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**Center for Nanotechnology in Society**  
**University of California, Santa Barbara**

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**WEEKLY CLIPS**

May 18 – 25, 2009

**The Miami Herald** 

Posted on Monday, 05.25.09

**EarthTalk: What is nanotechnology'?**

BY E/THE ENVIRONMENTAL MAGAZINE

EMAGAZINE.COM

Dear EarthTalk: What is "nanotechnology"? I've heard that nanoparticles are already in consumer products, yet we haven't really studied their potential health impacts.

- Dan Zeff, San Francisco

Nanotechnology makes use of minuscule objects - whose width can be 10,000 times narrower than a human hair - known as nanoparticles. Upwards of 600 products on store shelves today contain them, including transparent sunscreen, lipsticks, anti-aging creams and even food products.

Global nanotechnology sales have grown substantially in recent years, to \$50 billion in 2007, according to Lux Research, author of the annual Nanotech Report. And the final tally isn't in yet, but analysts had predicted 2008 sales to be \$150 billion. The National Science Foundation says the industry could be worth \$1 trillion by 2015, when it would employ two million workers directly.

What makes nanoparticles so useful is their tiny size, which allows for manipulation of color, solubility, strength, magnetic behavior and electrical conductivity. Nanoparticles do exist in nature, and they're also created inadvertently through some industrial processes. What's new - and potentially hazardous - is the widespread engineering of these particles for commercial purposes.

While there is no conclusive evidence that nanomaterials are either unsafe or not, health advocates worry that we're already putting them on our bodies and ingesting them as if they'd been thoroughly tested and proven safe. Animal studies, including one with rats at the University of Rochester, have shown that some nanoparticles can cross the blood-brain barrier, which protects the brain from toxins in the bloodstream. And inhaled nanoparticles have also harmed the lungs of animal test subjects.

Despite these and other studies, nanomaterials are virtually unregulated in the U.S. And of \$1.3 billion budgeted for research in 2006, only \$38 million went to examining risks to health and to the environment.

"While the benefits of nanotechnology are widely publicized, the discussion of the potential effects of their widespread use in consumer and industrial products is just beginning to emerge," reports the Journal of Nanobiotechnology. "Both pioneers of nanotechnology and its

opponents are finding it extremely hard to argue their case as there is limited information available to support one side or the other."

Europe's regulators are far more wary about nanotechnology than their American counterparts. Britain's Royal Society recommended in 2004 that nanoparticles be viewed as brand new substances, and the European Commission is examining them on a case-by-case basis. The U.S. Environmental Protection Agency is loosely charged with regulating nanotechnology here, but has barely dipped its toe in the water.

Taken together, the evidence suggests considerable uncertainty about the use of nano-ingredients in consumer products. It's just not known if they're safe, which begs the question: Why have we gone ahead and approved them for commercial use? Indeed, we may look back at our current decade and see it, for better or worse, as a time when tiny things caused big and momentous changes in our lives.

<http://www.miamiherald.com/news/environment/story/1064578.html>



### **New JRC-IHCP call on nanotechnology safety assessment**

*(Nanowerk News)* By this Call for Expressions of Interest (CEI) the Joint Research Centre, Institute for Health and Consumer Protection, Management Support Unit, will make up the list of service providers which will be used for the conclusion of public contracts on certain services to be provided to the Institute. The object of this call for expression of interest is the provision of services in the field of nanotechnology — safety assessment of products and substances.

[Notice has been given](#) by the Institute for Health and Consumer Protection, at the Joint Research Centre of the launch of a call for expression of interest (CEI) for "Nanotechnology — safety assessment of products and substances".

All institutes, organisations or companies wishing to be included on the list of service providers for the [Institute for Health and Consumer Protection](#) are invited to submit an application in accordance with the rules set out in this notice for the purpose specified. There is no special legal form required from applicants.

The awarding authority will draw up a list of candidates whose applications meet the criteria set out in the call, which will be subdivided into sub-lists, each of which will correspond to one of the following fields:

- IT platform for nanomaterials NAPIRAhub: substance-related management of information, database management, adaptation of the data model, adaptation of the data structure, tool adaptation, such as query tools, installation and communication support, training for users.
- Nanotechnology: substance identification and definition.
- Nanotechnology: information requirements for nanomaterials for safety assessment.
- Test methods and testing strategies for manufactured nanomaterials: environmental toxicity and environmental fate.
- Test methods and testing strategies for manufactured nanomaterials: human health hazards.

- Risk assessment and safety assessment methodology for nanomaterials, exposure scenarios, risk management measures, dose descriptors.
- Reference nanomaterials, reference substances, repository of substances, distribution.
- Nanomaterial characterisation, homogeneity and stability: physico-chemical and biophysical measurements.

<http://www.nanowerk.com/news/newsid=10796.php>

## Lung Cancer "Smelled" by Nanotechnology Sensors

May 25, 2009 by

[Michele Blacksberg](#)

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Two separate groups of researchers have experimented with the use of nanotechnology sensors to detect the presence of cancer by "smelling" air molecules in the breath of patients with [lung cancer](#) and chronic obstructive pulmonary [disease](#) (COPD).

Breath analysis of cancer patients had been studied in 2006 by Michael McCulloch in a research study where five dogs were trained to either sit or lie down in front of a test station after inhaling breath samples of 86 cancer patients and 83 healthy patients. The dogs accurately

identified those patients with [lung cancer](#) and [breast cancer](#)

between 88-97 % of the time even if the patients were smokers or were in the early stages of their disease.

Nanotechnology has furthered the method of diagnosing cancer with "smell" using specially programmed nanotechnology sensors. In Haifa Israel, Dr. Hossam Haick Ph.D and his team tested carbon nanotubes coated with special organic substances that are capable of signaling the electrical change when they come in contact with the type of molecules that are in human breath.

Carbon nanotubes are rolled sheets of carbon atoms arranged in a hexagon pattern and are 10,000 times thinner than hair. The researchers used 10 different types of coatings which create different identifiable signals when exposed to the type of substances in exhaled air. The air tested was from 15 patients with stage 4 [lung cancer](#) and 15 healthy individuals. Their device was able to discern between "healthy air" and "lung cancer" air.

[http://www.associatedcontent.com/article/1781600/lung\\_cancer\\_smelled\\_by\\_nanotechnology.html?cat=5](http://www.associatedcontent.com/article/1781600/lung_cancer_smelled_by_nanotechnology.html?cat=5)



Posted: May 25, 2009

## Nanotechnology regulation - international approaches

(*Nanowerk Spotlight*) A recent report ([International Approaches to the Regulatory Governance of Nanotechnology](#) – pdf download, 1 MB) from the School of Public Policy and Administration at Carleton University in Canada gives an overview of how five jurisdictions (US, UK, EU, Australia and Canada) reacted to the recent emergence of nanotechnology-based products in the marketplace and it describes how this triggered activities in three domains: (a) public and stakeholder debate, (b) development of initial policy options, and (c) the management of regulatory development in a situation of scarce data.

The bulk of the report describes the current situation (up to March 2009) in the five jurisdictions and this part doesn't contain information that hasn't already been covered elsewhere. In analyzing this data, however, the authors (Jennifer Pelley and Marc Saner from the Regulatory Governance Initiative at Carleton University) make some interesting observations and attempt to develop a set of six key regulatory governance principles that they propose for consideration by regulators.

<http://www.nanowerk.com/spotlight/spotid=10791.php>

## PalmBeachPost.com |

By [SUSAN SALISBURY](#)

Palm Beach Post Staff Writer

Sunday, May 24, 2009

Self-cleaning windows. Socks that don't smell. Slacks that fend off spilled tomato juice.

Nanotechnology, the art and science of manipulating atoms on a nano scale, has generated more than 800 such "miracle" products on the market - and that's probably a gross underestimation. Even Elmer's has a Nano Glue it claims bonds to any surface. And remember when lifeguards had "white noses" because of the zinc oxide in sunscreen? Now, almost all sunscreen is made with nano particles, resulting in transparent zinc oxide.

But now, increasingly, the technology that spawned these wonder products is leading some to suggest that small - or, at least, nano small - can sometimes lead to big trouble.

With pharmaceutical giants Bayer, BASF and Pfizer and energy companies such as Exxon Mobil furiously pursuing nanotechnology projects, a number of consumer groups are raising the alarm.

In November, Friends of the Earth and 13 other advocacy groups filed a petition asking the Environmental Protection Agency to regulate nanoscale silver products as pesticides.

"The concern is that nano particles are so small they may be able to penetrate human skin or human cells in ways that larger particles have not been able to," said Friends of the Earth spokesman Nick Berning.

And what happens if such particles accumulate in the body, reaching higher and higher levels as we grow older? Could

they harm us?

"We don't know what might be toxic," Berning said. "More than anything, there are unknowns. It seems ridiculous we are already putting nano particles into foods and consumer products."

[http://www.palmbeachpost.com/business/content/business/epaper/2009/05/24/a1a\\_nanotech\\_0525.html](http://www.palmbeachpost.com/business/content/business/epaper/2009/05/24/a1a_nanotech_0525.html)

## Raman, nanotechnology approach detects, tracks and kills cancer cells

MAY 22, 2009--"By using [Raman spectroscopy](#), we showed that it is possible not only to monitor and detect nanomaterials moving through the circulation, but also to detect [single cancer cells](#) tagged with carbon nanotubes," said Dr. Alex Biris, coauthor of a paper that describes a method of detecting, tracking, and killing cancer cells in real time. "In this way, we can measure their clearance rate and their biodistribution kinetics through the lymph and blood systems," he added. "Until now, nobody has been able to fully understand and study *in vivo* and in real time how these nanoparticles travel through a living system." The work represents a new approach to cancer treatment beyond surgery, radiation, and chemotherapy.

Co-author Dr. Vladimir P. Zharov emphasized that [in vivo Raman flow cytometry](#) is promising for the detection and identification of a broad spectrum of various nanoparticles with strong Raman scattering properties, such as cells, bacteria, and even viruses. "Before any clinical application of nanoparticles, it is imperative to determine their pharmacological profiles," Zharov said. "And this tool will provide this function as a supplement or even an alternative to the existing methods."

Biris, of the University of Arkansas at Little Rock (UALR), is chief scientist at the Nanotechnology Center and assistant professor of applied science in University's Donaghey College of Engineering and Information Technology. Zharov is professor and director of the Phillips Classic Laser and Nanomedicine Laboratories in the University of Arkansas for Medical Sciences (UAMS) Winthrop P. Rockefeller Cancer Institute.

In their research, Biris, Zharov, and UAMS colleague Ekaterina Galanzha, M.D., injected a single human cancer cell containing carbon nanotube material in the tail vein of a test rat. They were able to follow the circulation of the carbon nanotubes in the blood vessels to the rat's ear, tracking the cell through the rat's blood stream, lymphatic system, and tissue with a Raman spectrometer.

The paper describing this work appears in the *Journal of Biomedical Optics*. In the same issue, Biris and Zharov published a second paper discussing how nanoparticles can tag cancer cells. A laser then heats the nanoparticles, killing the cancer cell.

"If we are able to target cancer cells using these nanomaterials, we can monitor where the cancer cells are specifically located, and then we can kill them," Biris said. He noted the live rat experiment shows how the cancer killing process leaves only a dead cell and nanoparticles that, within a matter of hours, disintegrate and die.

[http://bioopticsworld.com/display\\_article/363058/131/none/none/NEWSA/Raman,-nanotechnology-approach-detects,-tracks-and-kill](http://bioopticsworld.com/display_article/363058/131/none/none/NEWSA/Raman,-nanotechnology-approach-detects,-tracks-and-kill)



Posted: May 20, 2009

**NGOs disappointed at nanotechnology outcomes from ICCM2**

(*Nanowerk News*) The Second International Conference on Chemicals Management (ICCM) meeting in Geneva last week addressed nanotechnology and manufactured nanoparticles as an emerging policy issue for the first time. ETC Group's Diana Bronson attended the meeting and worked with NGO partners to urge the ICCM to take effective action on nano-scale technologies.

"The actions on nanotechnology that were agreed upon today do not reflect the urgency of the issue. The delegates were made aware that nanomaterials are an intergenerational risk, with nanoparticles being passed from mother to child via maternal blood. Yet these risks appear to have been ignored in the response by ICCM2," said Dr. Mariann Lloyd-Smith, IPEN CoChair.

"We are a long way from the statement that was adopted less than a year ago at the meeting organized by the International Forum on Chemical Safety in Dakar," said Diana Bronson from ETC Group. "There, governments, industry, trade unions and non-governmental organizations had agreed that the precautionary principle needed to be applied, that countries should have the right to say no to nanotechnology and that special measures need to be taken to protect vulnerable groups. We got none of that in Geneva."

The Dakar statement was undermined during the preparatory period of this conference, marginalizing the UN and along with it, the majority of its member states. Successive drafts, negotiated during late night sessions in English only, placed the OECD and the International Standards Organization firmly in charge of the issue. Not surprisingly, this version failed to get the support of delegates.

"After some tough negotiations, the resolution adopted by the plenary of the conference recognizes the need for a truly global, open and transparent process to address the issues raised by nanotechnologies, states that further research needs to be undertaken, and that wider dissemination of information about the presence of nanomaterials in products is required," said David Azoulay from the Center for International Environmental Law (CIEL). "The resolution also contains loose proposals for some modest actions over the next three years: consultation, information sharing, meetings and workshops in different regions, and, critically, a report on the issues of relevance to developing countries and countries in transition to the Third Session of the ICCM. It is now up to organizations and governments who are concerned about these issues to ensure that these actions are provided with the necessary resources so that substantive discussions can take place, leading to a stronger plan of action at ICCM3."

<http://www.nanowerk.com/news/newsid=10755.php>



## 'Nanotechnology' May Simplify Antibiotic Treatment

05.19.09, 12:00 PM EDT

### Study using nanoparticles in aerosol spray shows promise

TUESDAY, May 19 (HealthDay News) --So-called "nanotechnology" may improve the effectiveness of antibiotics by allowing the medicine to be put into an aerosol form, new research suggests.

A spray of antibiotics encapsulated in microscopic antimicrobial silver carbene complexes (SCCs) proved highly successful at just half the

dosage of conventionally inhaled antibiotics in tests on mice infected with *Pseudomonas aeruginosa*, a common bacteria that causes a pneumonia-like respiratory illness in people.

"During a 72-hour period, all of the infected control mice died, whereas all of the mice that received just two doses of SCC22-loaded nanoparticles spaced 24 hours apart survived," investigator Dr. Carolyn L. Cannon, of the Washington University School of Medicine, said in a news release issued by the American Thoracic Society. She is scheduled to present her team's research Tuesday at the society's annual meeting in [San Diego](#).

More testing needs to be done to confirm whether an aerosol of nanoparticle antibiotics aids absorption of the medication. However, if, as in the study, dosages can be reduced to a once-a-day spray, treatment regimens would be simpler and easier to follow. This, theorizes Cannon and her colleagues from the Center for Silver Therapeutics Research at the University of Akron in Ohio, could lead to illnesses being less severe and easier to contain.

<http://www.forbes.com/feeds/hscout/2009/05/19/hscout627068.html>



**Abstract:**

The US-EU-Africa-Asia-Pacific and Caribbean Academy of Nanoscience and Nanotechnology (USEACANN) has been founded. The academy which is the first of this kind world wide is the advisory arm of the expanded US-Africa Caribbean Nanotechnology Initiative (USACANI).

## Academy of Nanoscience and Nanotechnology (USEACANN)

Ithaca, NY | Posted on May 23rd, 2009

USACANI is now called US-EU-Africa-Asia-Pacific and Caribbean Nanotechnology Initiative (USEACANI) covering 158 countries with special focus on USA, Africa and the Caribbean.

For more information, please click [here](#)

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[http://www.nanotech-now.com/news.cgi?story\\_id=33335](http://www.nanotech-now.com/news.cgi?story_id=33335)

**UPI Asia.com**

**Integrating natural and social science**

By Cong Cao  
Column: Notes on China

Published: May 26, 2009

New York, NY, United States, — On May 7, 1959, the British physicist and novelist C. P. Snow delivered a lecture, “Two Cultures and the Scientific Revolution,” at the University of Cambridge, his alma mater. In this famous Rede lecture, Snow pointed out that the polarization between the cultures represented by scientific and liberal intellectuals is a “practical and intellectual and creative loss ... to us as people, and to our society.” Because the majority of intellectuals know only one culture, they may wrongly interpret modern society, inappropriately describe the past, and incorrectly forecast the future.

Time flies and half a century has passed by. But the “gulf of mutual incomprehension” in the Snowian sense still lies between the culture of the natural sciences and that of the humanities and social sciences. With the natural sciences spreading from the West to other parts of the world, the “two cultures” phenomenon is no longer unique to the West any more – the Canto version of “Two Cultures,” published by Cambridge University Press in 1993, alone has been translated into at least 17 different languages.

Although science and technology have become increasingly important in the West, very few politicians have received training in the natural sciences. As the famous biologist Edward O. Wilson of Harvard University pointed out in his 1997 masterpiece, “Consilience: The Unity of Knowledge,” “half the legislation coming before the United States Congress contains important scientific and technological components ... yet the vast majority of our political leaders are trained exclusively in the social sciences and humanities, and have little or no knowledge of the natural sciences.” The same was true then as it is true now.

Toward the other extreme of the United States perhaps is China. As the country has witnessed tremendous social transformation and pursued modernization in the past 30 years, the culture represented by advocates of science and technology has reached a peak. Technocracy has become one of the hallmarks of contemporary China, where leadership at all levels has been dominated by those with college education in science and engineering.

In fact, for quite some time after the establishment of the People’s Republic a key objective, and the motto of students, was, “One would not be afraid to go around the world with a grasp of mathematics, physics and chemistry.”

It is only most recently that those trained in the social sciences and humanities have entered the top echelon of leadership. Of course, the more they are represented among government officials in terms of academic background and expertise, the more profound the impact they will have on governance.

In fact, to some extent, China has returned to its own past. Once upon a time, proficiency in the doctrine of Confucianism was the sole criterion for becoming a scholar-official. From today’s perspective, Confucianism belongs to the humanities.

According to the late well-known Chinese sociologist Fei Xiaotong, there are two kinds of knowledge based on its nature – knowledge of what and knowledge of how. The former is about technique, while the latter is normative. In Fei’s view, these two kinds of knowledge were divided in traditional Chinese society. Scholar-officials only cared about how to use the Confucianism-based normative knowledge to govern and become “persons of brain.” They looked down upon technical knowledge as exotic skills used by “persons of labor.”

The differences between the two cultures may lead to narrow and biased knowledge among students and scholars. In China, for example, the separation of arts from sciences artificially divides disciplines and leads or misleads students’ orientation toward education. Consequently, students of the humanities and social sciences often have little knowledge of the natural sciences, and are far less likely to take the initiative to acquire knowledge across disciplines and seek to balance their knowledge structure as students of the natural sciences do.

A better example to illustrate this is perhaps the bloggers at ScienceNet.cn, an online community set up by the “Science Times”, a leading science and technology daily published by the Chinese Academy of Sciences, the Chinese Academy of Engineering and the National Natural Science Foundation of China. The bloggers are mainly natural scientists and technologists, but their blogs cover content far beyond their professional backgrounds, which is plausible.

Coincidentally, at Brown University, one of the Ivy League schools in the United States, undergraduates are not required to decide which specialty to major in. However, science- and engineering-oriented students usually take electives in humanities and the social sciences to expand their knowledge; on the contrary, students of humanities and the social sciences rarely actively seek to learn the natural sciences. In fact, such a situation is common at American universities, where students of the humanities and social sciences are most likely not to select natural science courses unless they are required by the degree.

In recent years, I have been involved in a project of nanotechnology and society at the University of California, Santa Barbara, which has given me firsthand knowledge about how social scientists and natural scientists work together. There are a materials science Ph.D.-turned-historian of science who writes about the history of nanotechnology, an expert of American literature who studies patents of quantum dots, and a professor of history of science who mines publication and patent data and uses games to demonstrate technology, and so on.

On the occasion of the commemoration of 50th anniversary of Snow's "Two Cultures" lecture, I feel that the "two cultures" are still moving along their distinctive and respective orbits. It is easier said than done to integrate them.

[http://www.upiasia.com/Society\\_Culture/2009/05/26/integrating\\_natural\\_and\\_social\\_science/4987/](http://www.upiasia.com/Society_Culture/2009/05/26/integrating_natural_and_social_science/4987/)



## Call to Set Up a Nanotech Arab Body

*Summary posted by Meridian on 5/21/2009*

Source: Gulf Times

Author: Bonnie James

Participants at an expert meeting on ethics of nanotechnologies in the Arab region, which was organized by the United Nations Educational, Scientific and Cultural Organization (UNESCO)'s Cairo and Doha offices and took place from May 18-19 in Doha, Qatar, called for the creation of an Arab council and for the topic to become part of the international political agenda. Forty participants from different regions of the world were invited to provide answers and exchange views on the ethical dimensions of nanotechnology and the implications on Arab states

. Mukhles Sowwan of Al-Quds University, set forth a proposal for establishing an Arab Council on Nanotechnology (ACON), saying that "[T]he mission of ACON should be to raise awareness of the benefits and dangers of molecular nanotechnology, and assist in the creation and implementation of comprehensive balanced plans for responsible use of this technology." Sowwan discussed the many potential benefits of nanotechnology such as solutions for water shortages and infectious diseases, but added that the risks "...include unstable arms race on account of horrifically effective weapons, criminal and terrorist use because of small and hard to detect equipment, environmental damage or health risks from unregulated products, black market in molecular nanotechnology, and economic and social problems due to cheap products, inflated prices and change of lifestyle." Other experts called for military use of nanotechnology to be put on the international political agenda. The article can be viewed online at the link below.

*The original article may still be available at*

[www.gulf-times.com/site/topics/article.asp?cu\\_no=2&item\\_no=291882&a...](http://www.gulf-times.com/site/topics/article.asp?cu_no=2&item_no=291882&a...)

<http://www.merid.org/NDN/more.php?id=1922>

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