



WORKSHOP / / NEW MATERIALS FOR ART Who can exploit the invisible nature ?

/NanoScience/ Which apport
/NanoTechnology/ to
/NanoMatériaux/ contemporary art ?

/Nanoart/ what is it ?
Which is the state of the art?

From the Art of Nanometer to Nanoart
International meeting between masters of nanometer and masters of Nanoart

Photo: « Kristallisor 5 » © Gerda Steiner, Jörg Lenziinger

Thursday, NOVEMBER 19th 2009 –
9h

Campus Curie – Ulm
11, rue Pierre et Marie Curie
Paris 5^{ème}

Free **Entrance**
(follow the indications)

confirmation by mail : nanoscienceart@gmail.com





« No molecule in history received so much attention as the double helix of DNA »
Martin Kemp

Workshop « New materials for art »

From the Art of Nanometer to Nanoart

International meeting

Artists and the invisible nature. *The Mona Lisa of modern science* painted by Martin Kemp and appeared in *Nature*¹ brings us back to another article published fifty years earlier by the same journal²: James Watson, American geneticist and biochemist, and Francis Crick, British biologist, publish the structure of nucleic acids, including that of DNA, that constitutes our chromosomes (Fig. 1).

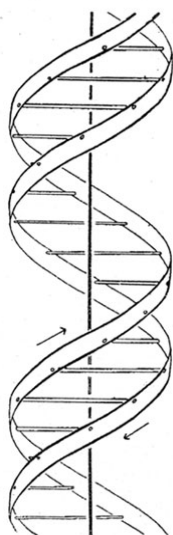


Figure 1. DNA structure, designed by Odile Crick, wife of Francis Crick².

Friend of Watson, Dali will use the deoxyribonucleic acid, *memory of God* to

the service of each element of the world,³ and which is the source of his artistic production: *The Great Masturbator in a Surrealist landscape with DNA* (1957) and *Galacidalacidesoxyribonucleicacid* (1963) are the most widely known. More recently, in 1999, the American artist Sara Sze installs *Everything That Rises Must Converge* at the Cartier Foundation for Contemporary Art. The deoxyribonucleic-inspired work binds to the memory of Dali's enthusiasm for this icon escaped from the infinitely small.

The art of nanometer. In the twenty-first century, contemporary art expresses its interest for the new research axes in material science, and in particular for those who observe, design and manufacture objects of a billionth of a meter. The first exhibition on the topic "*nanoscience and art*" took place in Paris in 2003 at the *Fraich'attitude* gallery⁴. Since then, a few - but growing - cultural events have spread out in some major cities around the world: from Los Angeles⁵

³ Salvador Dali 3: DNA and deoxyribonucleic acid. Extract from an interview granted to Antenne 2, February 19, 1978. Archives the INA: <http://www.ina.fr/media/entretiens/video/I00008420/salvador-dali-the-dna-and-l-acidedesoxyribonucleique.en.html>.

⁴ (a) <http://www.galeriefraichattitude.fr/Nano.htm>;
(b) *Nano*, L. Dreyfus, 2003, Ed LDAC & A, 3

⁵ *Nanoculture, Implications of the New Technoscience*, N. K. Hayles, 2004, Ed Intellect Books, Bristol, U.K.

¹ M. Kemp, *Nature* **421**, 416-420 (2003)

² J. Watson D., F.H.C.Crick, *Nature* **171**, 737 -- 738 (1953).

to Bergame⁶ and in Paris⁷ again. Other place, other form, internet provides a spider-web of exhibitions and contests devoted to nanoart⁸. Whether an artist seizes the infinitely small on a fixed or moving support, the art of nano seems to be heading to photography and video. But, catalyzing the inspiration of the artist, the billionth of a meter also offers those concepts developed by material science to understand, construct and propose to society such an invisible world.

From the quantum source... During the last twenty years, research in physics and chemistry has developed in Europe, United States and Asia, a territory that will soon be the one of nanoscience. Originating from the concept of "nano", these studies make a difference between the size of the objects and their interactions. Thus, nano is bounded on one side to the dimensions of the atom - the ten billionth of a meter - and on the other to those of molecular aggregates being hundred times larger. The forces involved in the atomic scale include concepts from quantum physics, responsible for a major revolution during the first half of Twentieth century, in the apprehension of the intimate secrets of nature. Dali's surrealism, just to cite his own, will develop a new source of inspiration from it in the early 1940s. "*I study, I find a way to transmute my works in antimatter*" he wrote in 1958 in the *Manifesto of Antimatter* (Deux... Quatre Editions, Paris, Clermont-Ferrand, France). Between larger objects, forces are deployed as being weak. Then, a labile construction game, whose bricks are just as small as a hair being cut off in one thousand pieces, finally starts (Fig. 2).

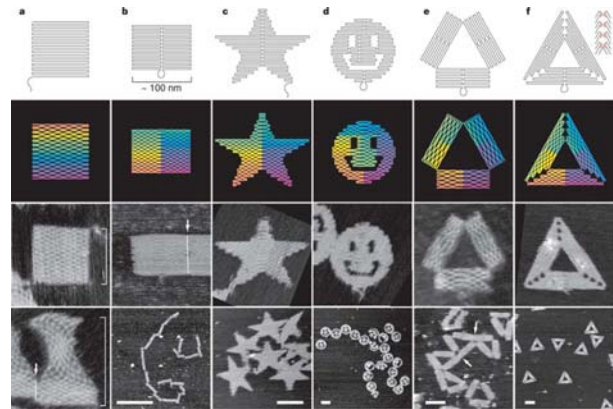


Figure 2. DNA origami. Images of DNA strands modeled in various geometric forms and observed with Atomic Force Microscopy⁹.

...to nanomaterials for art. It would be presumptuous to attempt to summarize the possibilities for physicists and chemists offered by the control over matter. While the possibility of transforming matter into living objects is still remote, the boundaries that divide the worlds of living and inert actually intersect, they collide and blend together to the point of constituting a blurred interface. Molecular self-recognition, targeting of tumor cells, the constitution of hybrid systems glass-cell or glass-enzyme, the production of nanoobjects from micrometric bio-organisms, molecular engines, photonic crystals, DNA manipulation echoed Nature playing dice with the Uncertainty principle of Heisenberg¹⁰, the superposition of states¹¹ and the influence of the the observer over the observed¹², the wave-particle duality.¹³ These few examples of what existed and what exists today constitutes a tiny list of possibilities and it shows how distance between the disciplines can be reduced. The nano

⁹ Paul W. Rothemund K., *Nature* **440**, 297 (2006).

¹⁰ We can not know simultaneously and with precision the speed and position of a quantum object. "I, who admired only Dali, I begin to admire that Heisenberg who looks like me." S. Dali, *Manifesto of antimatter*.

¹¹ Schrödinger's cat is neither dead nor alive: it exists in a superposition of both states.

¹² When we look at this cat, the two states are not correlated: the cat is then effectively dead or alive. The observer influences the state of the observed.

¹³ The properties of light are both those of being particle (concept of location) and wave (concept of relocation). Apparent paradox integrated by the theory.

⁶ *Nan°art Vedere l'invisibile*, S. Raimondi, 2007, Ed Skira, Milano, Italy

⁷ *Blow-up*, Nanomondo Immagini dal Centro di Ricerca S3, 2008, Ed Damiani, Bologna, Italy

⁸ <http://nanoart.blogspot.com/2007/07/nanoart-2007-international-online.html>

objects and its related concepts are an available source to the artist.

Conceive, receive and preserve. New bricks, new ideas freely thrown to the artists! Let's hope that new artworks will come out following the ideas presented during this workshop. The issue approaches the interests of the preserver who is face to face with contemporary artworks to a more lack of theoretical foundation. Cesare Brandi published, in 1963, a *Theory of Restoration*, placing the act of restoring within the actual way of thinking¹⁴. Unavoidable reference for some people, true bible for others, this theory seems however insufficient to the restoration of conceptual materialistic works.

Aim. This workshop will attempt to give an idea of existing materials and concepts existing in nanoscience. It will bring material scientists, historians art curators, preservers, artists, gallery owners and art critics around works and experiences,

Dr. Niki Baccile #
Prof. Thierry Lalot ◇

¹⁴ Brandi C., *Théorie de la restauration*, translated from italian by Colette Déroche, Editions du patrimoine, Centre des Monuments nationaux, Paris, 2001.

Laboratoire de Chimie de la Matière Condensée, CNRS, University Pierre et Marie Curie, Collège de France.

◇ Centre de Recherche en Préservation des Biens Culturels (CRPBC), Histoire Culturelle et Sociale de l'Art (HiCSA), University Paris 1 Panthéon-Sorbonne

Additional Information



ORGANISERS

Baccile Niki, Centre National de la Recherche Scientifique, Laboratoire de Chimie de la Matière Condensée, Université Paris 6 Pierre et Marie Curie, Collège de France.

Lalot Thierry, Centre de Recherche en Préservation des Biens Culturels (CRPBC), Histoire Culturelle et Sociale de l'Art (Equipe d'accueil HiCSA), Université Paris 1 Panthéon-Sorbonne.



DATE

Thursday, November 19th 2009 – 9h

WHERE

Campus Curie – Ulm
11, rue Pierre et Marie Curie, Paris 5^{ème}
(follow the indications)



The workshop is free for all participants. Please send a mail to : nanoscienceart@gmail.com for registration



SPEAKERS

Babonneau Florence

Research director at CNRS, Director of Paris Center Institute of Materials, Laboratoire de Chimie de la Matière Condensée, University Pierre et Marie Curie, Collège de France

Balzerani Margherita

Curator and art critic, Paris

Burton Michael

Artist, London, United Kingdom

Caissagnon Sophie

Assistant professor, University Pierre et Marie Curie CNRS, École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ESPCI)

Dubertet Benoît

CNRS, Institut des Nanosciences de Paris CNRS, École Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ESPCI)

Elias Mady

Artist, Zürich, Swiss

Leibler Ludwik

Professor at Collège de France, Paris

Lenzlinger Jörg

University of Sassari, Italy

Livage Jacques

CNRS, Ecole Polytechnique, Paris

Luca Malfatti

Art critic, Milan, Italy

Quéré David

Artist, Dresden, Germany

Raimondi Stefano

Artist, Turin, Italy

Ruhland Grit

Artist, Zürich, Swiss

Scali Alessandro

Assistant professor, art historian, Centre de Recherche en Préservation des Biens Culturels (CRPBC), Histoire Culturelle et Sociale de l'Art (HiCSA), Université Paris 1 Panthéon-Sorbonne

Steiner Gerda

Whitney William



SITE INTERNET

<http://hicsa.univ-paris1.fr/page.php?r=3&lang=fr&o=16>

<http://www.labos.upmc.fr/lcmcp/?q=node/1782>

Program

9h00 *Welcoming of participants*

9h15 *Introduction*
Niki Baccile, Thierry Lalot

Session 1 – Art et Matériaux Moderator : Thierry Lalot

9h30
William Whitney
University Paris 1 Panthéon-Sorbonne
An experimental history of art

10h00
Margherita Balzerani
Art critic, Paris
Immaterials, concretely?

10h30 *Discussion*

10h50 *Break*

Session 2 – Nanoscience Moderator : Florence Babonneau

11h10
Jacques Livage
Collège de France, Paris
From the science of fire to bio-inspired nanomaterials

11h50
Mady Elias
CNRS – Paris Institute of Nanosciences
Matter exposed to its viewers...

12h30 *Discussion*

12h50 *Lunch*

Session 3 – Artworks and experiences Moderator : William Whitney

14h00
Luca Malfatti
University of Sassari, Italy
Nanomaterials in design and architecture

14h20
Stefano Raimondi
art critic, Milan, Italy
Contrast and presentation of Nanoart

14h40
Jean-François Berret
CNRS - University Paris Diderot, Paris
Liquid magnets

15h00
Alessandro Scali
Artist, Turin, Italy
It's a small world

15h00
David Quéré
CNRS - Ecole Polytechnique, Paris
A waterproof world

15h40 *Discussion*

16h00 *Break*

16h20
Gerda Steiner & Jörg Lenzlinger
Artists, Zürich, Swiss
Ovulazione Cristallina

16h30
Sophie Caissagnon
University Pierre et Marie Curie, Paris
Matter degrading nanoparticles

16h50
Grit Ruhland
Artist, Dresden, Allemagne
Slippers for slippery animals

17h10
Ludwik Leibler
CNRS – ESPCI, Paris
Self-healing matter

17h30
Michael Burton
Artist, London, United Kingdom
Nanotopia: exploring future scenarios and the social impact of nanotechnology

17h50
Benoît Dubertet
ESPCI, Paris
A quantum dot, that's all folks !

18h10 *Discussion*

18h30 *Conclusion et closing*
Niki Baccile, Thierry Lalot

Biographie des intervenants

Florence Babonneau



Florence Babonneau, winner of the silver medal of CNRS in 2005, is research director at CNRS and director of the Paris Center Materials Institute. She leads the research team: *Sol-Gel Materials and Nuclear Magnetic Resonance (NMR)* in the Laboratoire de Chimie de la Matière Condensée de Paris. Her research is primarily focused on the structural characterization of materials prepared from molecular precursors with special emphasis on the use of solid-state NMR for their study. Several classes of materials are studied: hybrid organic / inorganic networks prepared by sol-gel processing, nanoparticles functionalization, interactions in self-assembled systems, interfaces in host – guest systems.

<http://www.labos.upmc.fr/lcmcp/?q=node/590>

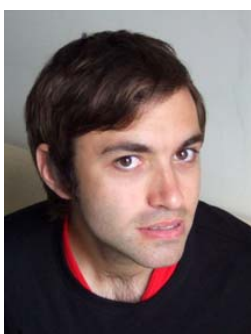
Margherita Balzerani

Balzerani margherita is curator and art critic. She worked for several years in the Department of Cultural Action of the Palais de Tokyo, site for contemporary creation in Paris. Author of many articles on contemporary artists: Maurizio Cattelan, Bruno Peinado, Chen Zhen, Daniel Pflumm, Dominique Gonzalez-Foest, Mathieu Briand, Thomas Hirshhorn, Nari Ward, Kolkoz, Martin Knight, Le Cercle Ramo Nash. Topic of her doctoral thesis done under a joint supervision between the University of Paris I Panthéon-Sorbonne and University of Rome La Sapienza, she focuses on aesthetic issues of video games and their influence on contemporary artistic creation. Margherita Balzerani is also professor of Semiotics and Art History in the School of Manga, Eurasiam and is currently curator at the Contemporary Art festivals on virtual worlds (ATOPIC Festival 2009, Game Factory's ART II). She teaches Tools for Digital Art at the Ecole Nationale Supérieure des Beaux Arts in Paris. She lives and works in Paris.



<http://margheritabalzerani.blogspot.com/>

Michael Burton



Michael Burton is a multidisciplinary artist: he uses video, photography, performance, living organisms and biological systems as working tools. He graduated from the Royal College of Art and he lives and works in London. His work is provocative, it aims at stimulating an ethical debate around social and cultural desires on science and technology. It provides a vision and concrete experiences of our future manipulation of human evolution through emerging tools of genetic engineering, bio and nanotechnology. MB participated in international exhibitions and collaborates with organizations such as the Wellcome Trust, the Government Office for Science and with eminent scientists,

artists, choreographers, designers and architects.

<http://www.michael-burton.co.uk>

Sophie Cassaignon



Sophie Cassaignon is Doctor of Sciences and a lecturer at the University Pierre and Marie Curie in Paris. She is also a researcher in the hybrid materials and nanomaterials team in the Laboratoire de Chimie de la Matière Condensée de Paris. She focuses on the synthesis, by soft chemistry tools, of metal oxides (Ti, Mn, ...), on the control of the crystalline phase, size and morphology. She explores the oxide-solution interface trying to understand the mechanisms involved. Applications can be found in electrochemical devices (solar cells, lithium batteries) and photocatalysis (degradation of organic pollutants).

<http://www.labos.upmc.fr/lcmcp/?q=node/1026>

Benoit Dubertet

B. D. is a research fellow in the CNRS Laboratory of Optical Physics at the Ecole Supérieure de Physique et Chimie Industrielle (ESPCI), ParisTech. He is the author of many works on the study and application of semiconductor nanoparticles (quantum dots) in optical imaging, especially for in vivo visualization of biological systems.

<http://www.lpem.espci.fr/>



Mady Elias



Mady Elias is a physicist and professor at the University of Evry and CNRS member detached at the Institut des nanosciences de Paris (INSP). Her research focuses on the physics of colour applied to artworks. She is co-author of the book *The Color: Light, Vision and Materials*. In 2008, she contributed to decoding the "sfumato" technique used by L. da Vinci in his painting *La Joconde*.

Ludwik Leibler

Ludwik Leibler is a physicist specialized in study of polymers. He is a professor at the Ecole Supérieure de Physique et Chimie Industrielle (ESPCI), ParisTech. He developed the theory of spontaneous assembly of polymers at the College of France under the supervision of Pierre-Gilles de Gennes, he joined the CNRS at the University Louis Pasteur in Strasbourg. He works on adhesion phenomena, on polymeric systems, nanostructured coatings, ordered hybrid materials and the chemistry of interactions. In February 2008, his team developed a self-healing polymer in cooperation with Arkema. He is a member of the National Academy of Sciences, he won the silver medal of CNRS in 1989 and many other international awards.



<http://www.mmc.espci.fr/eng/welcome.htm>

Jörg Lenzlinger & Gerda Steiner



Gerda Steiner and Jörg Lenzlinger are two Swiss artists who live and work in Uster, near Zurich. Their work focuses on the adaptation of nature through synthesis. The currency used by the Swiss artists is a flipped Hegelian dialectic with the empirical use of objects such as taxidermic animals and insects, pools of motor oil, dead trees and plants, chemicals. Many of their works exploit the properties of liquid / gas and solid / liquid interfaces including the use of urea molecule. Their work is focused on the unity of opposites like life and death, good and evil, hope and despair. It is an existential sawtooth journey which gives beauty to almost anything. Artists exhibited worldwide including at the Venice Biennale in 2003, the National Museum in Addis Ababa, the Wiler Kunsthalle Wil, the Musée d'Art Contemporain de Lyon.

<http://www.steinerlenzlinger.ch>

Jacques Livage

Jacques Livage is Doctor of Sciences and was professor at the University Pierre and Marie Curie until 2001. Since 2001, he is professor at the College de France, Chair of Chemistry of Condensed Matter and member of the Academy of Sciences. J.L. contributed to the initial development of the green "sol-gel" chemistry process which is used to develop original materials that can not be obtained by classical methods of solid state chemistry. Inspired by the process of biomineralization, green chemistry can build glass or ceramic directly from molecular precursors in solution. The sol-gel processes can form a network of oxide at room temperature which can involve organic chemistry and inorganic chemistry and synthesis of hybrid organo-mineral complexes. These materials, real nanocomposites at the molecular scale, have outstanding optical properties that combine fragile organic pigments to the hardness of glass. In recent years, Jacques Livage spent most of his work to the encapsulation of enzymes, antibodies and even living cells in silica matrix. Encapsulated species keep their biological activity, which can even be improved by changing the chemical nature of the matrix. Current studies focus on the viability of bacteria immobilized in silica gel to produce biosensors and bioreactors.



http://www.college-de-france.fr/default/EN/all/chi_mat/

Luca Malfatti

L.M. is lecturer in science and technology of materials and technology of architecture at the University of Sassari, Italy. He works on the synthesis and layout of porous thin films obtained by self-assembly of soaps in aqueous solution and the formation of organic-inorganic hybrid networks obtained by synthetic routes from soft chemical processes, like sol-gel.

David Quéré



David Quéré is research director at CNRS and at the Ecole Supérieure de Physique et Chimie Industrielle (ESPCI), ParisTech and teacher at the Ecole Polytechnique. He was a researcher at the Collège de France in the Organized Physics of Fluids Laboratory team of Pierre-Gilles de Gennes. His research focuses on problems of surface wettability and his team explained the *lotus effect* and it develops textured superhydrophobic surfaces. It also works on the time of impact of a drop bouncing on a surface.

<http://www.pmmh.espci.fr/fr/gouttes/indexUS.html>

Stefano Raimondi

Stefano Raimondi is an Italian curator and art critic. He holds an MA in *History and criticism of art*. His masters thesis was focused on *Nanoart*. He is the curator of the exhibition *Nan°arte*, held in Bergamo (Italy) in 2007. In 2008, he began a collaboration with FLASH art magazine, where he writes reviews of exhibitions of contemporary artists.

<http://www.stefanoraimondi.it/>



Grit Ruhland

G.R. is a German artist who lives and works in Dresden. Since 2007 he is assistant professor of design and presentation in the department of architecture at the University of Wuppertal. He won several awards to support young artistic creation and since 2000 he participated at exhibitions in Germany and Europe. He contributed to the *Nan°arte* exhibition in Bergamo in 2007.

<http://www.grit-ruhland.de>

Alessandro Scali



Alessandro Scali is an Italian artist. He participated in the *Nan°arte* exhibition in Bergamo in 2007 and was invited to Seville Biennial in 2008 to expose on this topic.

http://www.nanoarte.it/nano_eng.html

William Whitney

William Whitney is a lecturer at the University of Paris 1 Panthéon - Sorbonne, where he teaches History and Civilizations: History of modern worlds, contemporary world history, art and music. He is a member of the Centre de Recherche en Préservation des Biens Culturels, associated with the Graduate school of art history at the University Paris 1 Panthéon – La Sorbonne.

Biography of the organisers

Niki Baccile

Niki Baccile is a CNRS researcher since November 2008 in the Team *Sol-Gel Materials and Nuclear Magnetic Resonance* inside the Laboratoire de Chimie de la Matière Condensée de Paris (University Pierre et Marie Curie, CNRS, Collège de France). He performs his academic education at the University of Padua (Italy) and then he prepares and obtains his doctorate in materials chemistry at the University Pierre and Marie Curie in 2006. He continued his career with two post-doctorates, the first one at the Charles Gerhardt Institute (Montpellier) and the second one at the Max-Planck Institute (Berlin, Germany). His work focuses on the synthesis and structural characterization of materials structured at the nanoscale and obtained from renewable resources. He has been interested for several years to influence of the field of nanoscience in contemporary art.

Thierry Lalot

Appointed lecturer at the University Paris 6 Pierre et Marie Curie in 1991 after obtaining his doctorate in polymer chemistry, that same year, Thierry Lalot exerted a dual activity of teaching and research in this area until in 2008. During these seventeen years he devoted to polymer science that he teaches jointly to organic chemistry and general chemistry. In the early 2000s, he turned to the world of cultural heritage. His interest into the materiality of these objects are finalized in 2002 through his participation to the training of Conservation-Restoration of Cultural Heritage (CRBC), University Paris 1 Panthéon-Sorbonne, where he dispenses therefore a course entitled "Synthetic polymers and natural substances. Appointed professor to that same institution in September 2008, he was officially assigned the leadership of the CBRC, and he extends his teachings to this course and to the Master of Preventive Conservation. Such an extension confronts him more strongly to the sense of heritage objects, illustrated by their materiality seal and the values they convey. This approach is precisely that of the Center for Research in Conservation of Cultural Property (CRPBC), whose direction was granted to him by the Department of Art History and Archeology in 2008. In the academic year 2010, Thierry Lalot will moderate the Master 2 CBRC Research at the University Paris 1 Panthéon-Sorbonne.