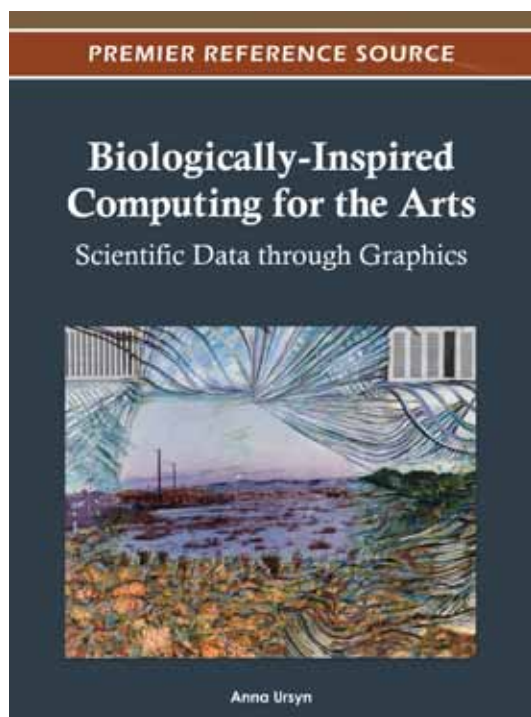


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## Biologically-Inspired Computing for the Arts: Scientific Data through Graphics



Anna Ursyn  
(University of Northern Colorado, USA)

Images support connections between biology, engineering, and material sciences resulting in a growing partnership among academia, laboratories, and industry. Scientists focus on biology-inspired research to understand how biological systems work, and then create systems and materials that would have efficiency and precision of living structures. The Art–Science connection has become one of prominent trends exemplified by themes presented in journals, conferences, and books.

**Biologically-Inspired Computing for the Arts: Scientific Data through Graphics** comprises a collection of authors' individual approaches to the relationship between nature, science, and art created with the use of computers. Themes discussed in the book relate to the use of visual language in communication about biologically-inspired scientific data, visual literacy in science, and application of practitioner's approach. This comprehensive reference will assist programmers, scientists, engineers, computer science and science-oriented students in creating and effectively communicating their projects using science-related knowledge.

### Topics Covered:

- Biologically inspired computing in relation to the aesthetics of presenting data and information
- Cognitive thinking, visual thinking, visual literacy, visual communication
- Computer graphics and computer science, computer art, nano art and liquid crystals
- Exploring interactive aspects of visualization regarding water-related concepts
- Inquiries about nature- or science-related art creation
- Instructional technology with integrative approach
- Investigating information visualization that links art, nature, and science
- Science: biology and microbiology, physical geology, the cosmos, astrophysics, physics, geometry, fractals, liquid crystals, or other areas of interest
- Shortcuts to integrative learning art, science, programming, and computer graphics
- Teaching and learning science through computer art production
- Visual presentation of scientific concepts and data, Displaying data through cognitive drawing

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**Market:** This premier publication is essential for all academic and research library reference collections. It is a crucial tool for academicians, researchers, and practitioners and is ideal for classroom use.

**Anna Ursyn, PhD**, is a Professor and Computer Graphics Area Head at the School of Art and Design, University of Northern Colorado. She combines programming with software and printmaking media, to unify computer generated and painted images, and mixed-media sculptures. Ursyn had over 30 single juried and invitational art shows, participated in over 100 fine art exhibitions, and published articles and artwork in books and journals. Research and pedagogy interests include integrated instruction in art, science, and computer art graphics. Since 1987 she serves as a Liaison, Organizing and Program Committee member of International IEEE Conferences on Information Visualization (iV) London, UK, and Computer Graphics, Imaging and Visualization Conferences (CGIV). She serves as Chair of the Symposium and Digital Art Gallery D-ART iV, 1997-2011.

## Section 1: Visual Data Formation: Biology Inspired Generation and analysis of Objects and Processes

### Chapter 1

#### *Bio-Interfaces:*

Zuanon Rachel (Anhembi Morumbi University, Brazil)

### Chapter 2

#### *Flow Simulation with Vortex Elements*

Stock Mark (Independent artist, scientist, and programmer, USA)

### Chapter 3

#### *Cooperation of Nature and Physiologically Inspired Mechanisms in Visualisation*

al-Rifaie Mohammad Majid (Goldsmiths, University of London, UK)

Aber Ahmed (The Royal Free Hospital, London, UK)

Bishop John Mark (Goldsmiths, University of London, UK)

### Chapter 4

#### *Ohm1gas:*

Auson Kuai Shen (Academy of Media Arts Cologne, Germany & Cologne Game Lab, Germany)

### Chapter 5

#### *Bridging Synthetic and Organic Materiality:*

Yoshida Hironori (Carnegie Mellon University, USA)

## Section 2: Visualizing the Invisible: Processes for the Visual Data Formation

### Chapter 6

#### *Sustainable Cinema:*

Hessels Scott (City University, Hong Kong)

### Chapter 7

#### *Seeing the Unseen*

Laramée Eve Andrée (Maryland Institute College of Art, USA)

Thokala Kalyan Chakravarthy (University of Akron, USA)

Webb Donna (University of Akron, USA)

Kang Eunsu (University of Akron, USA)

Kolodziej Matthew (University of Akron, USA)

Niewiarowski Peter (University of Akron, USA)

Xiao Yingcai (University of Akron, USA)

### Chapter 8

#### *Nano-Art:*

Orfescu Cris (NanoArt21, USA)

### Chapter 9

#### *Nature Related Computerkunst*

Schneider Wolfgang (Computerkunst/Computer Art, Germany)

## Section 3: Scientific Communication through Visual Language

### Chapter 10

#### *Biological Translation:*

Hover Collin (University of Texas at Arlington, USA)

### Chapter 11

#### *Looking at Science through Water*

Ursyn Anna (University of Northern Colorado, USA)

### Chapter 12

#### *Visual Tweet:*

Ursyn Anna (University of Northern Colorado, USA)

### Chapter 13

#### *Digital Approaches to Visualization of Geometric Problems in Wooden Sangaku Tablets*

Constant Jean (Northern New Mexico College, USA)

## Section 4: Tools for Metaphors: Nature Described with the Use of Mathematics and Computing

### Chapter 14

#### *Drawings from Small Beginnings*

Dehlinger Hans (Universität Kassel, Germany)

### Chapter 15

#### *On the Designing and Prototyping of Kinetic Objects*

Huang Scottie Chih-Chieh (Chung Hua University, Taiwan)

Shih Shen-Guan (National Taiwan University of Science and Technology, Taiwan)

### Chapter 16

#### *A New Leaf*

Lee Liz (State University of New York at Fredonia, USA)

## Section 5: Analytical Discourse: Philosophy and Aesthetics of Nature Inspired Creations

### Chapter 17

#### *Science within the Art:*

Craft Doug (Doug Craft Fine Art, LLC, USA)

### Chapter 18

#### *Getting Closer to Nature:*

Walker James Faure (University of the Arts, London, UK)

### Chapter 19

#### *drawing/ / digital/ / data:*

Harty Deborah (Nottingham Trent University, UK)

### Chapter 20

#### *From Zero to Infinity:*

Spada Clayton S. (Cypress College, USA)

Raphael Victor (Independent artist, USA)

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