

HEGL ProSeminar/Seminar: Illustrating Mathematics

SoSe 2022

- **Contact:** Dia Taha (dtaha@mathi.uni-heidelberg.de)
- **Website:** <https://hegl.mathi.uni-heidelberg.de/seminars/hegl-proseminar/>
- **Description:** This is the third iteration of the ProSeminar/Seminar organized by the Heidelberg Experimental Geometry Lab (HEGL). During the coming Summer Semester, the Seminar will focus on illustrating mathematical ideas from geometry and adjacent fields using computational and fabrication tools available at HEGL. The Seminar will concurrently run hands-on projects based on a pool of suggested mathematical readings and visualization case studies. A sample of the illustrations that have been developed at HEGL is available in the window display of the Lab (Level -1, Mathematikon) and the Lab website (<https://hegl.mathi.uni-heidelberg.de/galleries/>).

Additional figures

313

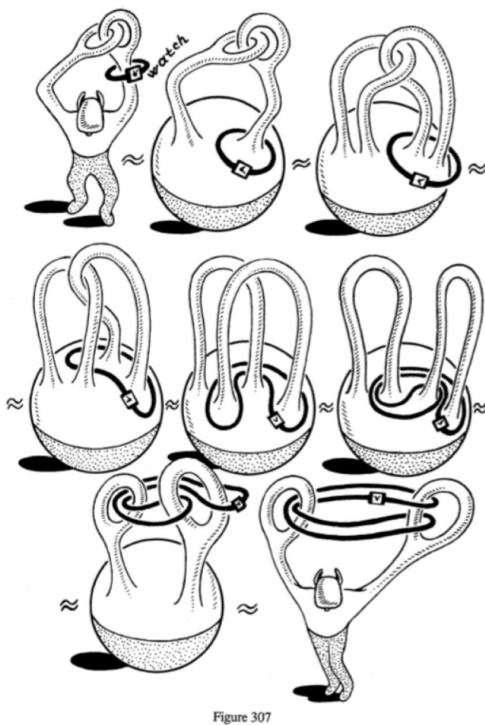


Figure 307

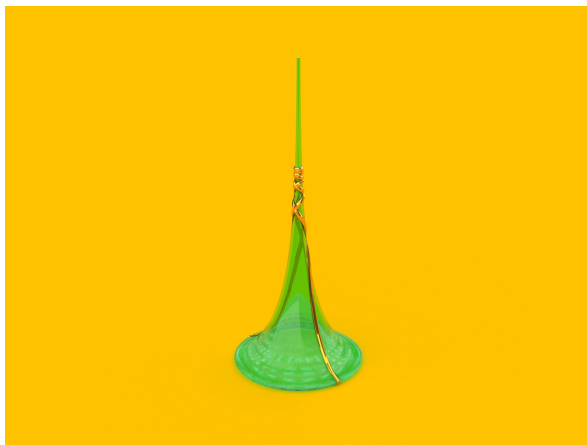
(a) Unliking Handcuffs (Fomenco 1997)



(b) Sierpinski Christmas Tree (HEGL 2021)

Figure 1: Mathematical illustrations come in different forms.

- **Format:** You will, in groups, read about and give a series of short, focused presentations on a number of mathematical topics. Following each presentation, you will create illustrations for the topic covered in your presentation. Each illustration project will extend over a number of weeks based on the complexity of the illustrated topic and the illustration medium. Near the end of the Semester, you will refine some of your related illustrations and write a short blog post that showcases your refined illustrations and explains the underlying mathematical ideas.
- **Topics:** The topics covered will include mathematical puzzles, proofs without words, fractals, tilings, graphs, topological spaces, Riemannian manifolds, dynamical systems, and data visualization. We will also touch on some elements of computational geometry and mathematical visual design.



(a) A Geodesic on a Pseudosphere (Taha 2021)



(b) Hyperbolic Coral (Menelaos 2021)

Figure 2: 3D illustrations developed at HEGL.

- **Illustration media:** The media used for illustrations will include computer graphics, 3D printing, laser cutting, paper crafting, and drawing. HEGL will provide all the consumables, equipment, and proprietary software packages needed for the approved projects.
- **Reading:** Reading and technical training materials will be provided throughout the Semester.
- **Intended audience and prerequisites:** The intended audience is mainly Bachelor's students, possibly Master's students. Some background in programming is helpful but not required. The ProSeminar/Seminar will be conducted in English.
- **Time and location:** to be announced
- **Briefing:** **Wednesday, February 16, 2022, at 12 PM, on Zoom.** Please indicate your interest in Müsli or via **email** (dtaha@mathi.uni-heidelberg.de) to receive the Zoom link.