

# EXHIBITION INFORMATION

## LOCATION

Hall C1 (3F), COEX

## HOURS

Aug 13 13:00~18:00  
Aug 14-20 09:00~18:00  
Aug 17 Closed

## CREDIT

### NIMS-IMAGINARY

Hyungju Park (Chair)  
Wonju Jeon (Administrative Coordinator)  
Chulmin Kang (Installation Manager)  
Yeon Eung Kim (Coordinator)  
Yongtak Jin (Translation, Technical Support)

### MFO-IMAGINARY

Andreas Daniel Matt (Project Management, Exhibits)  
Christian Stussak (Software, Technical Support)  
Bianca Violet (Communication, Exhibits)  
Christoph Knoth, Konrad Renner (Design, Exhibits)  
Daniel Ramos, David Grünberg, Carla Cederbaum (Networking, Support)

Gert-Martin Greuel (Scientific Advisor IMAGINARY)  
Gerhard Huisken (Director MFO/IMAGINARY)

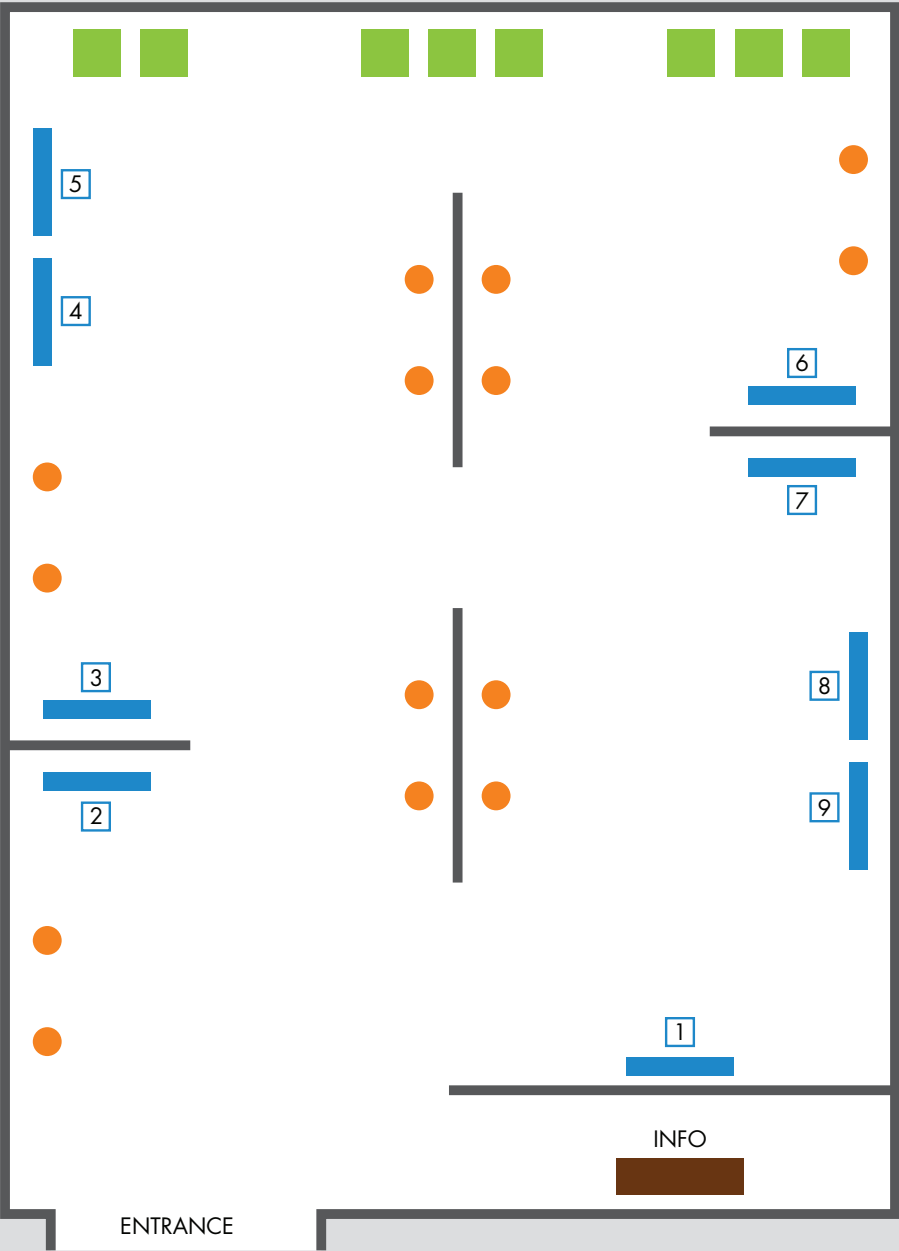
All contributors of the IMAGINARY exhibits

NIMS - IMAGINARY is organized by the National Institute for Mathematical Sciences (NIMS). IMAGINARY is a project by the Mathematisches Forschungsinstitut Oberwolfach, supported by the Klaus Tschira Stiftung.

Please contact our coordinator via email for visiting  
NIMS - IMAGINARY exhibition in Daejeon  
Contact: [imaginary@nims.re.kr](mailto:imaginary@nims.re.kr)

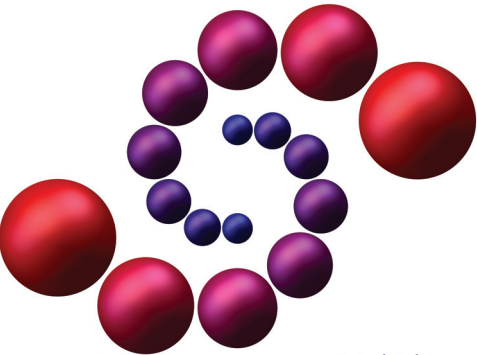
# EXHIBITION MAP

WELCOME TO  NIMS IMAGINARY  
open mathematics



- Image
- Interactive Program
- 1 Mathematics Image Gallery
  - 2 Crystal Flight, FroZenLight
  - 3 jReality, Qi
  - 4 Dune Ash, TsunaMath
  - 5 Mathematics Film Gallery
  - 6 The Future of Glaciers  
The Sphere of the Earth
  - 7 Cinderella
  - 8 Morenaments
  - 9 SURFER
- Sculpture

 NIMS IMAGINARY  
open mathematics  
at ICM 2014, SEOUL



Spiral Spheres

$$0 = \prod_{k=0}^1 \prod_{l=0}^7 \left( \left( x - i^{2k} \psi_x \left( \frac{\pi}{5} l \right) \right)^2 + \left( y - i^{2k} \psi_y \left( \frac{\pi}{5} l \right) \right)^2 + z^2 - \left( \frac{\pi}{10} \left\| \Psi \left( \frac{\pi}{5} l \right) \right\| \right)^2 \right)$$

$i^2 = -1, \quad \Psi(t) = (\psi_x(t), \psi_y(t)) = (e^{it} \sin t, e^{it} \cos t)$   
 $b = \frac{2\sqrt{5}}{5}, \quad \phi = \frac{1}{2}\pi$  (golden ratio)

Aug 13-20, 2014, Hall C1 COEX, Seoul

[www.imaginary.org/nims](http://www.imaginary.org/nims)

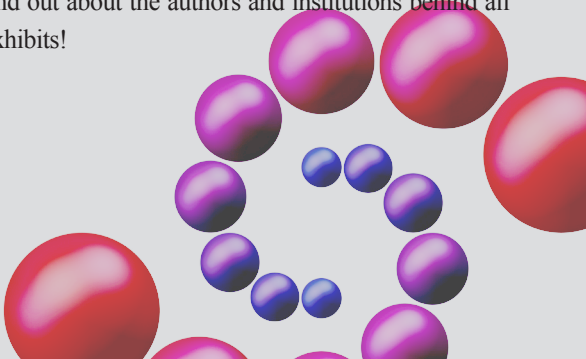
# WHAT IS IMAGINARY?

IMAGINARY is an interactive mathematics exhibition and open platform for mathematical exhibits. Originally developed for the Year of Mathematics 2008 in Germany, it has now grown into a huge international project with more than 125 exhibitions in 30 countries, attracting over 1 million visitors.

The exhibition sets out to evoke interest and curiosity in mathematics. With visual aids including virtual realities and 3D objects, it helps the visitors to understand various mathematical concepts in an interactive manner. Visitors are encouraged to interact with the exhibits and create their own mathematical artworks or simulations using special software. Demonstrators are available to give helpful insights into the mathematics behind the modules shown.

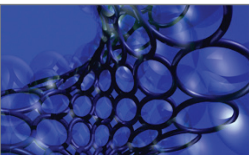
This special exhibition titled NIMS -IMAGINARY features 9 interactive touch screen panels, a mathematical image gallery and 3D sculptures. It will be permanently installed at the National Institute for Mathematical Sciences (NIMS) in Daejeon, South Korea, afterwards.

Please refer to [www.imaginary.org/nims](http://www.imaginary.org/nims) to download all programs under an open source license and to find out about the authors and institutions behind all exhibits!



# EXHIBITS

## IMAGES, FILMS AND SCULPTURES



Images are the visual heart of the exhibition. They are created by mathematicians and artists to show the beauty of different mathematical concepts. There are 16 printed images and a digital image gallery with brief explanations.



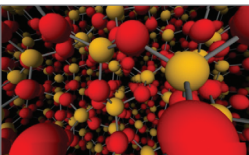
The exhibition also presents 15 mathematical sculptures, which are 3D printed objects. There are many algebraic surfaces, some minimal surfaces and a space curve. Some of them are classic and known objects, others are newly constructed surfaces.



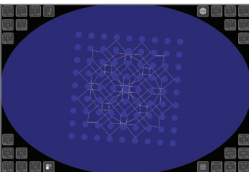
An interactive film gallery invites you to browse through 10 films of mathematics and art. Topics include elliptic curve cryptography, wild knots, fractal animations, braids, dimensions, oceanography and much more!

## TOUCHSCREEN PANELS

### ► Crystallography and Reflections (Crystal Flight, FroZenLight)



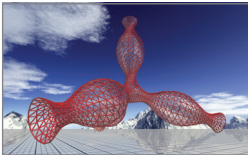
Crystal Flight is an interactive program that takes you on a journey through the inside of a quartz, fluorite or diamond crystal and to two curved abstract mathematical spaces. Flying a miniaturesspaceship you can explore these structures even in 3D!



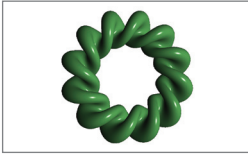
FroZenLight simulates a perfect ray of light reflecting on circular mirrors. As simple as it sounds, one can explore optics and geometry. However, it also gives an insight into chaos, art and cryptography.

# EXHIBITS

### ► Differential Geometry (jReality, Qi)

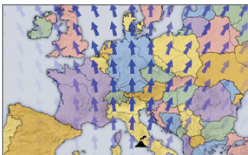


jReality allows you to experience mathematical objects in a virtual reality environment, like a first-person video game. You can walk, fly and shoot small balls in virtual scenes. Each one contains a mathematical sculpture related to differential geometry.



Qi enables you to observe constant mean curvature and constrained Willmore surfaces. You can choose different surfaces, texture and viewing properties, and transform them in real-time!

### ► Mathematics of Planet Earth (Dune Ash, The Future of Glaciers, The Sphere of the Earth, TsunaMath)

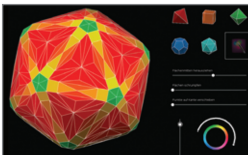


Volcanic eruptions, tsunamis and melting glaciers: Can they be predicted using mathematics? How big is the contribution of mathematical sciences to the task of understanding these current geophysical problems and catastrophes that massively challenge our world?



On two interactivestations you can learn how mathematics describes these phenomena and also explore the mathematics behind cartography and map projections. These exhibits are part of the initiative Mathematics of Planet Earth ([mathsofplanetearth.org](http://mathsofplanetearth.org)).

### ► Mathematical Simulation (Cinderella)



Various mathematical and physical phenomena are addressed with the program Cinderella. This is a compilation of interactive applications that communicate topics such as symmetry, chaos and dynamics. You can virtually experiment with a robot, observe fish swarms, let sunflowers grow or play logic games.

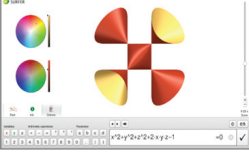
# EXHIBITS

### ► Symmetry Groups (Morenaments)



With Morenaments you can easily paint symmetrical patterns in one of the 17 wallpaper groups. You can discover and investigate their geometrical properties like rotation centers and mirror axes. Feel free to paint in a creative way and experience how a few strokes fill the entire space in a beautiful ornament!

### ► Algebraic Geometry (SURFER)



With SURFER you can experience the relation between algebra and geometry, i.e. formulas and forms, in an interactive way. You can enter simple equations and produce beautiful images, which are surfaces in space. Mathematically, the program visualizes real algebraic geometry in real-time. The surfaces shown are given by the zero set of a polynomial equation in 3 variables.

