



## The mathematics of Nature's forms



### Alberto Bressan to speak at the next SISSA colloquium

15 June 2016, 3 pm  
SISSA, Main Lecture Hall  
Via Bonomea 265, Trieste

The shape of a leaf, the pattern on a viper's skin, a mollusc's shell: Nature knows how to create accurate patterns. Alberto Bressan, mathematician at Penn State University (Pennsylvania, USA) will give a talk (for the SISSA Colloquia series) on the mathematics governing the growth of biological forms. The event, to be held in English, is free and open to the public.

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Did you know that the growth of leaves in many plant species follows the Fibonacci numerical sequence? The truth is that Nature almost never creates haphazardly, and the observation of



examples like leaves, the stripes on a zebra, the complex but repetitive arrangement of florets on a cauliflower, the spots on a ladybird's back (to mention but a few) reveals a large variety of mathematical regularities. So what is the mathematics governing the growth of living things? That is the question that Alberto Bressan, mathematician at Penn State University and for many years professor at SISSA, will attempt to answer.

"Living tissues, like stems, leaves and branches in plants and bones in animals grow into a wide variety of shapes", explains Bressan. "In some cases, Nature has found ways to control this growth with very high accuracy". In his talk, Bressan will discuss these phenomena from a mathematical perspective and illustrate some results and open questions in scientific research, as well as considering in detail the issue of numerical simulations.

The colloquium, open to the public and free, will be held in English.

### **Bio**

Alberto Bressan is a professor of mathematics at Penn State University where he heads the Center for Interdisciplinary Mathematics. Bressan was a professor at SISSA from 1991 to 2003.

His research interests involve non-linear analysis, with special reference to non-linear partial differential equations, optimization problems, differential inclusions, mathematical control theory and differential games. He obtained important results regarding the fundamental properties of solutions and the convergence of approximations of vanishing viscosities.

He won the Bôcher Memorial Prize in 2008 and the SIAM Analysis of Partial Differential Equations Prize in 2007. He also received the Feltrinelli Prize for Mathematics, Mechanics and Applications from the *Accademia Nazionale dei Lincei*.

### **IMAGES:**

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