HEGL Proseminar/Seminar: Illustrating Mathematics
## SoSe 2023

- **Contact**: Dia Taha (dtaha@mathi.uni-heidelberg.de)

- **Website**: https://hegl.mathi.uni-heidelberg.de/seminars/hegl-proseminar/

- **Overview**: This is the third iteration of the Illustrating Mathematics Proseminar/Seminar, organized by the Heidelberg Experimental Geometry Lab (HEGL). During the Summer Semester, the seminar will focus on using computational and fabrication tools at HEGL to illustrate mathematical ideas from geometry and related fields. The seminar will involve hands-on projects based on recommended mathematical readings and visualization case studies. Examples of illustrations created at HEGL can be seen in the Lab's window display (Level -1, Mathematikon) and on the Lab website (https://hegl.mathi.uni-heidelberg.de/research-2/research/).
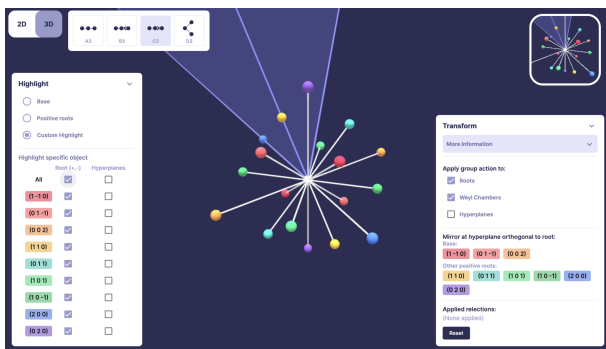

(a) Root Systems and their Weyl Groups (HEGL Proseminar/Seminar WiSe22)
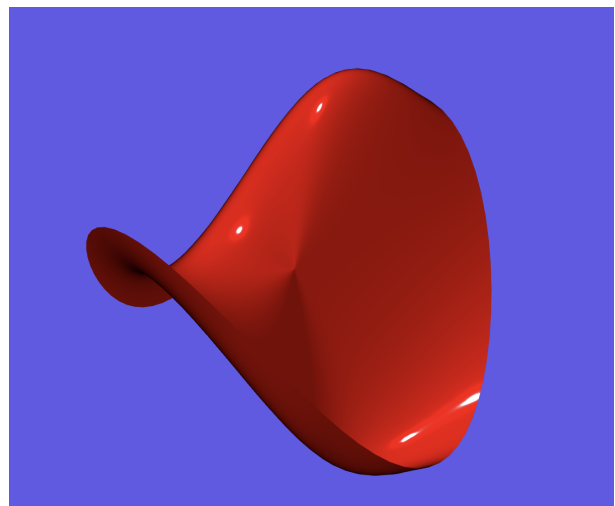
(b) Disc and Annulus Deformations (HEGL Independent Project WiSe22)

Figure 1: 3D illustrations developed at HEGL.

- **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.
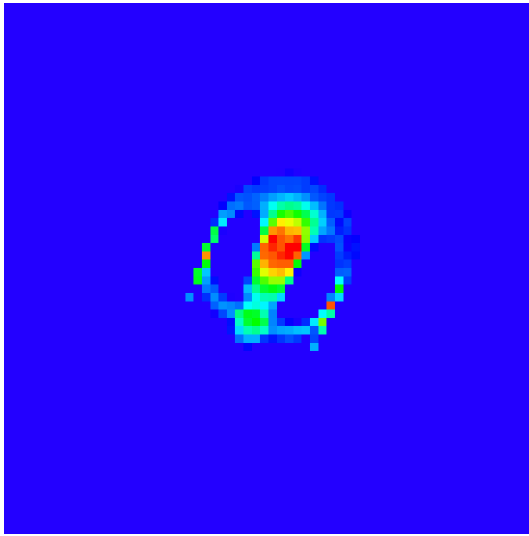
(a) Continuous Cellular Automata (HEGL Praktikum WiSe22)
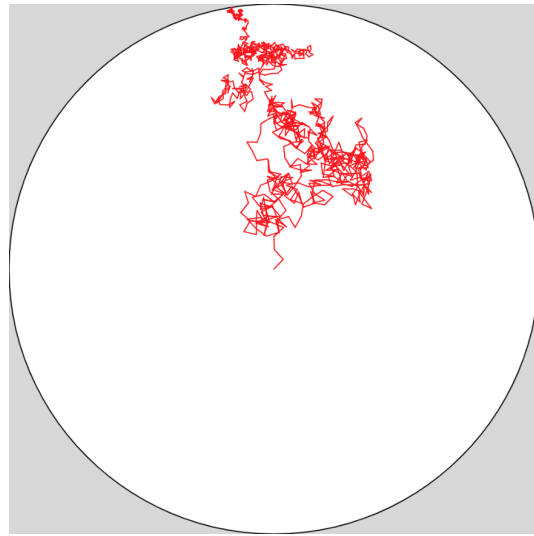
(b) Random Walks in the Poincaré Disk (HEGL BOGY Internship WiSe22)

Figure 2: 2D 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 Bachelor's students. Some background in programming is helpful but not required. The Proseminar/Seminar will be conducted in English.

- **Time and location**: Wednesday from 2–4 PM. The location is TBA.

- **Briefing**: **Thursday, February 16, 2023, at 12 PM, on Zoom**. Please indicate your interest in **Müsli** (https://muesli.mathi.uni-heidelberg.de/) or via **email** (dtaha@mathi.uni-heidelberg.de) to receive the Zoom link.
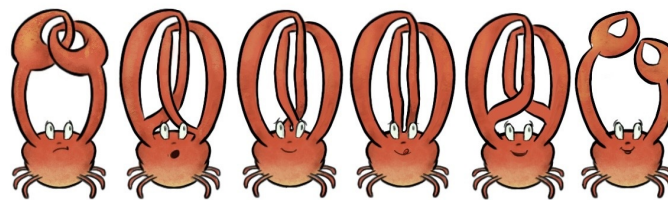

Figure 3: A mathematical crab untangling its pincers. (Ana Chaviz Caliz 2022)