

# Gallery by Curtis T McMullen

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## Gallery

### Hyperbolic plane

Triangles and curvature

<<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/tris.gif>>

Pentagons <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/ngon5.gif>>

SL2 Z <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/sl2z.gif>>

Gamma(2) <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/gamma2.gif>>

Ideal triangles

<<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/igon3.gif>>

Farey packing <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/farey.gif>>

Geodesics <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/geods.gif>>

Horoballs <<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/horo.gif>>

Surface of genus 2

<<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/ngon8.gif>>

Torus lamination

<<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/lam.html>>

Open Riemann surface

<<http://www.math.harvard.edu/%7Ectm/gallery/fuchs/pants.gif>>

### Complex analysis

Hexponential for 31/3

<<http://www.math.harvard.edu/%7Ectm/gallery/cx/CubeRoot3.gif>>

Hexponential for 2E <<http://www.math.harvard.edu/%7Ectm/gallery/cx/2E.gif>>

Hexponential horocycle

<<http://www.math.harvard.edu/%7Ectm/gallery/cx/horoflow.gif>>

Airfoils <<http://www.math.harvard.edu/%7Ectm/gallery/cx/foils.gif>>

Streamlines <<http://www.math.harvard.edu/%7Ectm/gallery/cx/streams.gif>>

Complex roots movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/cxfns.mov.gif>>

$|\zeta(s)|$  on  $s=1/2+it$

<<http://www.math.harvard.edu/%7Ectm/gallery/cx/zeta.gif>>

### Solving polynomials

Historical overview

<<http://www.math.harvard.edu/%7Ectm/gallery/polynom/index.html>>

Newton's method

<[http://www.math.harvard.edu/%7Ectm/gallery/polynom/New\\_3.gif](http://www.math.harvard.edu/%7Ectm/gallery/polynom/New_3.gif)>

Newton's bifurcations

<[http://www.math.harvard.edu/%7Ectm/gallery/polynom/New\\_bif.gif](http://www.math.harvard.edu/%7Ectm/gallery/polynom/New_bif.gif)>

Solving the cubic

<<http://www.math.harvard.edu/%7Ectm/gallery/polynom/F4.small.gif>>

Solving the quintic

<<http://www.math.harvard.edu/%7Ectm/gallery/polynom/Icos.gif>>

Solving the sextic <<http://members.tripod.com/vismath7/crass/index.html>>

(Crass) <<http://www.csulb.edu/%7Escrass>>

Teichmüller space

Maskit slice <<http://www.math.harvard.edu/%7Ectm/gallery/teich/maskit.gif>>

Bers slice – square torus

<<http://www.math.harvard.edu/%7Ectm/gallery/teich/bers.sq.slice.gif>>

Bers slice – hex torus

<<http://www.math.harvard.edu/%7Ectm/gallery/teich/bers.hex.slice.gif>>

Anosov slice <<http://www.math.harvard.edu/%7Ectm/gallery/teich/pa.gif>>

Exotic slice <<http://www.math.harvard.edu/%7Ectm/gallery/teich/slices.html>>

Animated slices <<http://hypatia.rice.edu/%7Eddumas/bear/anim>> (Dumas)

<<http://hypatia.rice.edu/%7Eddumas>>

Holomorphic motion

<[http://www.math.harvard.edu/%7Ectm/gallery/teich/holo\\_motion.gif](http://www.math.harvard.edu/%7Ectm/gallery/teich/holo_motion.gif)>

Platonism

The 5 solids

<[http://www.math.harvard.edu/%7Ectm/gallery/gold/platonic\\_solids.gif](http://www.math.harvard.edu/%7Ectm/gallery/gold/platonic_solids.gif)>

Kepler's orbs <<http://www.math.harvard.edu/%7Ectm/gallery/gold/kepler.gif>>

Golden rectangles

<<http://www.math.harvard.edu/%7Ectm/gallery/gold/index.html>>

Icosahedron movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/a5.mov.gif>>

Icosahedral dynamics

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/icos.html>>

Fractional dimension

Random walks <<http://www.math.harvard.edu/%7Ectm/gallery/random/walks.html>>

Koch curve <<http://www.math.harvard.edu/%7Ectm/gallery/cx/koch.gif>>

Hironaka's M-curve

<<http://www.math.harvard.edu/%7Ectm/gallery/cx/Mcurve.gif>>

Riemann's curve <<http://www.math.harvard.edu/%7Ectm/gallery/cx/nowhere.gif>>

Diffusion limited aggregate

<<http://www.math.harvard.edu/%7Ectm/gallery/random/dla.gif>>

DJIA <<http://www.math.harvard.edu/%7Ectm/gallery/random/djia.gif>>

Percolation <<http://www.math.harvard.edu/%7Ectm/gallery/random/perc.gif>>

More percolation

<<http://www.math.harvard.edu/%7Ectm/gallery/random/fish.gif>> (Julia Fish) <<http://orathost.cfa.ilstu.edu/%7Erfinch/fish.html>>

### Topology

Celtic knot <<http://www.math.harvard.edu/%7Ectm/gallery/topology/celt7.gif>>  
Bicycle tracks?  
<<http://www.math.harvard.edu/%7Ectm/gallery/topology/biketracks.gif>>  
Outer space <<http://www.math.harvard.edu/%7Ectm/gallery/topology/outer.gif>>

### Kleinian groups

Sierpinski carpet limit set  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/acy.gif>>  
Quasifuchsian reflections  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/qq.gif>>  
Cusp group <<http://www.math.harvard.edu/%7Ectm/gallery/klein/cusp.gif>>  
Near cusp <[http://www.math.harvard.edu/%7Ectm/gallery/klein/near\\_cusp.gif](http://www.math.harvard.edu/%7Ectm/gallery/klein/near_cusp.gif)>  
Alg/Geom Limits  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/alggeom.html>>  
Honeycomb cusp <<http://www.math.harvard.edu/%7Ectm/gallery/klein/honey.gif>>  
Apollonian gasket  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/apollo.gif>>  
Whitehead link <<http://www.math.harvard.edu/%7Ectm/gallery/klein/white.gif>>  
SL<sub>2</sub>(Z[i])  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/whitelat.gif>>  
Whitehead's carpet  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/carpet.gif>>  
Figure 8 orbifold fiber  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/fiber.gif>>  
Totally degenerate group  
<<http://www.math.harvard.edu/%7Ectm/gallery/klein/tot.gif>>  
Griffin <<http://www.math.harvard.edu/%7Ectm/gallery/klein/totlox.gif>>  
Snowflake <<http://www.math.harvard.edu/%7Ectm/gallery/klein/flake.gif>> &  
blowup <<http://www.math.harvard.edu/%7Ectm/gallery/klein/flake.big.gif>>  
Convex hull <[http://www.math.harvard.edu/%7Ectm/gallery/klein/cvx\\_hull.gif](http://www.math.harvard.edu/%7Ectm/gallery/klein/cvx_hull.gif)>  
Bubbles <<http://www.math.harvard.edu/%7Ectm/gallery/klein/bubbles.gif>>  
(Brock) <<http://www.math.uchicago.edu/%7Ebrock>>

### Kleinian movies

Jellyfish movie  
<<http://www.math.harvard.edu/%7Ectm/gallery/movies/jellyfish.mov.gif>>  
Whitehead movie  
<<http://www.math.harvard.edu/%7Ectm/gallery/movies/whitehead.mov.gif>>  
The Blob movie  
<<http://www.math.harvard.edu/%7Ectm/gallery/movies/blob.mov.gif>> (Brock)  
<<http://www.math.uchicago.edu/%7Ebrock>>  
Apollonian movie  
<<http://www.math.harvard.edu/%7Ectm/gallery/movies/apollo.mov.gif>>  
(Dumas) <<http://math.harvard.edu/%7Eddumas>>

Quadratic polynomials

Mandelbrot set <<http://www.math.harvard.edu/%7Ectm/gallery/julia/Mfull.gif>>

Tree ( $z^2 + i$ ) <<http://www.math.harvard.edu/%7Ectm/gallery/julia/I.gif>>

Draped tree

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Idraped.gif>> (à la

Christo) <<http://christojeanneclaude.net/wt.html>>

Lamination for  $z^2 + i$

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/lam.gif>>

Cusped curve ( $z^2 + 1/4$ )

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Parab.gif>>

Rabbit <<http://www.math.harvard.edu/%7Ectm/gallery/julia/Order3.gif>>

Satellite <<http://www.math.harvard.edu/%7Ectm/gallery/julia/Satclip.gif>>

Cantor set and foliations

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Fol.gif>>

Complex dynamics

Sierpinski carpet Julia set

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Sierpinski.gif>>

Cubic polynomial

<[http://www.math.harvard.edu/%7Ectm/gallery/julia/Cubic\\_Bas.gif](http://www.math.harvard.edu/%7Ectm/gallery/julia/Cubic_Bas.gif)>

Cubic rational map

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Period3.gif>>

Degree two rational maps

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Rat.html>>

Icosahedral maps

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/icos.html>>

Deg 29 movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/deg29.mov.gif>>

Exponential map

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Exp.col.gif>>

Lattès Orbit  $(z-i)^2/(z+i)^2$

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/lattes.gif>>

Lightning <<http://www.math.harvard.edu/%7Ectm/gallery/julia/ice.gif>>

(Hironaka) <<http://math.fsu.edu/%7Ehironaka>>

Napoleon map

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/napoleon.gif>> and

Napoleonic bifurcations

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/napoleon.bif.gif>>

Complex dynamics movies

Julia movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/julia.mov.gif>>

Dancing Cantors movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/jcantor.mov.gif>>

Mandelbrot zoom movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/M.mov.gif>>

Vanishing limb movie

<<http://www.math.harvard.edu/%7Ectm/gallery/movies/rat.mov.gif>>

## Renormalization

Cascade of bifurcations

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Cascade.gif>>

Window of period 3

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Win.gif>>

Small M in M <<http://www.math.harvard.edu/%7Ectm/gallery/julia/Msmall.gif>>

Colorful M in M

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/Msmall.col.gif>>

Feigenbaum Julia set

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/feig.html>>

Golden Siegel disk

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/siegel.html>>

Golden circle map

<<http://www.math.harvard.edu/%7Ectm/gallery/julia/critcirc.html>>

## Dynamics on K3 surfaces

K3 movie <<http://www.math.harvard.edu/%7Ectm/gallery/movies/k3.movie.gif>>

K3 surface <<http://www.math.harvard.edu/%7Ectm/gallery/k3/k3.surf.gif>>

Tame <<http://www.math.harvard.edu/%7Ectm/gallery/k3/k3.tame.gif>>

Wilder <<http://www.math.harvard.edu/%7Ectm/gallery/k3/k3.wild.gif>>

Ergodic <<http://www.math.harvard.edu/%7Ectm/gallery/k3/k3.ergo.gif>>

Stable manifold

<<http://www.math.harvard.edu/%7Ectm/gallery/k3/stableman.gif>>

Tame blowup

<<http://www.math.harvard.edu/%7Ectm/gallery/k3/k3.tameblowup.gif>>

Poncelet's theorem

<<http://www.math.harvard.edu/%7Ectm/gallery/k3/conics.gif>>

Poncelet Java

<<http://www.math.harvard.edu/%7Ectm/gallery/poncelet/index.html>>

(Schwartz) <<http://www.math.umd.edu/%7Eeres>>

Dynamics on a (2,2) curve

<<http://www.math.harvard.edu/%7Ectm/gallery/k3/curve22.gif>>

## Number theory

Factorization

<<http://www.math.harvard.edu/%7Ectm/gallery/nos/factoring.png>>

(Schwartz) <<http://www.math.umd.edu/%7Eeres>>

## Billiards

Pentagon <<http://www.math.harvard.edu/%7Ectm/gallery/billiards/pent.gif>>

Unfolding

<[http://www.math.harvard.edu/%7Ectm/gallery/billiards/pent\\_double.gif](http://www.math.harvard.edu/%7Ectm/gallery/billiards/pent_double.gif)>

Trapped <<http://www.math.harvard.edu/%7Ectm/gallery/billiards/trapped.gif>>

L-shaped reality

<<http://www.math.harvard.edu/%7Ectm/gallery/billiards/ltable.jpg>>

(Duchins) <<http://www.math.uchicago.edu/%7Emduchin>>

Zero flux Peano curve

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<<http://www.math.harvard.edu/%7Ectm/gallery/billiards/arnoux.gif>>

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<http://www.math.harvard.edu/~ctm/gallery/menu.html>

<<http://www.math.harvard.edu/%7Ectm/gallery/menu.html>>

Respectfully, Roger L. Bagula

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