

**Special Hermitian metrics
on non-Kähler manifolds**

Firenze, April 20–22, 2016

Program

	wednesday April 20th, 2016	thursday April 21st, 2016	friday April 22nd, 2016
09:00 – 10:00	Weinkove 1	Weinkove 2	Weinkove 3
10:00 – 10:30	<i>coffee break</i>	<i>coffee break</i>	<i>coffee break</i>
10:30 – 11:30	Otiman	Pontecorvo	Lock
11:30 – 12:00	Stanciu	Tardini	
12:00 – 14:30	<i>lunch break</i>	<i>lunch break</i>	<i>lunch break</i>
14:30 – 15:30	Ornea	Apostolov	
15:30 – 16:00	<i>coffee break</i>	<i>coffee break</i>	
16:00 – 17:00	Moroianu	Fino	

Abstracts

Course

BEN WEINKOVE

TITLE: *The complex Monge-Ampère equation on non-Kähler manifolds*

ABSTRACT: In this mini-course I will describe recent progress on complex Monge-Ampère equations on non-Kähler manifolds and applications to existence of special metrics. I will also include some details of the proofs and techniques. The mini-course is intended for a broad audience. In my first lecture I will discuss some background and motivation, and give an overview of the latest developments in this area. In the second lecture I will begin a discussion of the a priori estimates required to prove existence of solutions to these equations in the non-Kähler setting, starting with the “zero order” estimate. In the third lecture, I will talk about the key second order estimates for Monge-Ampère equations, and describe the difficulties arising from the non-Kähler torsion terms. Finally, I’ll discuss some open problems in the field.

Talk

VESTISLAV APOSTOLOV

TITLE: *Locally Conformally Symplectic Structures on Compact Non-Kähler Complex Surfaces*

ABSTRACT: In this talk I will show that every compact complex surface with odd first Betti number admits a locally conformally symplectic 2-form which tames the underlying almost complex structure. I will then discuss a few possible ramifications of this result. This is a joint work with Georges Dloussky.

Talk

ANNA FINO

TITLE: *Special hermitian metrics in symplectic geometry*

ABSTRACT: Symplectic forms taming complex structures on compact manifolds are strictly related to a special type of Hermitian metrics, known in the literature also as “pluriclosed” metrics. I will present some general results on “pluriclosed” metrics and their link with symplectic geometry on compact solvmanifolds. Moreover, I will show for certain 4-dimensional non-Kähler 4-manifolds some recent results about the Calabi-Yau problem in the context of symplectic geometry.

Talk

MIKE LOCK

TITLE: *Special Hermitian metrics characterized by relationships between scalar curvatures*

ABSTRACT: On a Kahler manifold there is a clear connection between the complex geometry and underlying Riemannian geometry, which can be used to characterize the Kahler condition. While such a link is not as clear in the non-Kahler setting, one can seek to understand these characterizations as specific instances of a more general type. I will address such questions from the perspective of relationships between the Chern and Riemannian scalar curvatures. This is joint work with Michael Dabkowski.

Talk

ANDREI MOROIANU

TITLE: *The holonomy problem for locally conformally Kähler metrics*

ABSTRACT: A locally conformally Kähler (lcK) manifold is a complex manifold (M, J) together with a J -compatible Riemannian metric g which has the property that around every point of M there exists a locally defined Kähler metric belonging to the conformal class of g . In this talk I will explain the classification of compact lcK manifolds with reduced holonomy obtained in collaboration with Farid Madani and Mihaela Pilca. In particular, I will describe all compact manifolds admitting two non-homothetic Kähler metrics in the same conformal class.

Talk

LIVIU ORNEA

TITLE: *On the rank of locally conformally Kaehler manifolds*

ABSTRACT: I shall review the notion of LCK rank, with focus on the rank of Vaisman and locally conformally Kaehler manifolds with potential. Joint work with Misha Verbitsky.

Talk

ALEXANDRA OTIMAN

TITLE: *Constructions in locally conformally symplectic geometry*

ABSTRACT: We present a new construction of LCS manifolds based on the coupling form introduced by Sternberg and Weinstein.

Talk

MASSIMILIANO PONTECORVO

TITLE: *Bi-Hermitian metrics on Kato surfaces*

ABSTRACT: We discuss constructions of bi-Hermitian metrics on non-Kähler minimal surfaces with positive second Betti number. We will also describe some "topological" obstructions to existence of such metrics on Kato surfaces.

Short talk

MIRON STANCIU

TITLE: *Constructions involving the blow-up of locally conformally symplectic manifolds*

ABSTRACT: We present a few generalizations of known results in symplectic geometry which provide new methods of constructing locally conformally symplectic (LCS) manifolds, via the process of blowing-up.

Short talk

NICOLETTA TARDINI

TITLE: *Geometrically Bott-Chern formal metrics*

ABSTRACT: An important result of Deligne, Griffiths, Morgan and Sullivan is that any compact Kähler manifold is formal. In this talk we will discuss a geometric notion of formality related to the Bott-Chern cohomology of a complex manifold. In particular, we will focus on the triple Aeppli-Bott-Chern-Massey products and we will see some explicit examples.

Finally we will show that the existence of geometrically Bott-Chern formal metrics is not an open property under small deformations of the complex structure. This is a joint work with Adriano Tomassini.

Participants

<i>name</i>	<i>institution</i>	<i>email address</i>
Altavilla Amedeo	Marche	amedeoaltavilla (at) gmail.co
Angella Daniele	Firenze	daniele.angella (at) unifi.it
Apostolov Vetislav	Québec Montréal	apostolov.vestislav (at) uqam.ca
Bagaglini Leonardo	Firenze	leonardo.bagaglini (at) unifi.it
Biliotti Leonardo	Parma	leonardo.biliotti (at) unipr.it
Calamai Simone	Firenze	simocala (at) gmail.com
Chioffi Simon	UFF	simongchioffi (at) icloud.com
Fino Anna	Torino	annamaria.fino (at) unito.it
Jolany Hassan	Lille	hassan.jolany (at) math.univ-lille1.fr
Lock Michael	MSRI Berkeley	mlock (at) math.utexas.edu
Moroianu Andrei	CNRS Versailles	andrei.moroianu (at) math.cnrs.fr
Ornea Liviu	Bucharest	lornea (at) fmi.unibuc.ro
Otiman Alexandra	Bucharest	alexandra.otiman (at) yahoo.com
Pacini Tommaso	SNS Pisa	tommaso.pacini (at) sns.it
Panelli Francesco	Firenze	francescopanelli (at) virgilio.it
Parton Maurizio	Chieti-Pescara	parton (at) unich.it
Petrecca David	Hannover	david.petrecca (at) gmail.com
Piccinni Paolo	Roma Sapienza	piccinni (at) mat.uniroma1.it
Pontecorvo Massimiliano	Roma 3	max (at) mat.uniroma3.it
Raffero Alberto	Parma	alberto.raffero (at) unito.it
Rossi Federico	Milano-Bicocca	f.rossi46 (at) campus.unimib.it
Sarfatti Giulia	INdAM and IMJ-PRG Paris	giulia.sarfatti (at) gmail.com
Spotti Cristiano	Cambridge	c.spotti (at) dpms.cam.ac.uk
Stanciu Miron	Bucharest	mirostnc (at) gmail.com
Tardini Nicoletta	Pisa	nicoletta.tardini (at) gmail.com
Vezzoni Luigi	Torino	luigi.vezzoni (at) unito.it
Vuletescu Victor	Bucharest	vuli (at) fmi.unibuc.ro
Weinkove Ben	Northwestern	weinkove (at) math.northwestern.edu
Zedda Michela	Salento	michela.zedda (at) gmail.com

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April 20-22, 2016

Dipartimento di Matematica e
Informatica «Ulisse Dini»
Università di Firenze

Organizers

Daniele Angella (Università di Firenze)
Simone Calamai (Università di Firenze)
Cristiano Spotti (University of Cambridge)

Speakers

Vestislav Apostolov (Université du Québec à Montréal)
Anna Fino (Università di Torino)
Mike Lock (MSRI Berkeley)
Andrei Moroianu (Université de Versailles–St Quentin)
Liviu Ornea (University of Bucharest)
Alexandra Otiman (University of Bucharest)
Massimiliano Pontecorvo (Università Roma 3)
Miron Stanciu (University of Bucharest)
Nicoletta Tardini (Università di Pisa)
Ben Weinkove (Northwestern University)

Mini-course

The complex Monge-Ampère
equation on non-Kähler manifolds
Ben Weinkove (Northwestern University)

$$\text{Ric}^{CH}(\omega) = 0$$

Supported by:



SIR2014

"Analytic aspects in complex
and hypercomplex geometry"

For information and registration, please visit:

<http://nonkahlermetrics2016.dimai.unifi.it/>

(deadline: March 31)



$\partial\bar{\partial}(\omega^{n-1}) = 0$

$T^2 \rightarrow \mathcal{H} := (\mathbb{C}^2 \setminus \{0\}) / \langle Z \rangle \rightarrow \mathbb{C}P^1$