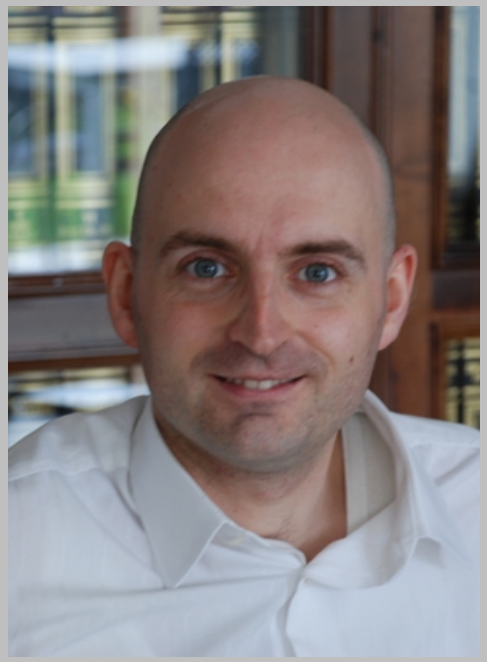

Camillo De Lellis

Eduard Čech

Matematický ústav AV ČR
zve všechny zájemce
na přednášku

Regularity and singularity of area-minimizing surfaces

kterou prosloví

Professor Camillo De Lellis

Universität Zürich

v pondělí 14. prosince 2015
v 10:30 hod.
ve velké posluchárně
Matematického ústavu AV ČR,
Žitná 25, Praha 1.

Jde o dvanáctou přednášku konanou
v rámci cyklu reprezentačních přednášek
organizovaných na počest

prof. Eduarda Čecha,

jednoho z nejvýznamnějších českých
matematiků novodobé historie
a zakladatele
Matematického ústavu AV ČR.

Jiří Rákosník, ředitel

Regularity and singularity of area-minimizing surfaces

The Plateau's problem, named after the Belgian physicist J. Plateau, is a classic in the calculus of variations and regards minimizing the area among all surfaces spanning a given contour. Although Plateau's original concern were 2-dimensional surfaces in the 3-dimensional space, generations of mathematicians have considered such problem in its generality. A successful existence theory, that of integral currents, was developed by De Giorgi in the case of hypersurfaces in the fifties and by Federer and Fleming in the general case in the sixties. When dealing with hypersurfaces, the minimizers found in this way are rather regular: the corresponding regularity theory has been the achievement of several mathematicians in the 60es, 70es and 80es (De Giorgi, Fleming, Almgren, Simons, Bombieri, Giusti, Simon among others).

In codimension higher than one, a phenomenon which is absent for hypersurfaces, namely that of branching, causes very serious problems: a famous theorem of Wirtinger and Federer shows that any holomorphic subvariety in $\mathbb{C}^n$ is indeed an area-minimizing current. A celebrated monograph of Almgren solved the issue at the beginning of the 80es, proving that the singular set of a general area-minimizing (integral) current has (real) codimension at least 2. However, his original (typewritten) manuscript was more than 1700 pages long. In a recent series of works with Emanuele Spadaro we have given a substantially shorter and simpler version of Almgren's theory, building upon large portions of his program but also bringing some new ideas from partial differential equations, metric analysis and metric geometry. In this talk I will try to give a feeling for the difficulties in the proof and how they can be overcome. Moreover I will touch some recent developments which go beyond Almgren's result.