

EMERGENT TECHNOLOGIES READING LIST 2011/12

This reading list has been given to the library by the course tutor. Please note that the library holds as many items as possible from this list, however if any items are not held in the library's collection, these may be requested via Inter-library loan at the issue desk.

Some items may be shared with other programmes or located in other parts of the library. For location details please consult the online library catalogue.

EMERGENCE AND DESIGN Term 1 and 2

Michael Weinstock

SESSION 1. Course Introduction – Origins, Aims and Instruments

Tutors: Michael Weinstock

Delivery: Seminar

Essential Reading:

Steven Johnson, *Emergence- The connected lives of ants, brains, cities and software* Scribner 2001

Brian Goodwin, *How the Leopard changed its Spots - The Evolution of Complexity*, Phoenix, London, 1994

Kevin Kelly, *Out of Control - The new Biology of Machines*, Fourth Estate, London, 1994

Recommended Readings:

Prigogine and I. Stengers, *Order our of Chaos*

S. Kaufmann *Origin of Order*

Darcy Thompson, *On Growth and Form*, 1961 edition, Chapter 9

SESSION 2. Evolution and Computation

Tutors: Michael Weinstock

Delivery: Seminar

Essential Reading:

Sean Carroll, *Endless Forms Most Beautiful, The New Science of Evo Devo and the Making of the Animal Kingdom* Norton New York, 2005

SESSION 4. Algorithmic Architectures.

Tutors: Michael Weinstock

Delivery: Studio Seminar and Extended Workshop session

SESSIONS 5, 6, and 7 The Generative Design Experiment.

Tutors: Michael Weinstock

Delivery: Studio Tutorials and Supervision

NATURAL SYSTEMS and BIOMIMETICS Term 1

Dr. George Jeronimidis with Evan Greenberg

SESSION 1. Course Introduction

Tutor: George Jeronimidis

Delivery: Seminar

Essential Reading:

J.E.Gordon, *'The Science of Structures and Materials'*

Recommended Readings:

'Smart Structures and Materials' 1996

'Natural Structures: Principles, Strategies and Models in Nature' Stuttgart/Tubingen Universities 1991

SESSION 2. Biomimetic Analysis and The Finite Element Method

Tutors: Evan Greenberg and Professor George Jeronimidis

Delivery: Seminar

Lotus Effect (self cleaning surfaces):

<http://www.botanik.uni-bonn.de/system/bionics.htm>

Drag reduction effect (shark skin analogue):

http://www.speedo.com/IWCatSectionView.process?IWAction=Load&Merchant_Id=1&Section_Id=13&Catalog_Id=3

Recommended Reading:

BIOMIMETICS WEBSITES -

<http://depts.washington.edu/mse/faculty/personal/sarikaya.html>

<http://www.aml.arizona.edu/faculty/calvert>

<http://www.mrl.ucsb.edu/mrl/irg2.html>

<http://materials.pnl.gov/rieke%20PC.htm>

<http://www.tufts.edu/as/biology/faculty/kaplan.html>

<http://www.aml.arizona.edu/faculty/calvert>

<http://www.rdg.ac.uk/biomimetics/>

<http://www.bath.ac.uk/Departments/Eng/biomimetics/>

<http://www.chm.bris.ac.uk/inorg/mann/home5.html>

<http://www.hw.ac.uk/cheWWW/staff/cv.html>

<http://www.zoo.ox.ac.uk/newsite/top.htm>

<http://photoscience.la.asu.edu/photosyn/pubs.html>

<http://www.cs.wayne.edu/biolab/>

<http://www.mech.ed.ac.uk/research/mpg/overview.html>

<http://www.cs.wayne.edu/~kjz/KPZ/PublicationsOnline/ComKISSV18N8P78/ComKISSV18N8P78.html>

http://www.cat.syr.edu/techcenter/molecular_electronics.cfm

SESSION 3. Active and Responsive Systems in Nature
Tutor: Professor George Jeronimidis
Delivery: Seminar

Essential Reading:

JFV. Vincent, *'Smart by Name, Smart by Nature'*
'Naturally New Materials'
'Actuating Systems in Biology'
'Ideas from Skins'

available online at <http://www.rdg.ac.uk/biomimetics/> and
<http://www.bath.ac.uk/Departments/Eng/biomimetics/>

'Lightweight Structures in Nature and Architecture' Stuttgart University 1984

SESSION 4. Components in Biological Structures
Tutor: Professor George Jeronimidis,
Delivery: Seminar

Essential Reading:

G. Jeronimidis, *'The Mechanics of Biological Materials and Structures'*
'Biomimetics of Flexible Composites'
'The Mechanical Design of Skin'

available online at <http://www.rdg.ac.uk/biomimetics/> and
<http://www.bath.ac.uk/Departments/Eng/biomimetics/>

SESSION 5. Movements without Muscles.
Tutor: Professor George Jeronimidis
Delivery: Seminar

SESSIONS 6 and 7. Computational Fluid Dynamics
Tutors: Evan Greenberg and
Delivery: Seminar and extended workshop session

SESSION 8. Student Presentations (1)
Tutors: Evan Greenberg with Professor George Jeronimidis
Delivery: Seminar and extended workshop session

SESSION 9 and 10 Student Workshops and Presentations
Tutors: Evan Greenberg with Professor George Jeronimidis
Delivery: Seminar and extended workshop session

SESSION 10. Conclusions
Tutors: George Jeronimidis, Michael Weinstock and Evan Greenberg
Delivery: Seminar and extended workshop session

CORE STUDIO - Terms 1 and 2

Recommended Reading:

Kolarevic, B. Ed. (2003). 'Digital Morphogenesis'. *Architecture in the Digital Age – Design and Manufacturing*. New York, London: Spon Press.

Terzidis, K. (2006). *Algorithmic Architecture*. London: Architectural Press.

Ball, P. (1999). *The Self-made Tapestry: Pattern Formation in Nature*. Oxford: Oxford University Press.

Hildebrandt, S. and Tromba, A. (1996). *The Parsimonious Universe: Shape and Form in the Natural World*. New York: Springer.

Nerding, W. et al Eds. (2005). *Frei Otto Complete Works: Lightweight Construction – Natural Design*. Basel: Birkhäuser.