MaTeinItaly is an exhibition that will guide you on a tour of mathematics and show you that mathematics is everywhere.
A journey that will surprise and amuse you, like being the main character in a science-fiction novel, because, like nature, our future is being written in mathematical characters.

The exhibition MaTeinItaly is organised by the Centro “matematita” of the University of Milan and by the Centro PRISTEM of the Università Bocconi of Milan.

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Project coordination
and communication
CodiCS - Comunicazione Scientifica

Exhibition design
Glas Architettura

Interactive and multimedia installations
CameraAnebbia
Ibimel srl
Digital Video spa

Graphic Design
Cristina Chiappini Studio

Sponsors
University of Milan
Università Bocconi
University of Milan-Bicocca
and with the endorsement of
Politecnico di Milano
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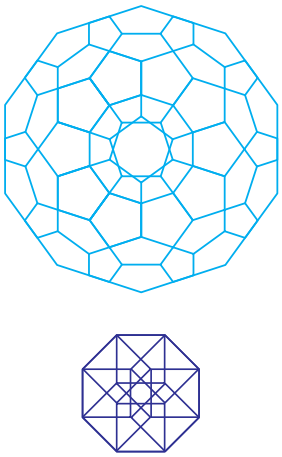
16.09.2014
16.11.2014

Triennale di Milano

Mathematicians in Search of the Future

# mate initaly

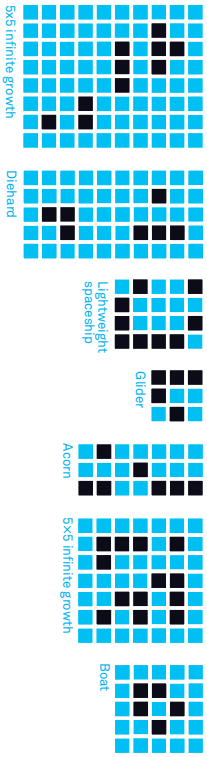




## Curiosity driven

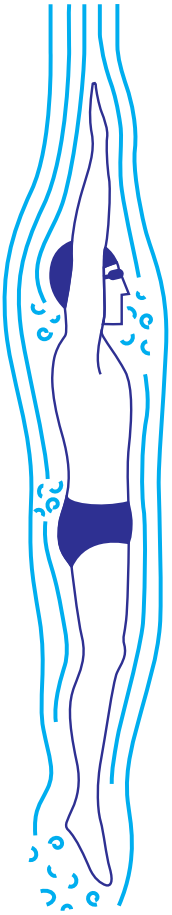
Mathematicians transform problems into numbers and shapes, and often they solve them. Then, however, new problems grow out of the same mathematical alphabet.
For example, numbers are undoubtedly useful: the shepherd uses 3, 57 and 18 to count his sheep; the carpenter uses 1.25 and 5/4 to measure; +37 and –25 are used to show credits and debts. But on the other hand they also open the door to the mathematics of curiosity and problems posed just for the fun of it. An innocent question like "How long is the diagonal of the square?" leads to the discovery of irrational numbers, like the square root of 2 or π.
Then we find that if we add +1 to a number over and over, they never end, so the set of numbers is infinite. But is there only one kind of infinite set, or are some bigger and some smaller?
These questions began with practical problems – the sheep and the shepherd, the carpenter's measurements, credits and debts – and then we discover that there are different kinds of infinite numbers; some sets are smaller, others larger. This too is the beauty of mathematics.

$x^n + y^n = z^n$ $\frac{\pi^2}{6} = \sum_{n=1}^{\infty} \frac{1}{n^2}$ $e(\Sigma) = V - S + F$



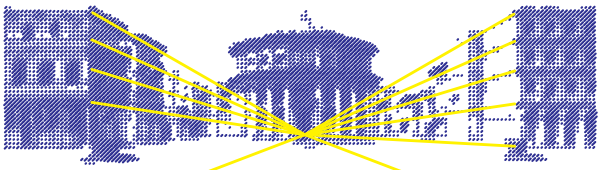

## What do mathematicians do?

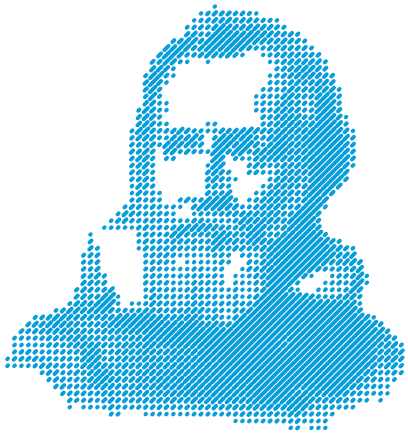
If you have formed the idea that mathematics is made of endless expressions, or swinging trapezes, and taps filling bathtubs, well then you are on the wrong road. Mathematicians, more than reckoning, spend their time solving problems. In fact, the starting point is almost always a real-life problem. What this means, however, is translating it into mathematical symbolism, writing it in formulas, and so going on to construct a model of it. Present-day mathematics is seeing an explosion of the theme of models in all kinds of different arenas; in medicine, economics, optimal management of air or rail traffic, in problems related to the security of various operations, of credit cards on Internet, and in the most surprising technological developments, from GPS to 3D printers, to the latest-generation mobile phones. And even in sports, where studies are made of the best suits for swimmers and the optimum profile for speedboats.



## Mathematics from the Italian perspective

Mathematics is international and forms an enormous mosaic in which centuries of different kinds of knowledge, cultures, approaches and inspirations are interwoven. An Italian perspective, like the one chosen for MaTeinItaly, gives us a closer view of some of the pieces, often revealing stories and points of view that are much more important than we had imagined. We will meet figures such as Leonardo Fibonacci, Galileo Galilei and Vito Volterra, who represent central tiles in this great mosaic. We will see how in Italy the meeting of art and geometry made it possible – with the invention of perspective – to represent the three-dimensional space that we live in on a two-dimensional canvas. And how to deal with – again thanks to geometry –the problem of representing the earth's surface on paper. Finally, the mathematicians of our day will tell us what they do, where and with whom they work, and what new horizons for our future they are exploring.





## Imagining impossible worlds

Sometimes the mind's eye is able to see relationships that were hidden or even absurd and unthinkable. The mathematician experiences the freedom to construct different worlds that just grow out of his imagination.
Driven by curiosity, he or she elaborates new theories that later, sometimes at a distance of decades or even centuries, are unexpectedly confirmed in the real world. Imagine, for example, a space with more than the three dimensions that we are used to; one in which, just to begin, the position of a point is defined by four numbers.
The fourth dimension could be time, temperature, a gradation of colour or something else. But the mathematician might not be interested in what the new dimension represents, and instead use his geometric intuition to understand – and to help us understand – what is a priori absolutely an unknown for him as well as for us.