SURFER

a real-time raytracer for algebraic surfaces

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Klaus Tschira Stiftung
gemeinnützige GmbH

MOTIVATION

$$((3x^2+(y-1.9)^2+4z^2-1)^2+0.2z)\cdot(((((0.8z+1.2)^3+5y-6)^2+16x^2-0.5)$$
$$\cdot(x^2+(y+6)^2+(z-2.8)^2-0.3)\cdot(x^2+(y-1)^2+(z+3.3)^2-0.03)+290)$$
$$\cdot(9x^2+(y-0.1\cdot z+2.5)^2+(4z-5+y)^2-1)-400)-99=0$$

MOTIVATION

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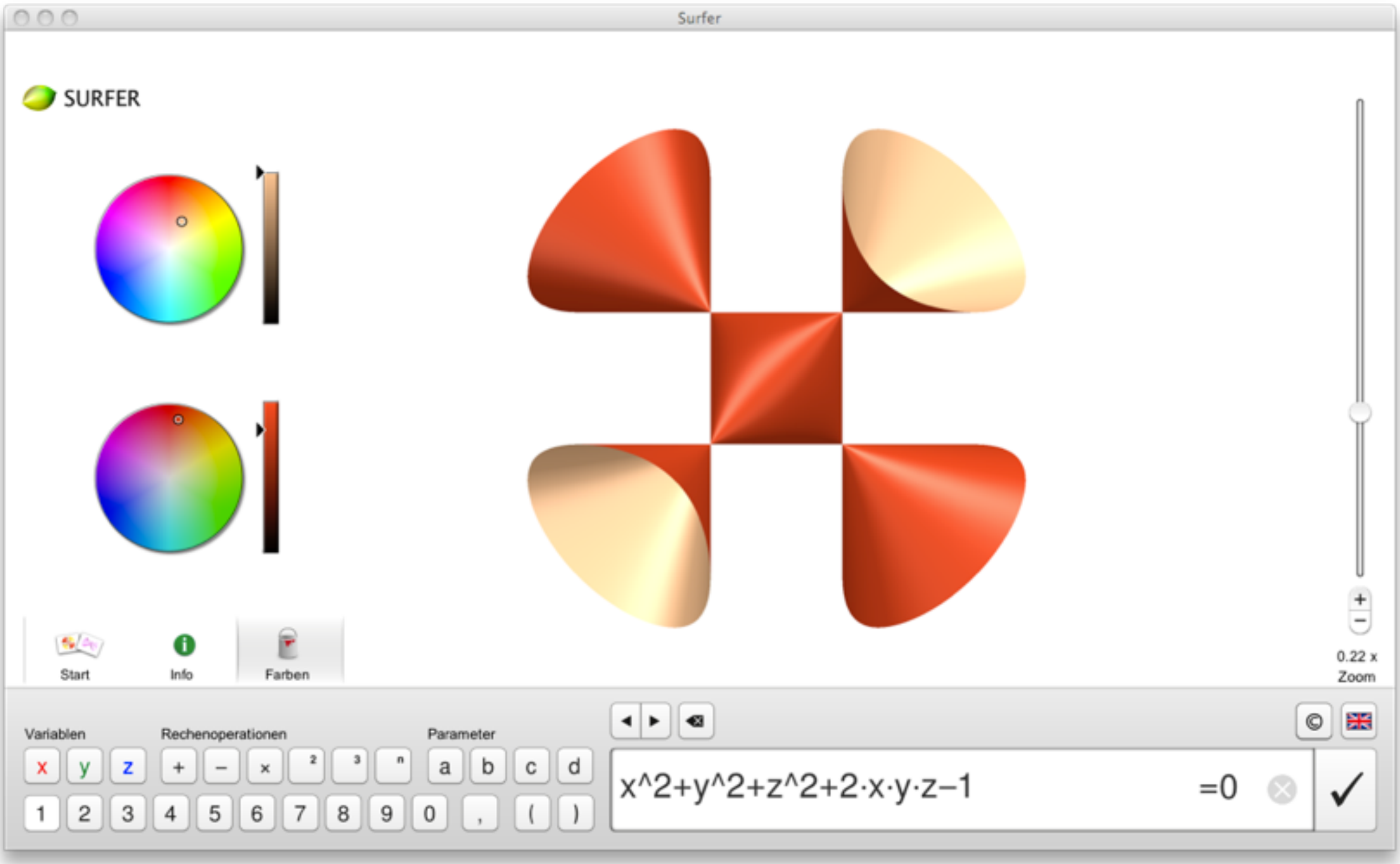
SURFER

IMAGINARY

open mathematics

SURFER


Surfer
SURFER
Start
Info
Farben
0.22 x
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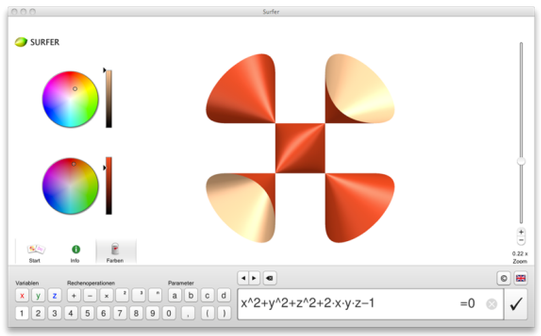
Parameter
x y z
+ − × ² ³ ⁿ
a b c d
1 2 3 4 5 6 7 8 9 0 , ( )
x^2+y^2+z^2+2·x·y·z−1 =0

SURFER

components

user interface

JavaFX; scalable, nice look, intuitive



galleries & explanations

LaTeX→PDF; get users started, teach some math

https://github.com/IMAGINARY/SURFER-Galleries

rendering core

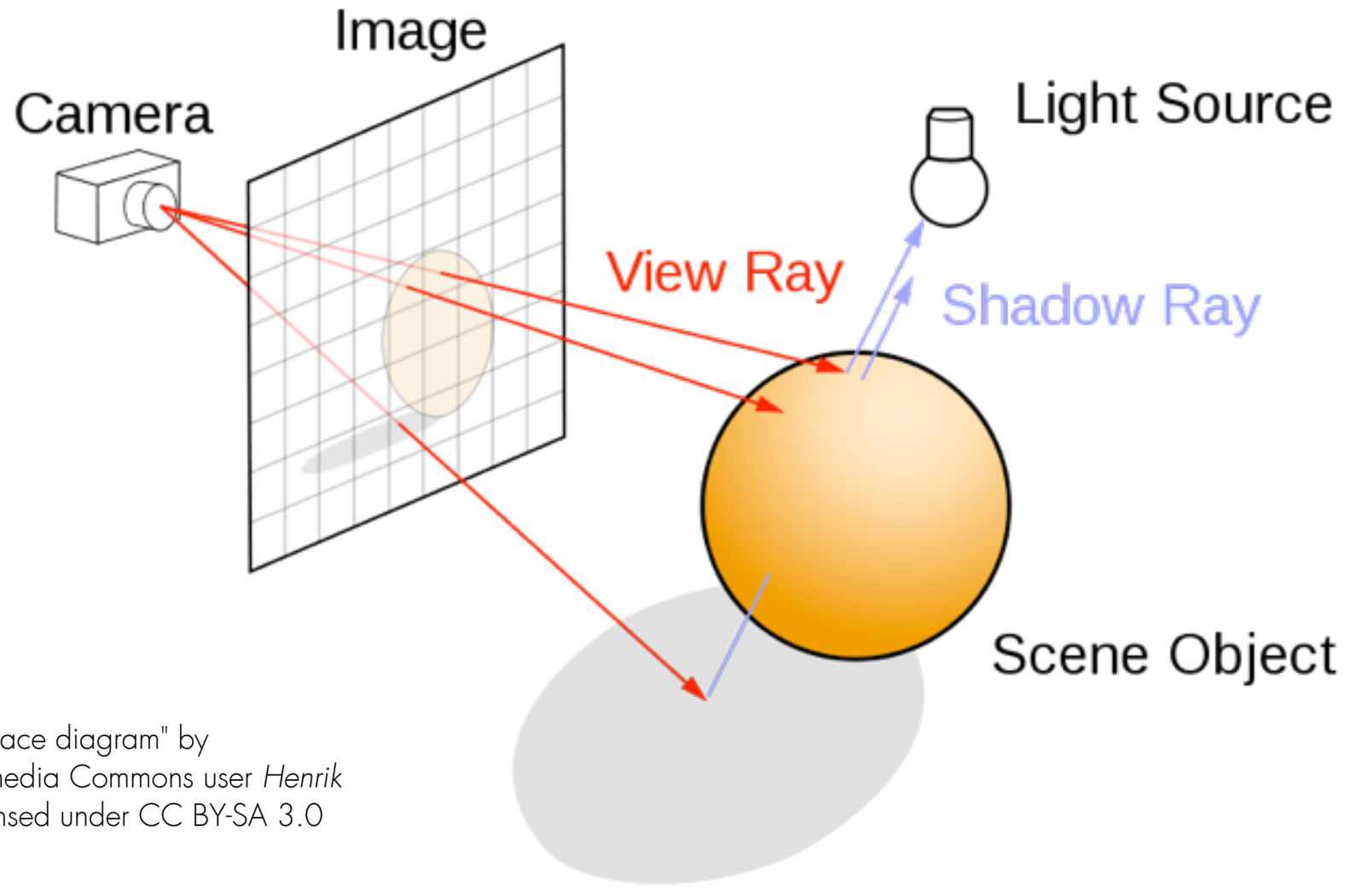
Java; does all the hard work

computer algebra, numerical methods, parallelization

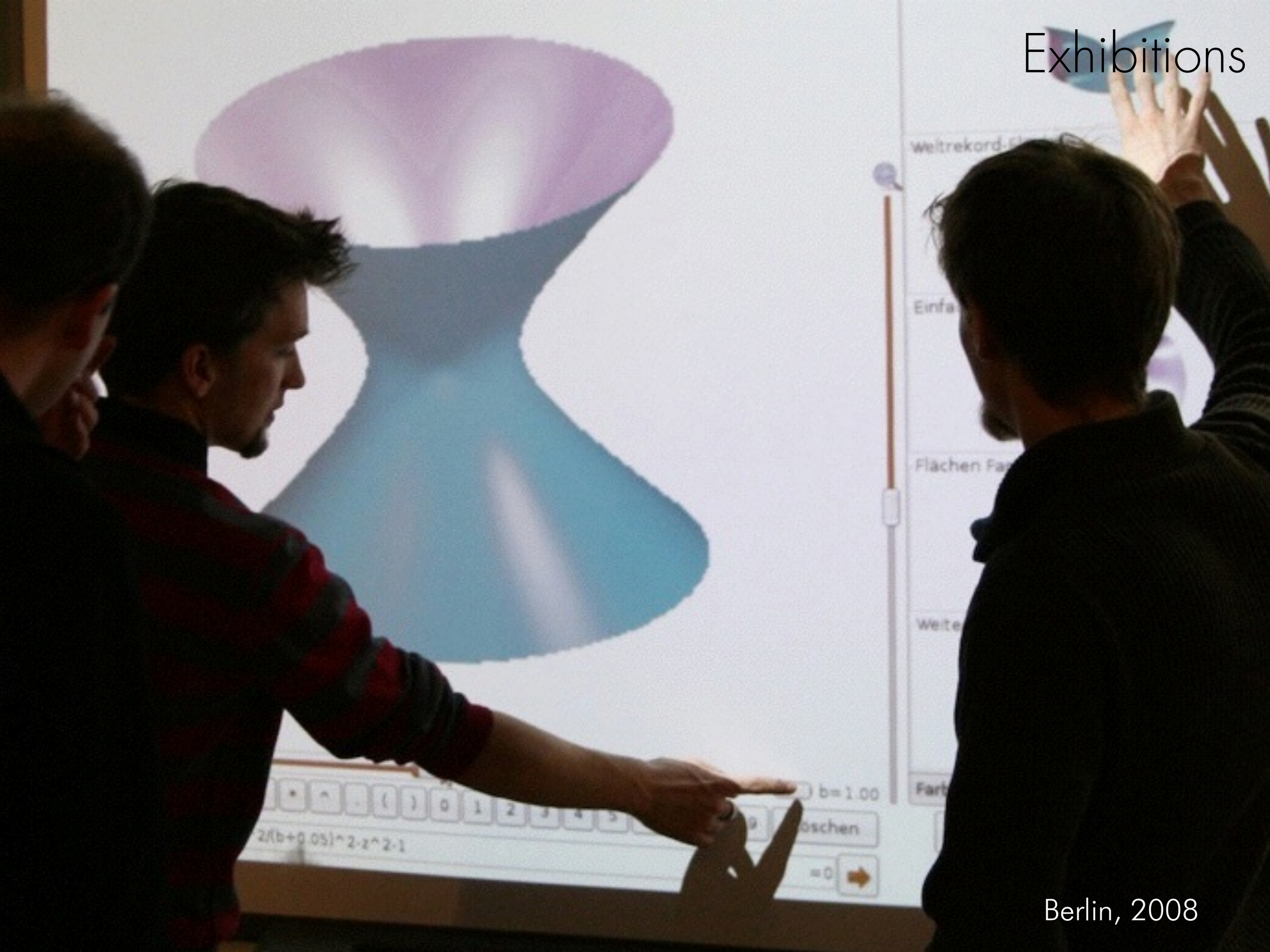
https://github.com/IMAGINARY/jsurf

Ray tracing

- non-linear objects (algebraic)
- real time



Exhibitions



Berlin, 2008

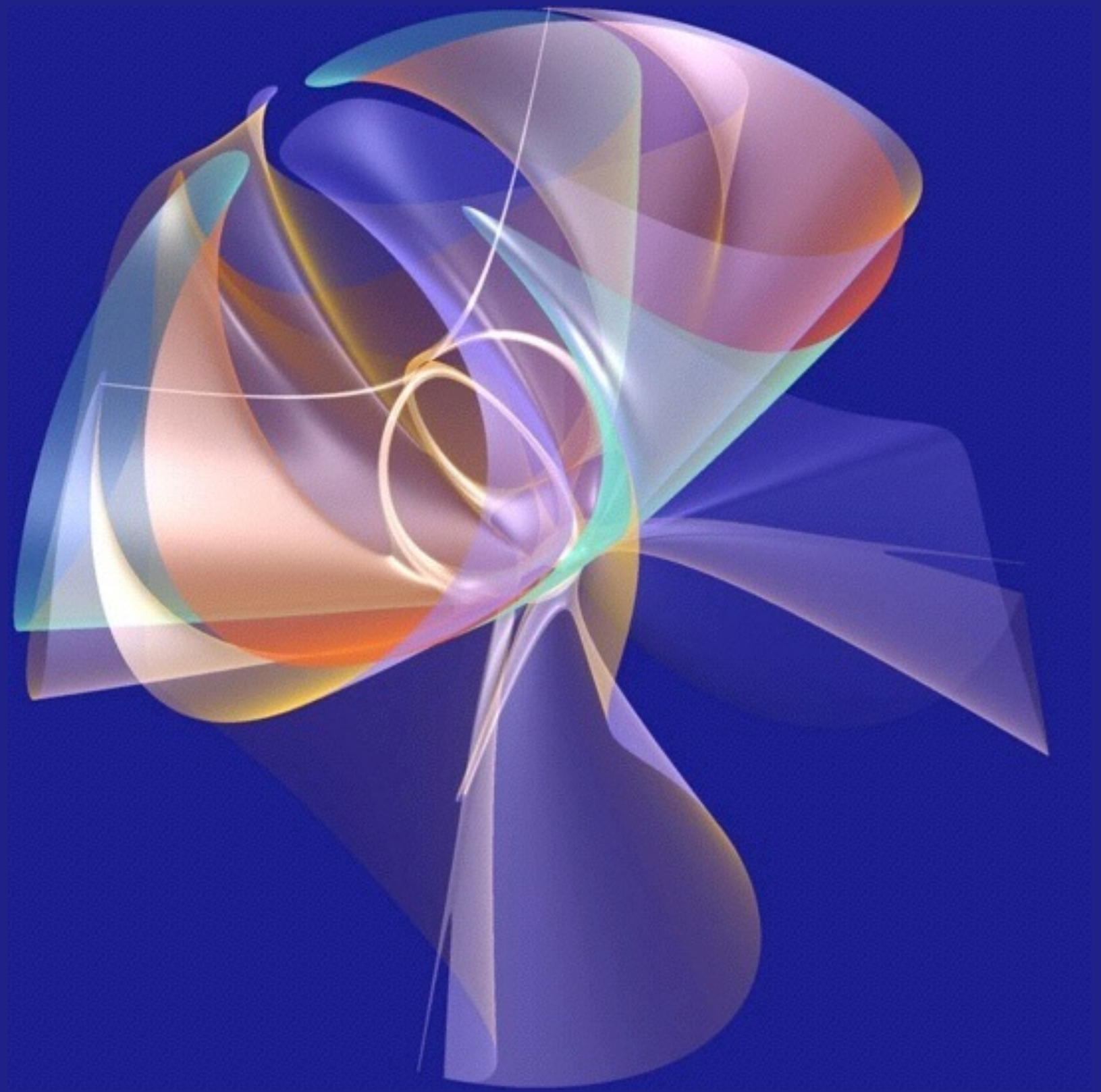
Exhibitions

Belgrade, 2011

Exhibitions

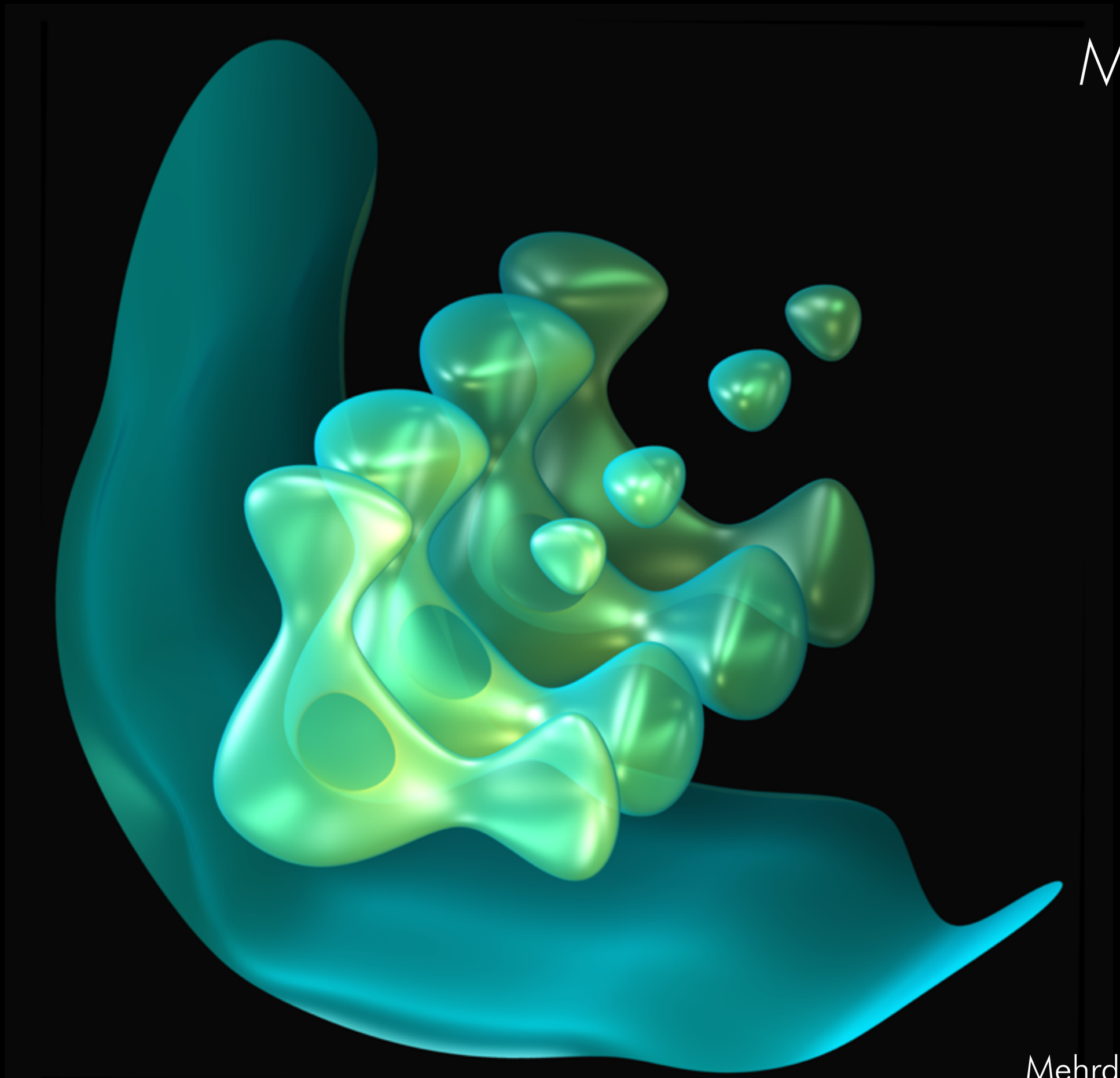
Buenos Aires, 2012

Math Art



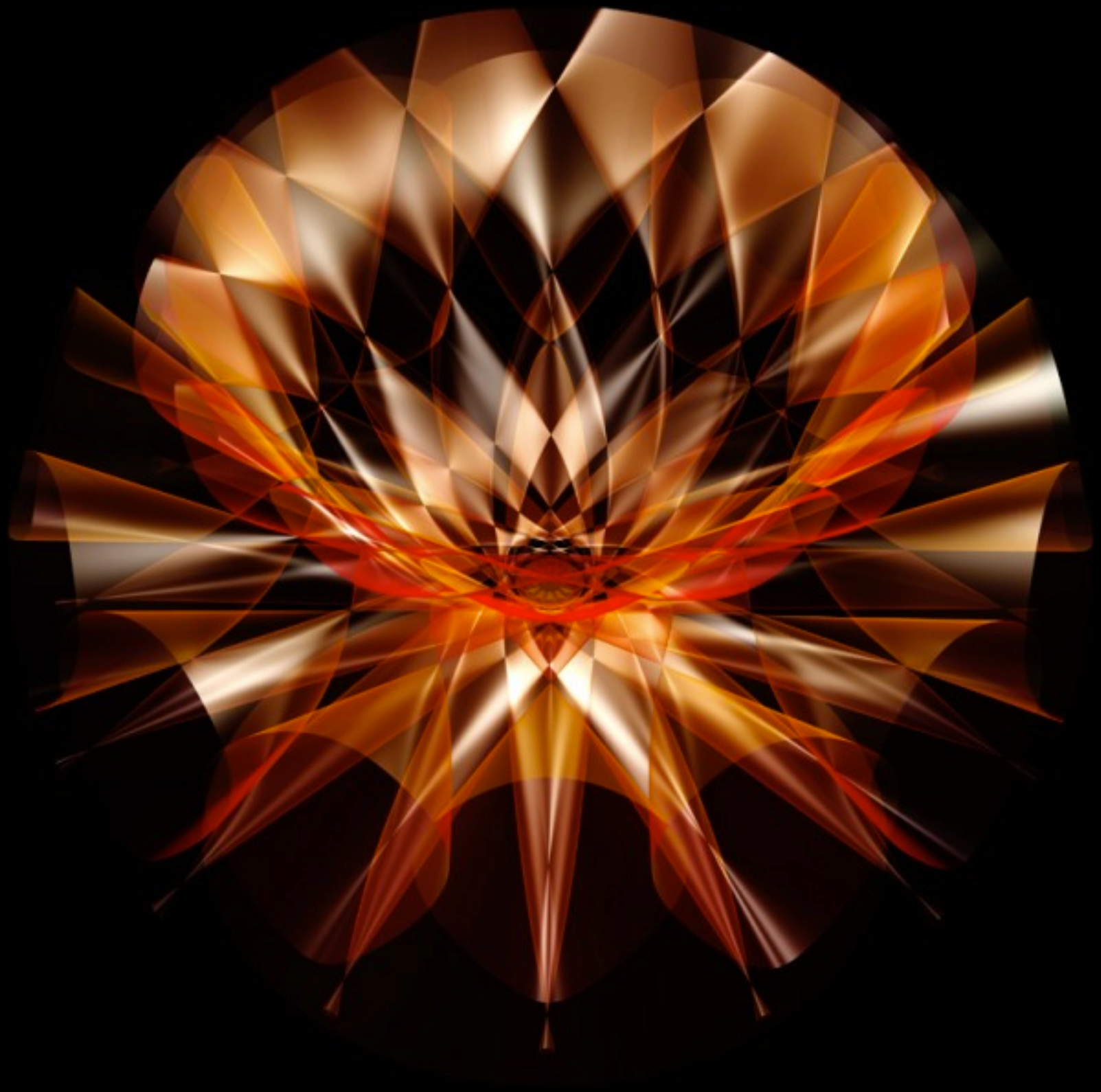
Angelika Schwengers

Math Art



Mehrdad Garousi

Math Art

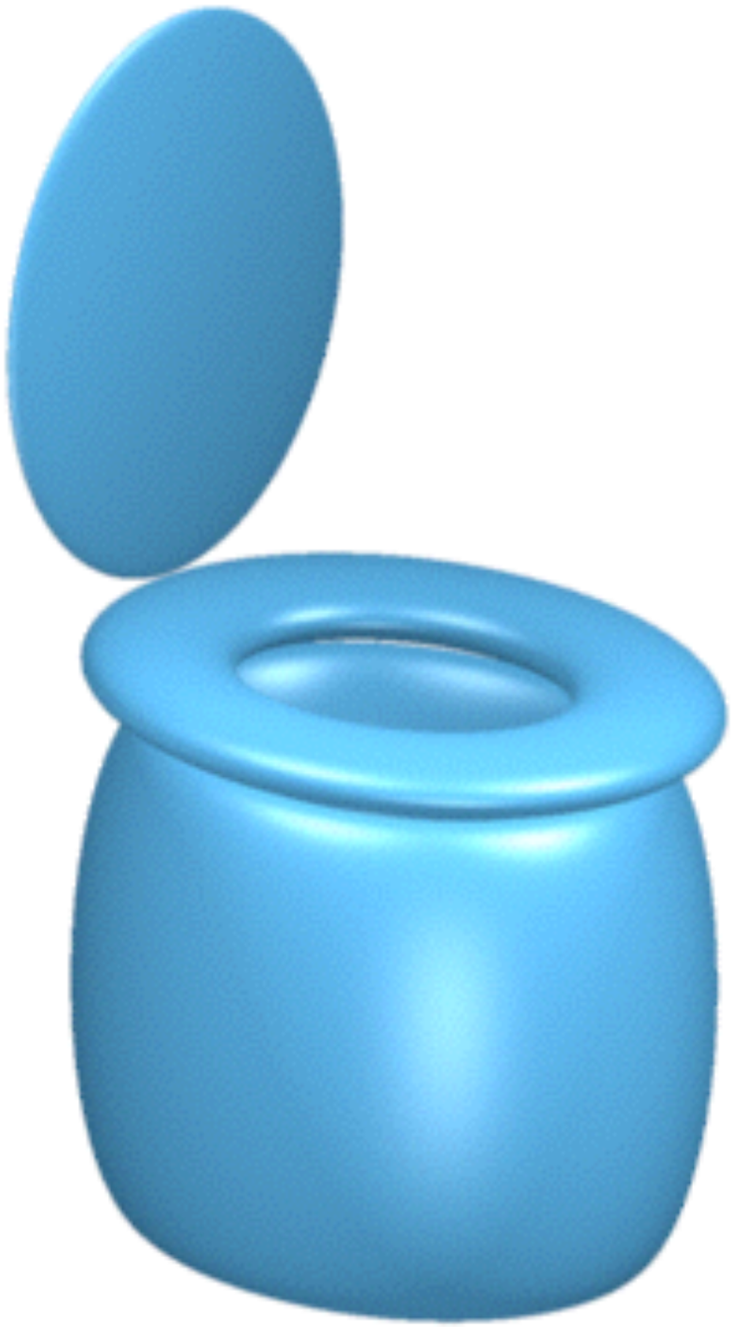


Torolf Sauermann

Math Art

Kurt Ballay

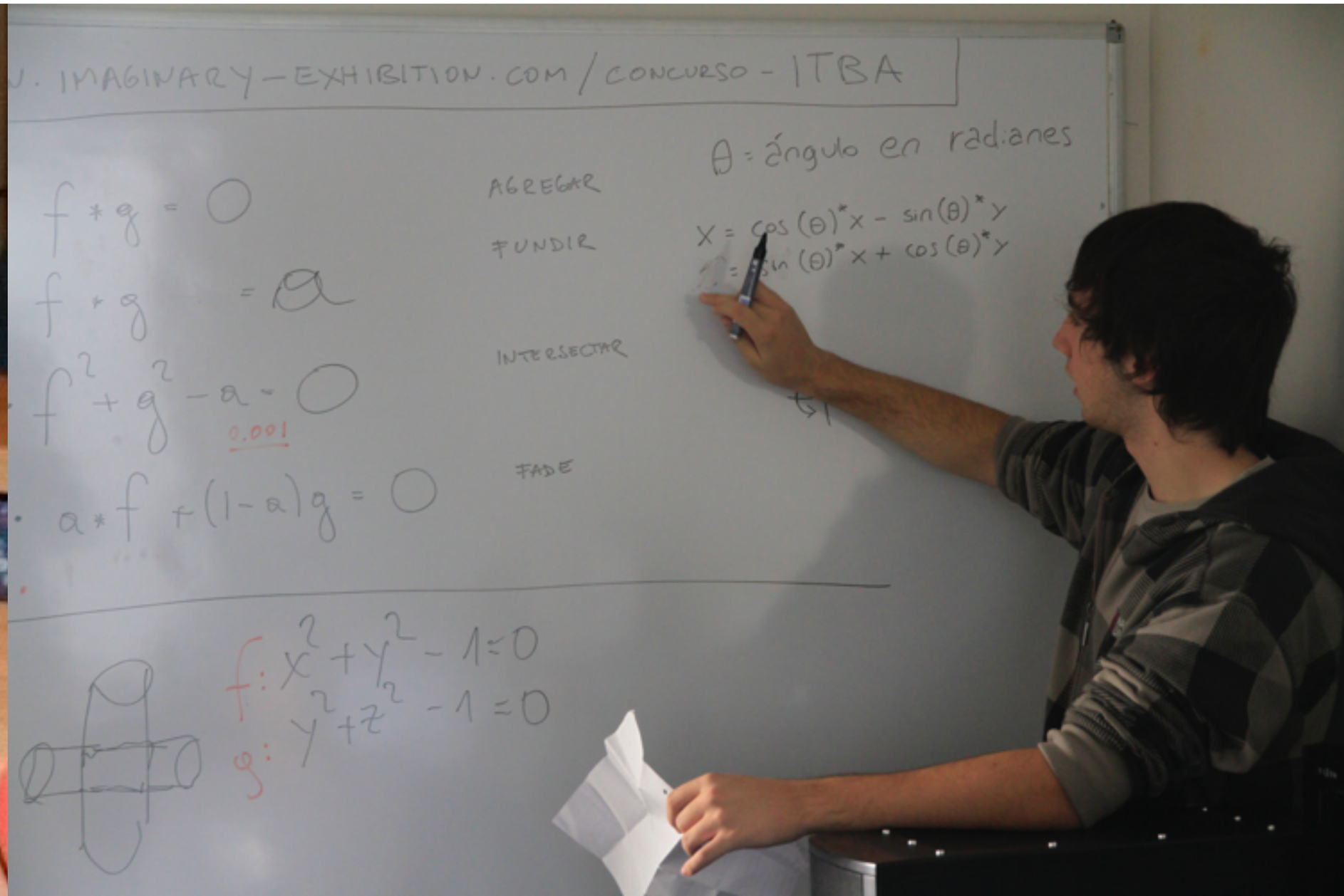
„Math Art“



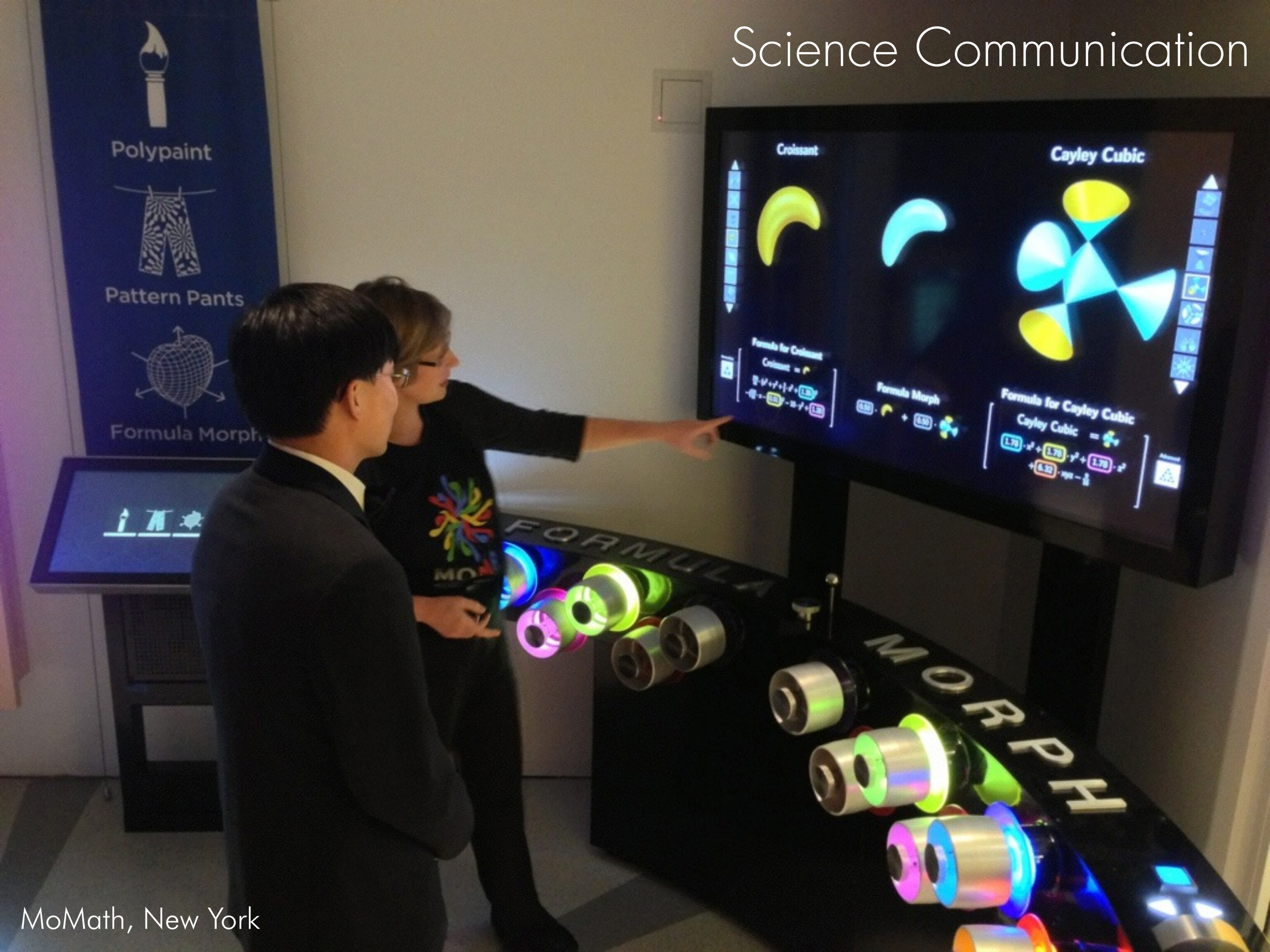
((0.7*x^2+y^2+0.07*(z-2)^2+0.9)^2-4*(0.7*x^2+y^2))
*((0.7*x^2+y^2+4*(z-0.58)^2+0.9)^2-4*(0.7*x^2+y^2)) *(100*(x
+1.52)^2+0.9*y^2+0.55*(z+0.86)^2-1)=0

Stephan Klaus

Education

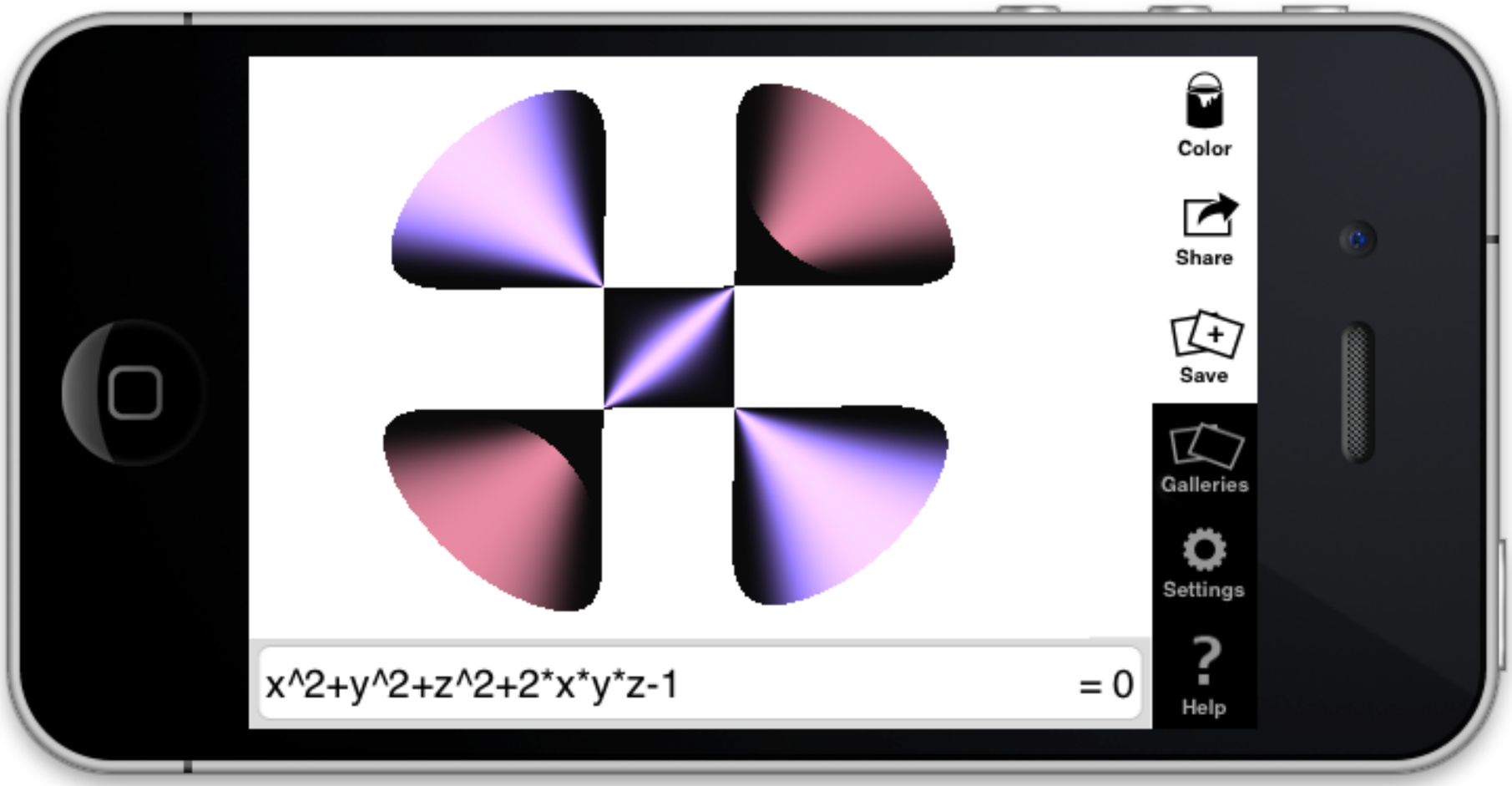

. IMAGINARY-EXHIBITION.COM / CONCURSO - ITBA
θ = ángulo en radianes
AGREGAR
FUNDIR
INTERSECTAR
FADE
0.001
f * g = 0
f + g = a
f² + g² - a = 0
a * f + (1-a) g = 0
X = cos(θ)*x - sin(θ)*y
= sin(θ)*x + cos(θ)*y
f: x² + y² - 1 = 0
g: y² + z² - 1 = 0

Science Communication

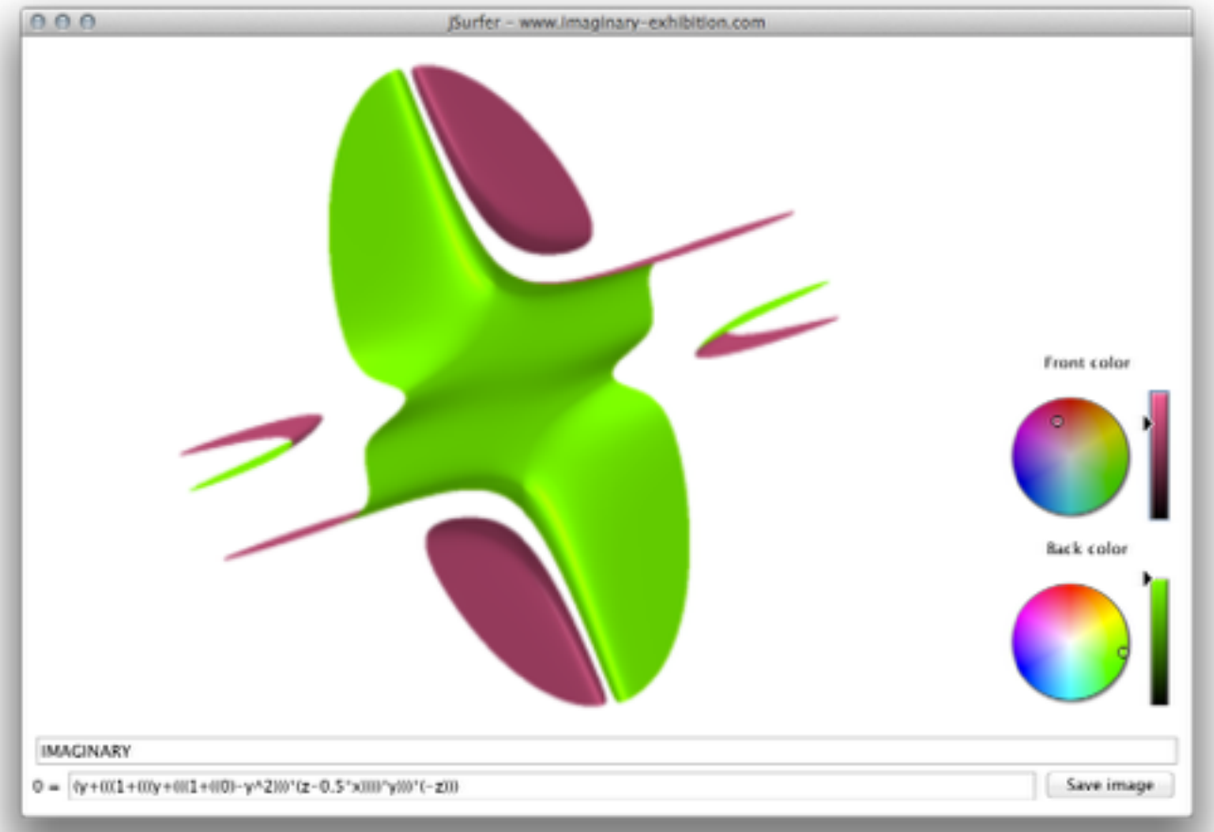


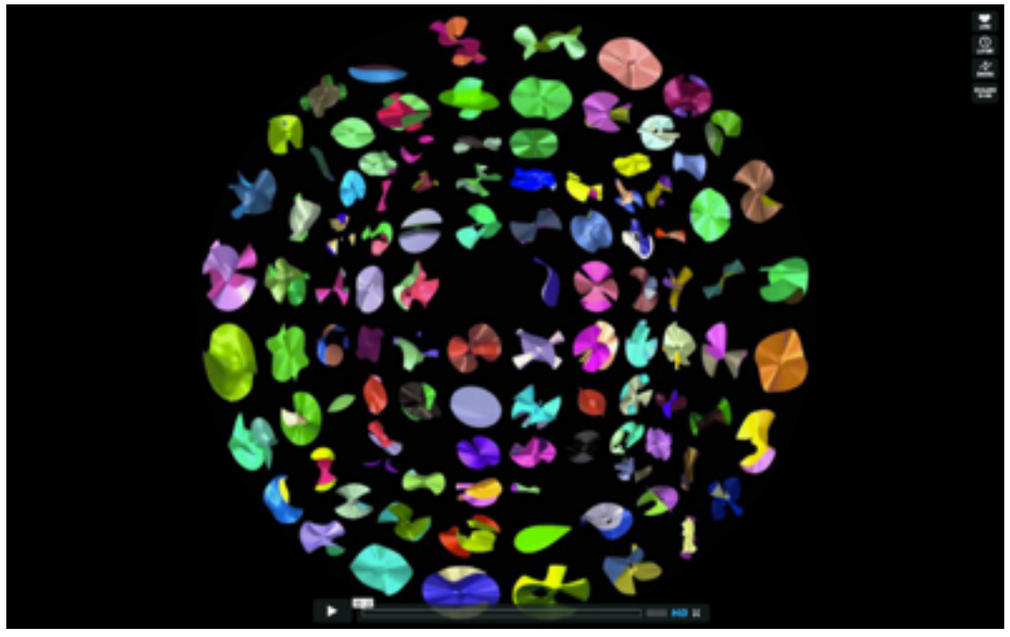
MoMath, New York

SPIN-OFFS



iSurfer
NameSurfer
Surfer Shuffle
TimeSurfer
JoySurfer
SoundSurfer
Surfer Dome
Processing Surfer
…



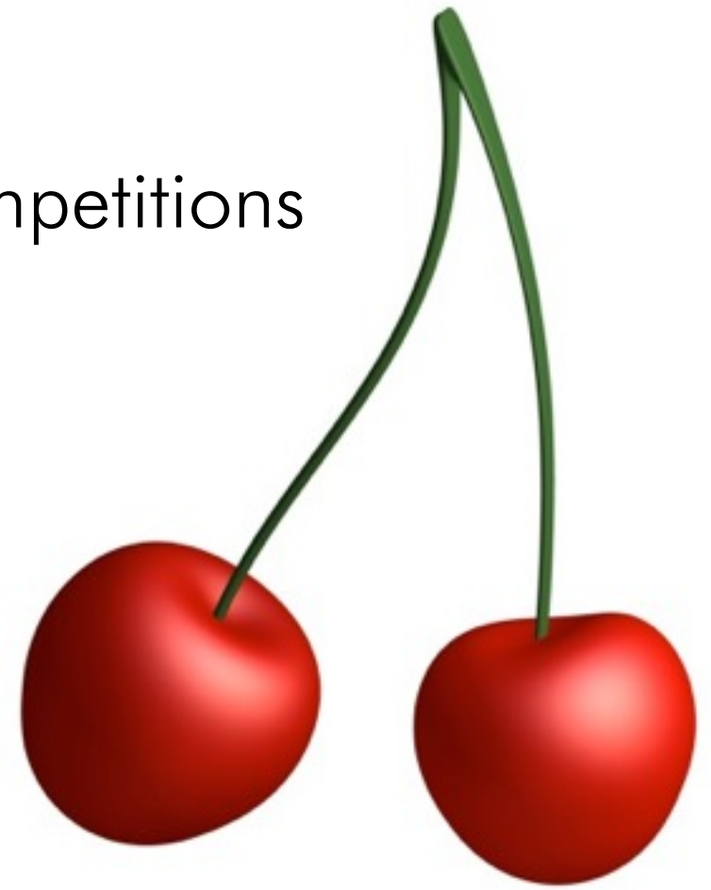


SURFER spreading through IMAGINARY 2008-2013

IMAGINARY exhibitions/activities: 110 Cities and 23 countries
Visitors: >1.000.000 visitors, among them 2.300 schools
Website: on average 800 unique daily visitors (on peak days up to 9,000 visitors)
Downloads: programs 700.000 times (programs), background material 500.000 times

START *SURF*ING

- SURFER to create pictures
- SURFER in education
- SURFER for events, workshops, museums, competitions
- New ideas with algebraic surfaces
- join our team!



www.imaginary.org/program/surfer
surfer@imaginary.org