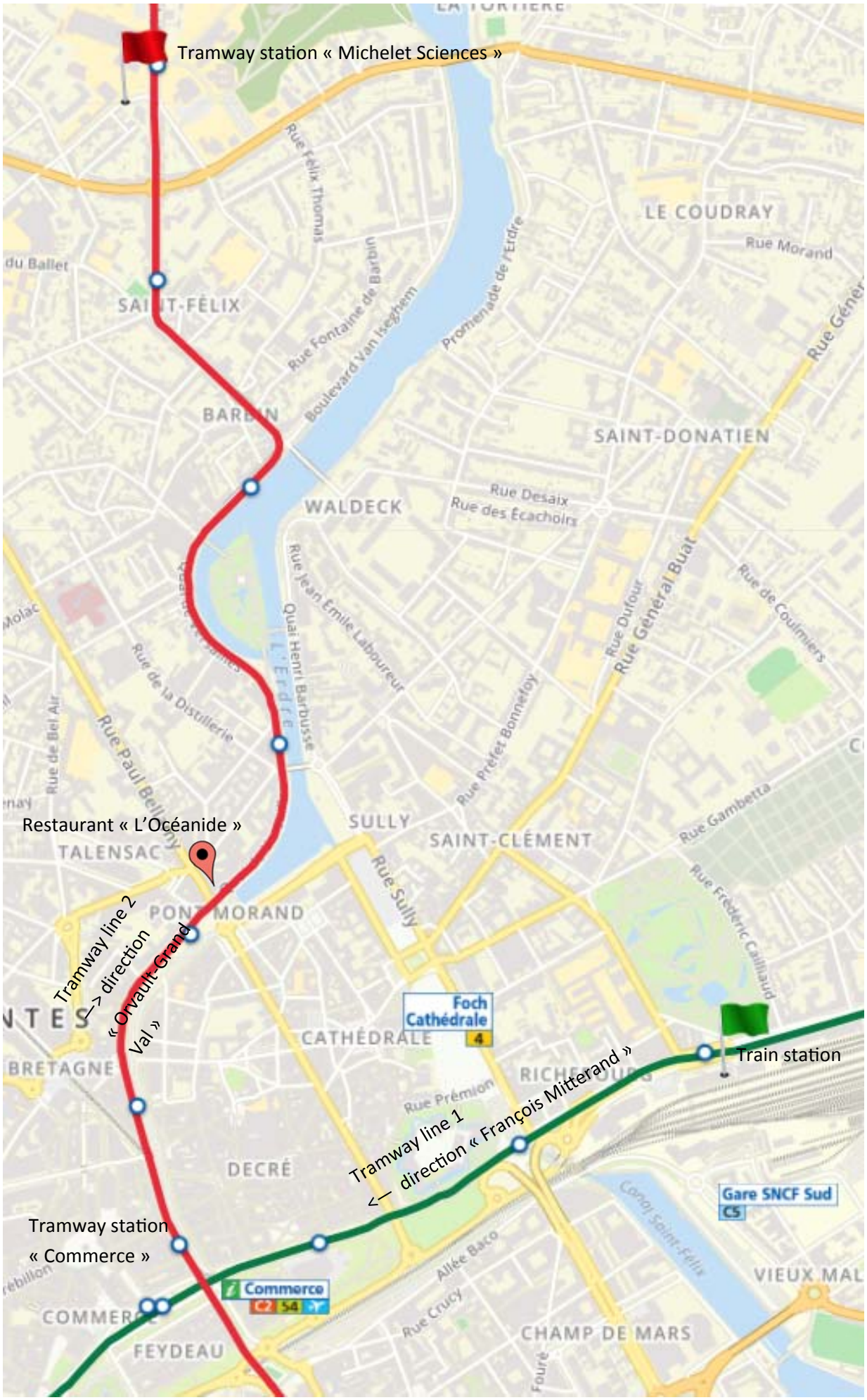
The participants will be accomoded in the hotel «Duc de Bretagne »

2/4 Rue Emile Pehant
44000 Nantes
Phone +33 (0)2 40 35 25 02

Restaurants in Nantes

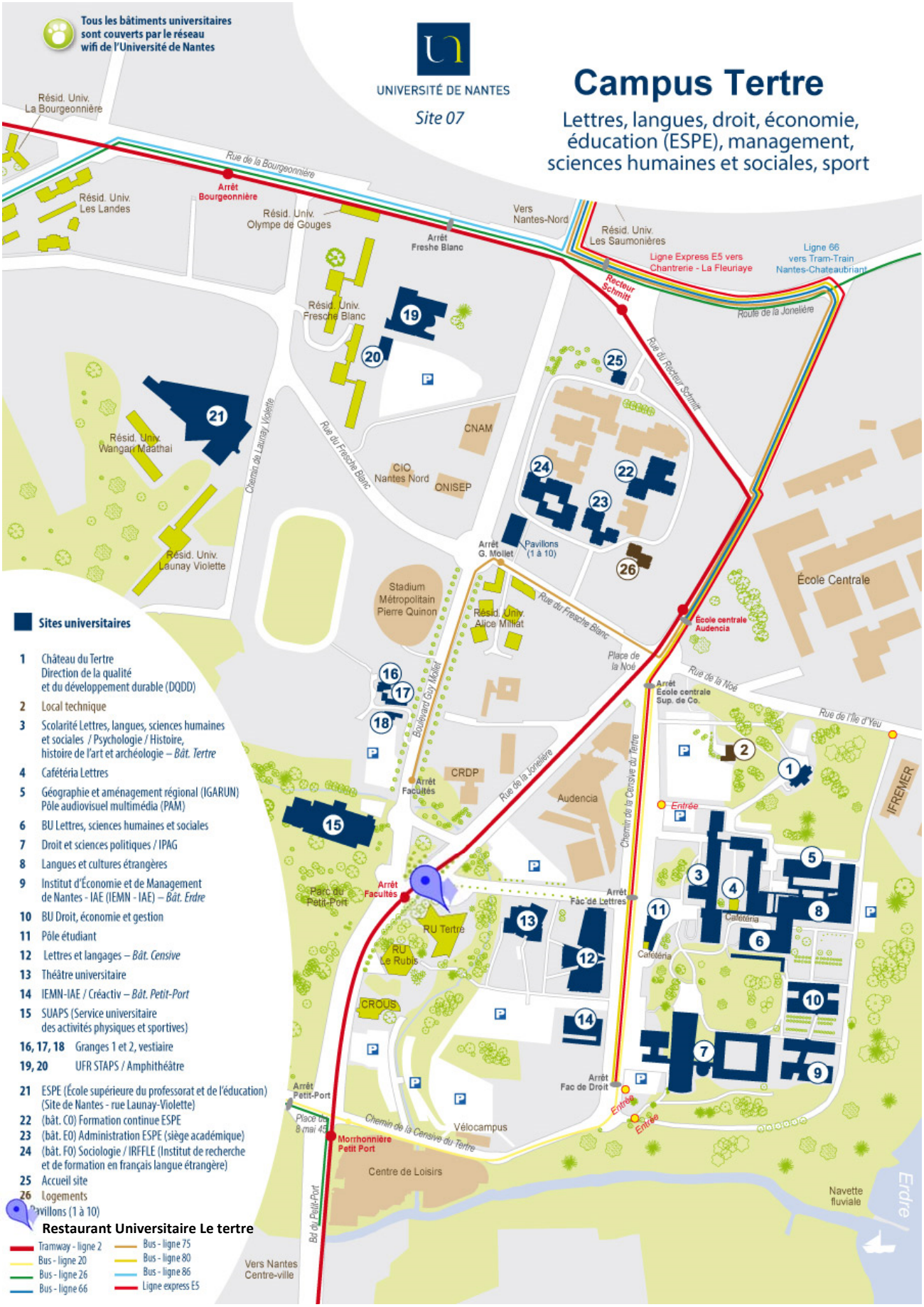
Les tables de Nantes: http://www.lestablesdenantes.fr

Map 1: Train station - Campus Sciences



Map 2: Campus Sciences - Amphi Pasteur

Map 3 : Restaurant Universitaire « Le Tertre »



Vers Campus Lombarderie

Laboratoire de Mathématiques Jean Leray : Information and facilities

Maths Building (n°10 on map 2)

Organizers of the conference:

- Yann Rollin - office 122 - Mobile phone +33 (0)6 58 96 62 48
- Carl Tipler - Mobile phone +33(0)6 74 16 46 05

Laboratory secretary :

- Stéphanie Benoit - Office 130 - Phone +33 (0)2 51 12 58 78
- Annick Egurbide - Office 125 - Phone +33 (0)2 51 12 59 01
- Ana Paula Dutra-Azevedo - Office 125 - Phone +33 (0)2 51 12 59 95
- Anaïs Goulian - Office 136 - Phone +33 (0)2 51 12 59 04

Department secretary :

- Brigitte Joubert - Office 141 - Phone +33 (0)2 51 12 59 00

Wifi network and internet access

How to connect to the wifi network "univ-nantes":
After starting the browser you will have access to the web page of the University of Nantes.
Enter the login and the password that you will find on the backside of your badge.
Mark with a cross the box "*J'ai pris connaissance de la charte d'utilisation et j'en accepte les termes*."
You can print documents in the computer room 127 (please bring a usb key).
To have access to the room, please see the secretaries .

IT service - Office 143
Saïd El Mamouni Phone +33 (0)2 51 12 59 45 - Eric Le Douaran Phone +33 (0)2 76 64 50 56
E-mail: mathsys@univ-nantes.fr

The library - Centre Régional de Documentation Mathématique (CRDM)

http://www.math.sciences.univ-nantes.fr/CRDM/

Access: Building 25 (directly accessible by Mathematics building)

Office hours: Monday to Friday : 9:00 am to 17:30

Librarian:

Claude Jouault: library reception - Phone +33 (0)2 51 12 59 02

Dinner – Thursday April 20th at 7.30pm

Restaurant "Océanide"

2 Rue Paul Bellamy, 44000 Nantes

Phone: 33 (0)2 40 12 14 34

The restaurant « L'Océanide » (see map 1) is located close to the tramway line 1, stop : 50 Otages

List of participants

Abdeloihed	Chrih	University of Monastir Tunisia
Aguilar-Aguilar	Rodolfo	Cinvestav, National Polytechnic Institute
Arezzo	Claudio	ICTP Trieste Italy
Berntsson	Bo	Université de Göteborg - Suède
Biquard	Olivier	Université Pierre et Marie Curie
Boucksom	Sébastien	Ecole Polytechnique Paris-Saclay
Cao	Junyan	Université Paris 6
Carron	Gilles	Université de Nantes
Clarke	Andrew	Universidade Federal do Rio de Janeiro
Delcroix	Thibaut	ENS Paris
Di Nezza	Eleonora	Imperial College London
Dinew	Slawomir	Jagiellonian University
Dixon	Kael	Université Libre de Bruxelles
Dong	Xin	Jagiellonian University
Dwivedi	Shubham	University of Waterloo
Fang	Yanbo	IMJ-PRG
Gauduchon	Paul	Ecole Polytechnique Palaiseau
Gontard	Sébastien	Université Grenoble Alpes (ex UJF)
Hashimoto	Yoshinori	Université d'Aix-Marseille
Hein	Joachim	Institute Jena Germany
Hultgren	Jakob	Chalmers University of Technology
Lefèvre	Louis-Clément	Université Grenoble Alpes
Li	Xiaoxiao	University of Notre Dame
Li	Yang	Imperial College London
Luckhardt	Daniel	University of Göttingen
Mccleerey	Nicholas	Northwestern University
Myga	Szymon	Jagiellonian University
Nguyen	Ngoc Cuong	Gaia, Postech University
Ouakkas	Seddik	Université de saida - Algérie
Pujia	Mattia	Università degli Studi di Torino
Rollin	Yann	Université de Nantes
Salis	Filippo	Università di Cagliari
Shareif	Albasher	Pedagogical University of Krakow
Sjöström Dyrefelt	Zakarias	Université Paul Sabatier
Subedi	Bishnu Hari	Tribhuvan University, Kathmandu, Nepal
Tipler	Carl	UBO
Tosatti	Valentino	Northwestern University, Evanston
Trusiani	Antonio	Università di Roma Tor Vergata
Vernier	Caroline	Université de Nantes
Viaclovsky	Jeff	University of Wisconsin, Madison
Wang	Xu	University of Gothenburg, Chalmers
Yotsutani	Naoto	Fudan University
Zeriahi	Ahmed	IMT, Université Paul Sabatier-Toulouse3

Program

Tuesday 18th	
9am - 10am	Welcome and registrations
10am - 11am	**Bo Berndtsson** 1
11am - 11.15am	Coffee break
11.15am - 12.15am	**Bo Berndtsson** 2
12.30am - 2pm	Lunch
2pm - 3pm	**Jeff Viaclovsky** 1
3pm - 3.15pm	Coffee break
3.15pm - 4.15pm	**Jeff Viaclovski** 2
4.15pm - 4.30pm	Break
4.30pm - 5.30pm	**Thibaut Delcroix**

Wednesday 19th	
10am - 11am	**Valentino Tosatti** 1
11am - 11.15am	Coffee break
11.15am - 12.15am	**Valentino Tosatti** 2
12.30am - 2pm	Lunch
2pm - 3pm	**Hans Hein** 1
3pm - 3.15pm	Coffee break
3.15pm - 4.15pm	**Hans Hein** 2
4.15pm - 4.30pm	Break
4.30pm - 5.30pm	**Eleonora Di Nezza**

Thursday 20th	
9am - 10am	**Bo Berndtsson** 3
10am - 10.15am	Coffee break
10.15am - 11.15am	**Bo Berndtsson** 4
11.15am - 12.15am	**Jakob Hultgren**
12.30am - 2pm	Lunch
	Free afternoon
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7.30pm	Dinner at the restaurant "L'Océanide"

Program

Friday 21th	
10am - 11am	**Jeff Viaclovsky** 3
11am - 11.15am	Coffee break
11.15am - 12.15am	**Jeff Viaclovsky** 4
12.30am - 2pm	Lunch
2pm - 3pm	**Hans Hein** 3
3pm - 3.15pm	Coffee break
3.15pm - 4.15pm	**Hans Hein** 4
4.15pm - 4.30pm	Break
4.30pm - 5.30pm	**Zakarias Sjostrom Dyrefelt**
Saturday 22th	
9am - 10.00am	**Valentino Tossatti** 3
10am - 10.15am	Coffee break
10.15am-11.15am	**Valentino Tossatti** 4

* Lunch will be taken at the Restaurant Universitaire « Le Tertre » (see map 3).

** The conference dinner will take place at the restaurant « L'Océanide» (see map 1).

Bo Berndtsson (Chalmers University) : *Direct image bundles and variations of complex structures*

Given a smooth proper fibration $p: X \to B$ and L a line bundle over X, the direct image

$$E := p_*(L)$$

is in many cases a holomorphic vector bundle over B. Its fibers are the species of holomorphic sections of L over the fibers of p, $X_t = p^{-1}(t)$, and they can be given various L^2-metrics. In case the fibration is of relative dimension n so that the fibers are compact Riemann surfaces, special cases of this situation can be used to study the variation of complex structures on the fibers X_t. (The fibers are all diffeomorphic, but their complex structure varies with t, so we can view the family X_t as a family of variations of complex structures on one fixed smooth manifold.) When the relative dimension is higher than one the situation is more complicated and one needs to consider also higher direct images. I will discuss the problems that arise in this connection, with previous work of Siu, Schumacher and To-Yeung and some recent joint work with Xu Wang and Mihai Paun.

Hans-Joachim Hein (Fordham University) : *Tangent cones of Calabi-Yau varieties*

It has been known for about 10 years that the classical Calabi-Yau theorem on the existence and uniqueness of Ricci-flat Kaehler metrics on smooth complex manifolds with zero first Chern class can be extended to a natural setting of weak Kahler metrics on singular complex varieties. However, until relatively recently nothing was known - even in the simplest nontrivial examples - about the precise asymptotic behavior of these weak Ricci-flat metrics at the singularities of the underlying varieties. I will explain work of Donaldson-Sun, H-Naber and H-Sun that resolves this question in certain cases.

Valentino Tosatti (Northwestern University) : *Metric Limits of Calabi-Yau Manifolds*

In this mini-course I will give an introduction to the study of limits of Ricci-flat Kaehler metrics on a compact Calabi-Yau manifold when the Kahler class degenerates to the boundary of the Kahler cone. Analytically, the problem is to prove suitable uniform a priori estimates for solutions of a degenerating family complex Monge-Ampre equations, away from some singular set. Geometrically, this can be used to understand the Gromov-Hausdorff limit of these metrics. And if the manifold is projective algebraic and the limiting class is rational, the limits possess an algebraic structure and are obtained from the initial manifold via contraction morphisms from Mori theory.

Jeff Viaclovsky (Wisconsin University) : *The geometry of SFK ALE metrics*

I will discuss some of the basics of scalar-flat Kaehler (SFK) metrics, and focus on the geom-etry of SFK metrics which are asymptotically locally Euclidean (ALE). These space arise as ”bubbles” in the compactness theory of Calabi’s extremal Kaehler metrics. I will also present some of the deformation theory of SFK ALE metrics.

Thibaut Delcroix (ENS Paris) : *Kaehler geometry of horospherical manifolds*

Horospherical manifolds form a class of almost homogeneous manifolds whose Kaehler geom-etry is very close to that of toric manifolds. They strictly contain homogeneous toric bundles,to which a lot of results holding for toric manifolds have been extended. I will present horo-spherical manifolds, trying to convince you that they are not much harder to deal with, and in particular I will present the criterion for K-stability in the Fano case that follows either from my work on spherical varieties, or from a direct, Wang-Zhu type, approach.

Eleonora Di Nezza (Imperial College) : *Monge-Ampre energy and weak geodesic rays*

The recent proof of Demailly' s conjecture by Witt Nystrm gives another evidence that pluripo-tential theory play a key role when working with complex Monge-Ampre equations in order to solve problems in differential and algebraic geometry. In this talk we investigate pluripotential tools: we characterise Monge-Ampre energy classes in terms of envelopes. And in order to do that, we develop the theory of weak geodesic rays in a big cohomogy class. We also give a positive answer to an open problem in pluripotential theory. This is a joint work with Tamas Darvas and Chinh Lu.

Jakob Hultgren (Chalmers University) : *Coupled Kaehler-Einstein Metrics*

A central theme in complex geometry is to study various types of canonical metrics, for ex-ample Kaehler-Einstein metrics and cscK metrics. In this talk we will introduce the notion of coupled Kaehler-Einstein (cKE) metrics which are k-tuples of Kaehler metrics that satisfy certain coupled Kaehler-Einstein equations. We will discuss existence and uniqueness prop-erties and elaborate on related algebraic stability conditions. (Joint work with David Witt Nystrm)

Zakarias Sjostrom Dyrefelt (Université de Toulouse) *: K-stability of constant scalar curvature Kähler manifolds*

In this talk we introduce a variational/pluripotential approach to the study of K-stability of Kähler manifolds with transcendental cohomology class, extending a classical picture for polarised manifolds. Our approach is based on establishing a formula for the asymptotic slope of the K-energy along certain geodesic rays, from which we deduce that cscK manifolds are K-semistable. Combined with a recent properness result of R. Berman, T. Darvas and C. Lu we further deduce uniform K-stability of cscK manifolds with discrete automorphism group, thus confirming one direction of the YTD conjecture in this setting. If time permits we also discuss possible extensions of these results to the case of compact Kähler manifolds admitting holomorphic vector fields.

Nantes tourism

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