



San Francisco State University, IED and VSN Mobil invite you to a workshop with Pino Trogu, Carmelo di Bartolo and Franco Lodato: **Bionics and Design, Pure and Applied Research**



Rotational Geometry and the Creation of Bionic Models

The Pioneering Work of Giorgio Scarpa (1938-2012)

Pino Trogu – trogu@sfsu.edu

A hands-on introduction to the rotational geometry and bionic models of Giorgio Scarpa. Models will be examined and interacted with, including a working, full-size replica of the model of the sea urchin's mouth, or Aristotle's lantern. In addition, workshop participants will be able to construct basic geometric modules and assemble them into simple chains. The articulated models produced by the participants during the workshop will be assembled together into "transformable fabrics" as envisioned by Scarpa, allowing for testing, discovery, and prototyping of his insights into the relationships between geometry and biological systems, to show how knowledge of the former can be used to model and understand the latter.



Bionic Applied to Advanced Design

Creativity and problem solving with the complexity laws

Carmelo di Bartolo - carmelodibartolo@designinnovation.net

Research and study of natural patterns, shapes and structures is a bionic methodology that applied to design becomes useful to define new materials, functional elements, morphologies. Furthermore, nature's adaptive systems can become strategies for companies and business. Since 1980, we started developing the first programs of bionic applied to design within the Research Centre of IED in Milan, working with Italian and international companies, and training professionals through the Bionics&Design Master. Since 1998, these experiences are systematically used as design methodology in Design Innovation. These activities have grown determining bionic as an opportunity to transfer natural and biological inputs into industrial solutions, other than in landscape design and in strategy design. These activities have allowed broadening the application range of the bionic methodology from new materials to interface design. The analogic models, are constantly shared between Design Innovation and the involved firms in a continuous cross-fertilization process. Natural structures, analogic models, product concepts and new materials conceived with this approach will be presented during this workshop.



Nature's Inventions and Industrial Innovations

An Introduction to the Principles and Methods of Bionics and Biomimicry

Franco Lodato – franco@vsnmobil.com

Life has been performing design experiments for 3.8 billion years and the best ideas on the planet today are those that perform well while economizing on energy and materials. Whatever a company's design challenge, the odds are high that one or more of the world's 30 million living creatures have not only faced the same challenge, but have evolved effective strategies to solve it, thriving. This workshop will explore how bionics and biodesign have been critical to Franco Lodato's trend-setting products. Strategies can range from the mimicry of nature to conceptual abstractions. In one of his projects, a woodpecker provoked a fresh look at the design of an ice axe. In another, the exterior shells of lobsters and other crustaceans suggested a layered polymer design for the coverings of rugged cell phones.

*The workshop will take place on Tuesday, July 29 at the **Politecnico of Milano, Bldg 25 "Emilio Massa"** – Via Golgi 40 – Milano 20133
As part of Living Machines 2014 – The 3rd Conference on Biomimetic and Biohybrid Systems – Milan, Italy, July 29–August 1, 2014*



Bionics and Design: Pure and Applied Research

Date: 29.07.2014

Politecnico di Milano, Bldg. 25 “Emilio Massa” Via Golgi, 40 – Milano www.polimi.it

Organizers:

Pino Trogu, Department of Design & Industry, San Francisco State University

trogu@sfsu.edu online.sfsu.edu/trogu/scarpa

Carmelo Di Bartolo, Design Innovation, Milan

carmelodibartolo@designinnovation.net www.designinnovation.net

Franco Lodato, VSNMobil franco@vsnmobil.com www.linkedin.com/in/lodatof

Program

Part 1 (Morning session)

Pino Trogu **Rotational Geometry and the Creation of Bionic Models:**

The Pioneering Work of Giorgio Scarpa

- 9:00 Welcome address
- 9:15 Overview of Scarpa’s work
- 9:30 Bionic model of Aristotle’s lantern
- 10:00 Break
- 10:15 Models of Rotational Geometry
- 10:30 Building an articulated chain (hands-on, kit-of-parts provided)
- 11:00 Assembly of individual chains into larger transformable fabric (test, as proposed by Scarpa)
- 11:30 Interaction with physical models and discussion
- 12:00 Lunch

Part 2 (Afternoon session)

Carmelo di Bartolo **Bionics Applied to Advanced Design:**

Creativity and Problem Solving with the Complexity Laws

- 1:30 The Center for Research at the Istituto Europeo di Design
- 1:45 Bionics methodology at *Design Innovation*
- 2:00 Advanced design: case studies at *Design Innovation*

Part 3 (Afternoon session)

Franco Lodato **Nature’s Inventions and Industrial Innovations:**

An Introduction to the Principles and Methods of Bionics

- 2:30 Bio-Design process: translating the biological systems into a language familiar to the designers
- 3:00 Bionics and design: problem solution through careful inspection of nature’s solutions to similar problems
- 3:30 Break
- 4:00 Three case studies, Sporting goods, Automotive and Healthcare: from ideation to point of sale
- 4:30 Interaction with products and discussion
- 5:00 General discussion: pure and applied research
- 5:30 Conclusion