

## **Theory and applications of fractal transformations**

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Let  $A$  and  $B$  be attractors of two point-fibred iterated function systems with coding maps  $f$  and  $g$ . A transformation from  $A$  into  $B$  can be constructed by composing a branch of the inverse of  $f$  with  $g$ . I will outline the shape of the theory of such transformations, which are termed "fractal" because their graphs are typically of non-integer dimension. I will also describe the remarkable geometry of these transformations when the generating iterated functions systems are projective. Finally, I will show how they can be used to provide new insights into dynamical systems and also how they can be used to manipulate, filter, process and efficiently store digital images, and how they can be used in image synthesis, leading to applications in the visual arts. The talk will involve some new theory and some computer graphics, and should be accessible to a broad mathematically literate audience.