GEOMETRICIAN'S VIEWS

SHADOW, SILHOUETTE AND PROJECTION

Co-funded by the Erasmus+ Programme of the European Union

2020-1-FR01-KA227-SCH-095534

RESEARCHER VIEW

Anyone who has played shadow puppets knows that you can't reconstruct an object from just one of its shadows. But if you have three shadows, in three directions perpendicular to each other (such as up, to the right and across the street), can you find the object? No, because several objects can have these three shadows. But there are more than three directions in space (an infinite number in fact). This is where the mathematician cannot help asking herself a question: how many shadows do I need to be able to reconstruct an object? Or, put another way, can I impose the shadows in many directions and find an object that has these shadows? And the answer, which continues to surprise me, was given by Kenneth Falconer in 1986: there is no limit. You can choose as many shadows in as many directions as you like, and you can still find an object that has those shadows. Amazing, isn't it? This result, I can say without shame that I still don't understand it. I understand the terms but it still hasn't entered my intuitive world.

Researcher: Olivier Druet

ARTISTIC VIEW

I like to watch children interact with their shadow. When they are small, they try to catch it, or run away from it. They may be afraid of shadows at night, in which they don't recognise the objects in their room. When they are older, two children may make their shadows kiss or fight, without themselves touching.
This exploration is at once emotional (a shadow is funny or scary), identity-related (who is my shadow, in relation to me?) and mathematical (what makes a shadow such a faithful and at the same time erroneous image of reality?)
It is this triad that drives me to write tales: to tell the story of the quest - personal, identity, understanding of the world - that embarks a character in a mathematical reflection, and the emotions that this brings. To build and share meaning around mathematics.

Artiste : **Merie Lhuissier**

Common view

The notion of shadow or silhouette and, more generally, of projection, is linked to the notion of loss of information. Now, losing information, having access to only part of the information, is very interesting for a story. By combining our two views on the theme, we identified several possible starting points for a story about shadows.
We could write an investigation, where you have to reconstruct an object knowing only shadows: investigate to find new shadows, and little by little find the object.
We could tell a misunderstanding: a scene that we interpret and understand completely differently depending on whether we see it in 3D or only in shadow.
Or we could write a marvellous tale in the world of a child's bedroom at night, with threatening, mischievous, surprising shadows, of which we are not sure whether they are fantastic entities or simple everyday objects, then which become tamed and finally become a game.
What is certain is that a story is being written

Les Maths en Scène

GEOMETRICIAN'S VIEWS