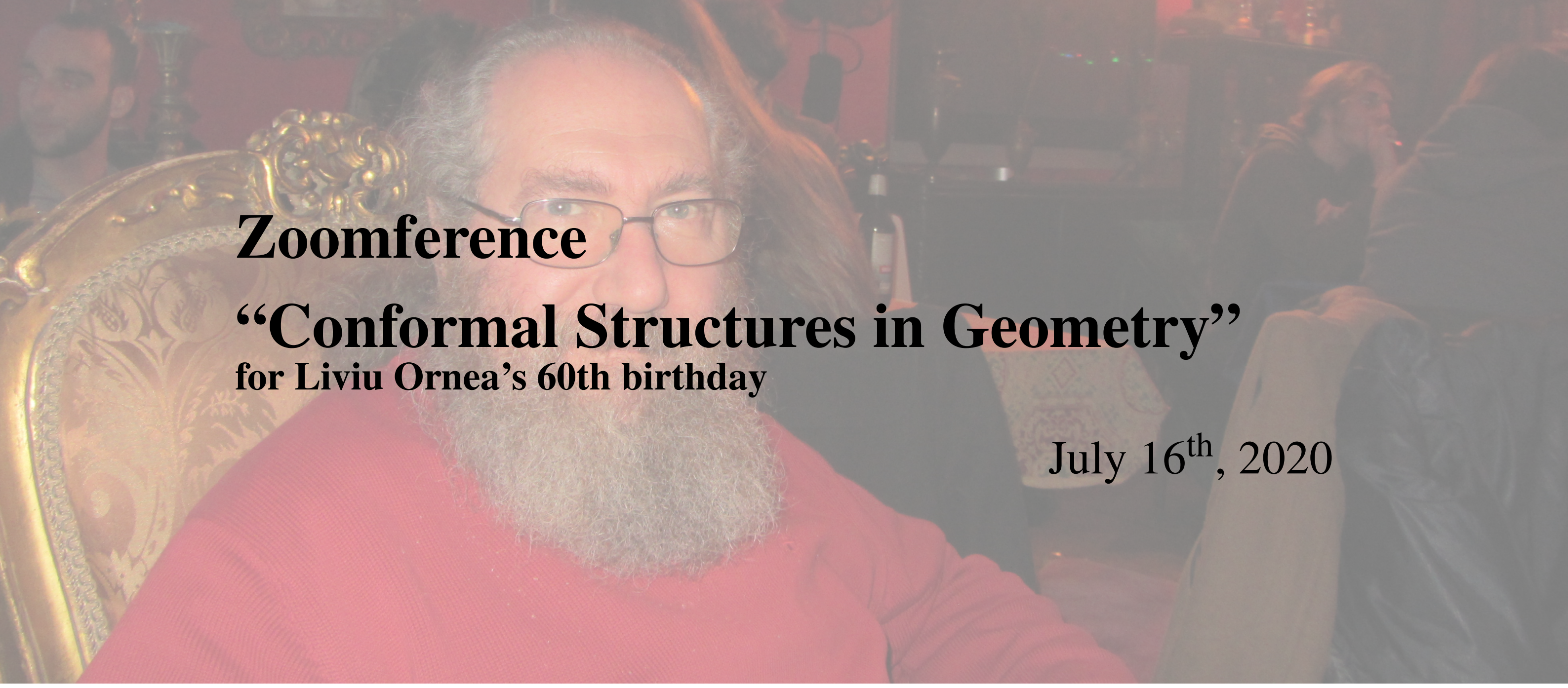

Zoomference

“Conformal Structures in Geometry”

for Liviu Ornea’s 60th birthday

July 16th, 2020

Invited Speakers

DANIELE ANGELLA (Florence)

VASILE BRÎNZĂNESCU (Bucharest)

ANNA FINO (Torino)

ANDREI MOROIANU (Paris)

MIHAELA PILCA (Regensburg)

ADRIANO TOMASSINI (Parma)

VICTOR VULETESCU (Bucharest)

Organizers

NICOLINA ISTRATI (Tel Aviv)
ALEXANDRA OTIMAN (Rome)
MASSIMILIANO PONTECORVO (Rome)

Abstracts

20 minutes Research Talks

Daniele Angella (Florence)
Examples emerging from lcK geometry

A beautiful construction from number theory allows to generalize Inoue-Bombieri surfaces to higher dimensions. **U**sually known as OT-manifolds, they were introduced by Oeljeklaus and Toma to answer problems in LCK geometry. **G**eneralizing known results for Inoue-Bombieri surfaces, we prove that OT-manifolds of simple type are rigid for deformations of the complex structure. **U**sing number theoretic properties of the construction and Fourier techniques, we compute cohomological invariants that will bring us to the conclusion. **R**ecently, Alexandra Otiman and Matei Toma showed much stronger results in their beautiful paper. **I**n collaboration with Maurizio Parton and Victor Vuletescu.

Vasile Brînzănescu (Bucharest)
Gauduchon metrics and stability

Anna Fino (Torino)
Kähler-like conditions and Vaisman metrics

Andrei Moroianu (Paris)
Open problems in LCK geometry

Mihaela Pilca (Regensburg)

LCK structures with holomorphic Lee vector field

I will present the description of the LCK structures with holomorphic Lee vector field on a compact complex manifold of Vaisman type.This description provides in particular examples of such structures whose Lee vector field is not homothetic to the Lee vector field of a Vaisman structure. The talk is based on joint work with Farid Madani and Andrei Moroianu.

Adriano Tomassini (Parma)

Harmonic forms on almost Hermitian manifolds

Let (M, J) be an almost-complex manifold; then if J is not integrable one has that $\overline{\partial}^2 \neq 0$ and so the Dolbeault cohomology of M is not well defined. However, if g is a J-Hermitian metric on (M, J) and $*$ denotes the associated Hodge-$*$-operator, then

$$\square_{\overline{\partial}} := \overline{\partial}\,\overline{\partial}^* + \overline{\partial}^*\overline{\partial}$$

is a second order, elliptic differential operator, without assuming the integrability of J. In particular, if M is compact, then $\mathrm{Ker}\,\square_{\overline{\partial}}$ is a finite-dimensional vector space. We describe the space of $\overline{\partial}$-harmonic $(1,1)$-forms on special almost Hermitian manifolds.

Next, we study the space of closed anti-invariant forms on an almost complex manifold, that is 2-forms α on M such that $J\alpha = -\alpha$, possibly non compact. We construct families of (non- integrable) almost complex structures on $\mathbb{R}^4$, such that the space of closed J-anti-invariant forms is infinite dimensional and also 0-or 1-dimensional. In the compact case, we construct 6-dimensional almost complex manifolds with arbitrary large anti-invariant cohomology and a 2-parameter family of almost complex structures on the Kodaira-Thurston manifold whose anti-invariant cohomology group has maximum dimension.

The results have been obtained in two joint papers with Richard Hind and Nicoletta Tardini.

Victor Vuletescu (Bucharest)

On LCK threefolds of algebraic dimension two

The classification of LCK surfaces of algebraic dimension one was achieved in the 90's by the work of Brînzănescu and Belgun. In this talk, we outline an attempt of classifying their next higher dimensional analogues: threefolds of algebraic dimension two. We eventually show that a similar result as in complex dimension two holds good, under some mild assumptions that are conjecturally true for all non-Kähler threefolds with this algebraic dimension. This is joint work with Maurizio Parton and Daniele Angella.