World Scientific
Connecting Great Minds
BOOKSHOP

Home Browse by Subject Bestsellers New Titles Editor's Choice New Reviews Textbooks
Search Book Series Study Guides Rights Inspection Copy Contact Us Join Our Mailing List
For Authors How to Order E-Catalogues

Browse all Subjects
Search Bookshop
Go
Book Offers
Browsing Corner
Study Guides
- New Titles
- Editor's Choice
- Bestsellers
- Book Series
- Textbooks
- Journals
- Join Our Mailing List

PATTERN FORMATION IN BIOLOGY, VISION AND DYNAMICS

by **Alessandra Carbone** *(University of Paris XII)*, **Misha Gromov** *(Institut d'Hautes Etudes Scientifiques & Courant Institute of Mathematical Sciences)* **& Przemsylaw Prusinkiewicz** *(University of Calgary)*

Table of Contents (105k)
Preface (165k)
Chapter 1: Paradigms of Pattern Formation: Towards a Computational Theory of Morphogenesis
Chapter 1.1: Introduction (242k)
Chapter 1.2: Single blind agent with finite memory (170k)
Chapter 1.3: Single blind agent with inflnite memory (190k)
Chapter 1.4: Single sighted agent receiving cues from the environment (one-way exogenous control) (315k)
Chapter 1.5: Single sighted agent receiving cues from the structure (two-way exogenous control) (165k)
Chapter 1.6: Single self-controlled agent (endogenous control) (176k)
Chapter 1.7: Multiple blind agents with finite memory (189k)
Chapter 1.8: Multiple blind agents with infinite memory (124k)
Chapter 1.9: Multiple sighted agents (264k)

Half a billion years of evolution have turned the eye into an unbelievable pattern detector. Everything we perceive comes in delightful multicolored forms. Now, in the age of science, we want to comprehend what and why we see.

Two dozen outstanding biologists, chemists, physicists, psychologists, computer scientists and mathematicians met at the Institut d'Hautes Etudes Scientifiques in Bures-sur-Yvette, France. They expounded their views on the physical, biological and physiological mechanisms creating the tapestry of patterns we see in molecules, plants, insects, seashells, and even the human brain. This volume comprises surveys of different aspects of pattern formation and recognition, and is aimed at the scientifically minded reader.

Contents:

- ***Growth and Form:***
- Paradigms of Pattern Formation — Towards a Computational Theory of Morphogenesis (P Prusinkiewicz)
- Growth and Form of Sponges and Corals in a Moving Fluid (J A Kaandorp & P M A Sloot)
- From Pseudo-Random Numbers to Stochastic Growth Models and Texture Images (L P Yaroslavsky)
- Crystal Growth, Biological Cell Growth, and Geometry (J W Cannon et al.)

- Recent Results on Aperiodic Wang Tilings (J Kari)
- ***Reaction– Diffusion and Beyond:***
- Biological Pattern Formation as a Complex Dynamic Phenomenon (H Meinhardt)
- Andronov Bifurcations and Sea Shell Patterns (M Argentina & P Coullet)
- Rational and Irrational Angles in Phyllotaxis (Y Couder & S Douady)
- ***Cellular Patterns:***
- Organogenetic Cellular Patterning in Plants (P W Barlow et al.)
- A Classification of Plant Meristems Based on Cellworks (3D L-Systems). The Maintainance and Complexity of Their Cellular Patterns (J Lück & H B Lück)
- Plant Meristems and Their Patterns (B Zagórska-Marek)
- Mechanical Stress Patterns in Plant Cell Walls and Their Morphogenetical Importance (Z Hejnowicz)
- Tensorial Model for Growth and Cell Division in the Shoot Apex (J Nakielski)
- ***DNA and Genetic Control:***
- DNA Nanotechnology — From Topological Control to Structural Control (N C Seeman)
- 3D DNA Patterns and Computation (N Jonoska)
- Circular Suggestions for DNA Computing (T Head)
- DNA Computing by Matching — Sticker Systems and Watson-Crick Automata (G Paun)
- ***Images and Perception:***
- Aspects of Human Shape Perception (J Ninio)
- Pattern Recognition in the Visual System and the Nature of Neural Coding (S Thorpe)
- How Can Singularity Theory Help in Image Processing? (M Briskin et al.)

Readership: Biologists, mathematicians and computer scientists.

"This gorgeously produced book gives an important entrée into the emerging world of biological mathematics ... One of the most revolutionary and exciting areas discussed in this book is that of DNA computing and DNA nanotechnology ... Mathematicians should find this book a fascinating introduction as well as a useful source book."

Journal la Gazette des Mathematiciens, 2002

444pp Pub. date: Apr 2000

ISBN 981-02-3792-8 US$111 / £76

Put in Shopping Cart

Checkout

World Scientific Home | WorldSciNet | eProceedings
Imperial College Press | WorldSciNet Archives

Copyright © 2007 World Scientific Publishing Co. All rights reserved.
Updated on 31 December 2007