

NANO NEWS - SOUTH AFRICA

Volume 7, August 2010

Edited by Patience Iyuke

Co-edited by Neil Coville

Introduction

July to September is the time for conferences so no doubt many of the readers are attending conferences on nano somewhere in the world during this period. It is astounding as to how many conferences on this topic take place on an annual basis. The newsletter will always list some of these – if there are others that need to be brought to our attention and will be of interest to SA scientists and engineers – please let us know.

On the local scene a number of conferences with some/lots of nano topics will take place in the next 9 months. These include: The SAIP Conference at the CSIR (Sept 2010), The Nanoscience Young Researcher Symposium in Western Cape (Sept 2010), CATSA in Bloemfontein (Nov 2010), the SACI Convention in Johannesburg (Jan 2011) and the SANi event (April 2011). Lots of choice!

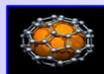
Neil Coville

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NANOSCIENCE YOUNG RESEARCHER SYMPOSIUM - WESTERN CAPE

Since 2009, the nanoscience Young Researchers Symposium (NYRS) had been held in Gauteng. The first symposium was held at CSIR (Pretoria) in 2009. The event was hosted by the University of Johannesburg in May 2010. It had been a major forum for students in science and engineering and had provided many opportunities for experts to exchange their ideas and knowledge on Nanoscience/ Nanotechnology.



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There is an open invitation to attend a symposium for young researchers (Masters & PhD) currently undertaking research in the nanoscience. This event is sponsored by the South African Nanotechnology Initiative (SANi) and the South African Agency for Science and Technology Advancement (SAASTA). The symposium will take place at the University of the Western Cape, Bellville, on the 17th September 2010 from 09h30 – 15h00. All students from academic and research institutions based in the Western Cape are invited.

There is no registration fee.

Prizes: There will be prizes for the best presentations

Abstract deadline: 31st August 2010.

Email the abstracts to: sani.studentchapter@gmail.com

If you wish to attend without participating in the presentations, you are requested to RSVP sani.studentchapter@gmail.com to save a place at the symposium.

Organizers:

Mr. Olushola Adeniyi , oadeniyi@uwc.ac.za

Ms. Ntombi Mathe, nmathe@csir.co.za

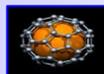
Hosted by:

SANi Student Chapter

Sponsored by:



Submitted by: Nikiwe Kunjuzwa
SANi Student Chapter Chairperson



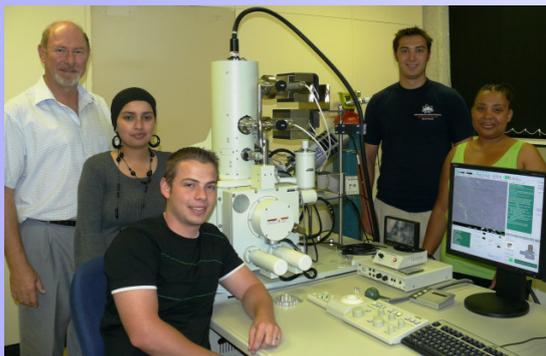
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R117M NMMU Plan for High Resolution Transmission Electron Microscopy Centre



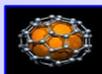
Prof. Jannie Neethling and some of his students at NMMU

The Nelson Mandela Metropolitan University on Monday, 25th of May, 2010 launched a R117-million project to build a high resolution transmission electron microscopy centre that will set it at the forefront of international research in this field. The capital investment, the largest yet in NMMU's history, includes the construction of a unique "room within a room" purpose-built building, and four state-of-the-art electron microscopes, of which three have been manufactured in Japan.

Speaking at the lunch event, NMMU vice-chancellor Derrick Swartz expressed his excitement about the project and hailed the academic team led by physics Professor Jannie Neethling who has been battling for two decades to get such a centre established at the university. "This is a revolutionary project, a marvellous project." It means that NMMU will become a primary site for nanoscale scientific research across South Africa and the wider African continent".

Key role players and donors in the project, which is due to be completed in mid-2011, include the Department of Science and Technology, National Research Foundation, the Department of Education, Sasol, NMMU, NMMU Trust and Dr Greg Olsen from USA.

The aberration corrected high-resolution transmission electron microscope "will allow scientists to see atoms for the first time in South Africa", explained Neethling, a leading electron microscopist focusing on nanomaterials research. "For many years, South Africa couldn't afford or didn't realise the importance of putting money into a centre like this. But without it physics/materials researchers in South Africa simply cannot compete at an international level. Up to now Neethling and his students have had to travel to nanoscience (the study of small things) centres in Germany, the Netherlands, Belgium and Sweden to use high resolution electron microscopes. "So this is the realisation of a long-held dreams".



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The new suite of microscopes will be used across a multitude of sectors like coal-to-liquid fuel, nanomaterials for nuclear energy, diamond products for cutting and drilling, metal alloys in the automotive industry and optical sensors and electronic devices. “For example if you want to use platinum alloys in a Boeing engine you must know the micro- and nano-atomic structure of that materials, as they determine its properties. You need to know how these properties will change when the materials are subjected to normal operating conditions, like high temperatures or stress”. The centre will allow the NMMU team to help with the development of new products, “to become a manufacturing nation and to improve our international competitiveness”, he said.

Beside the research, the centre will also be used to educate nanoscience students and group of school children. Skype will allow these groups to watch and ask questions without compromising the research.

The R30-million building that will house the microscopes will be “the most sophisticated building of its kind in Africa”, said physics professor Mike Lee. Designed by architects Stauch Vorster, it will ensure total control of noise, vibrations, temperature and even magnetic fields – any of which could cause the image of the atoms to move, undermining the performance of the microscopes.

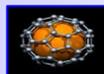
A project team visited existing similar centres around the world from Australia to Europe to learn from them about the construction of nanocentres. The final plans include acoustic padding, 1m concrete blocks for each microscope and highly sophisticated ventilation.

Original Source: Guy Rogers, The Herald, Tuesday, May 25, 2010
Submitted by Prof Jannie Neethling (NMMU) and Mthuthuzeli Zamxaka (SAASTA)

Report on the SAASTA Nanotechnology Project

The Rationale

The Sci-Bono Discovery Centre was awarded the Nanotechnology Project to manage on its behalf. The goal of the project was to introduce Teachers who teach Maths, Science and Life Sciences to research and determine career opportunities that exist for their learners in the fields of Nanosciences and Nanotechnology. 35 teachers from schools that have a strong science and maths curriculum were selected. The selection was weighted in favour of previously disadvantaged schools but included a small percentage of advantaged schools to ensure their exposure to research in South Africa and to build the profile of Nanotechnology across the board.



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Project Objectives:

- Educate the public on, and enhance their understanding of nanotechnology.
- Stimulate interest in nanotechnology and Nanoscience as a career in order to ensure long term capacity building in the field.
- Introduce teachers to Nanoscience and Nanotechnology and the importance of multidisciplinary studies.
- Stimulate teachers' interest in Nanotechnology research in South Africa and to provide teachers with opportunity for professional development.

Programme:

1. **Lectures**

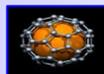
On the 30th of June 2010, 35 teachers, lecturers, scientists, researchers and SAASTA staff members attended an informative and engaging lecture session at Sci-Bono. The lectures were given by the following people:

- i) Dr. Sabelo Mhlanga from the University of the Witwatersrand (Wits) on Nanotechnologies for Water Treatment and Catalysis
- ii) Dr. Yahya Choonara from Wits on Nanotechnology and advanced drug delivery
- iii) Dr. Robert Tshikhudo from Mintek on Health
- iv) Mr. Ntsika Dlamini from the University of Johannesburg (UJ).

The afternoon session was a discussion around how we should as Sci-Bono make this more accessible to other teachers and ultimately to schools, before Nanotechnology becomes part of the syllabus.

2. **The Tour**

On July 1st, 26 of the more enthusiastic participants from the previous day went on a tour to various sites where Nanotechnology was being researched and practiced. The first stop was to Wits University, where Dr. Sabelo Mhlanga and his team took us on an hour tour of their facility. The lecturers and the researchers revealed their ingenuity and expertise and simply astounded us with the amazing work they were doing. What was notable was that some of the millions of Rands worth of equipment was the only one



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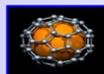
of its type to be seen in the southern hemisphere or in the world. The tour to Wits Medical School facilitated by Dr. Yahya Choonara was likewise mind-boggling, innovative and insightful. Our last stop was at Mintek where we were welcomed by Dr. Robert Tshikudu, treated to some lunch and then more of the same with some astounding research work and state of the art products. All of us simply overwhelmed by the amazing work that is being undertaken by some highly talented and erudite individuals, right here in our sunny South Africa.



Prof. Michael Witcomb & some students at the electron microscopic unit at Wits University. Picture by Dr. Sabelo Mhlanga.



*Prepared by Hemant Waghmarae,
Project Officer, Scio- Bono*



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A Major Initiative by DST on Risk Assessment of Nanomaterials in South Africa

A workshop for information sharing on the nanotechnology health, safety, and environmental research, organized by CSIR on behalf of DST, was held on 14th-15th July 2010 at the Farm Inn, in Pretoria. On the first day of the workshop, Dr. Daniel Adams, the Chief Director of Emerging Research Areas & Infrastructure, opened the workshop with a commitment by DST in the safe development of nanotechnology in South Africa. Presentations were then made by the CSIR outlining the processes implemented up to date and also the purpose of the present workshop. These were followed by presentations made by representative researchers and stake holders from different universities, institutions, and industry as well as science agencies. The later presentations outlined the activities pertaining to nanotechnologies, available expertise, as well as infrastructure in their relevant organizations.

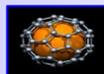
On the second day, the question of implementation in an effective and inclusive manner was discussed. The participants were therefore encouraged to comment and recommend on issues pertaining to:

- Research agenda and prioritization of research.
- Management of research.
- Education needs and skills developments.
- Process on evidence-based policy and informing the decision makers.
- Co-ordination and governance of research funding, bursaries, contracts

Recommendations were also made to prioritize the nanomaterials on which full scale risk assessment are to be conducted taking into account the quantities produced in the country and the possibility of increased exposure to these nanomaterials. In addition, the necessity for compilation of existing expertise, infrastructure and training needs in South Africa was stressed prior to any additional human and capital investment considering the fact that health risk assessment is costly, labour and resource intensive.

Consensus were then made for the creation of a Scientific Reference Group whose main brief will include the compilation of Key Strategic Research Areas (KSRA) in risk assessment in the country and also assess proposals submitted within the identified KSRAs. The group is to convene and produce the expected strategic research plan on risk assessment for nanomaterials in South Africa by the end of March 2011. Members for this scientific reference group were then identified from national and international scientists who are known to be experts in nanomaterial risk assessment.

Professor Mary Gulumian
NIOH/Wits



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Workshop on Advanced Materials & Technologies

An international workshop on Advanced Materials and Technologies for Global Energy and Environmental Challenges will be held in Pretoria, SOUTH AFRICA from the 6th to 9th of December, 2010. The workshop is organized by the DST/CSIR Nanotechnology Innovation Centre, National Centre for Nano-Structured Materials in association with the Department of Science and Technology.

This workshop will bring together a panel of highly-accomplished international experts in the field of Advanced Materials and Technologies for Energy and Environment. Talks will encompass how Advanced Materials and Technologies will be used to address the Global Energy Crisis and Environmental Issues. The structure of the workshop will comprise Invited Lectures and contributed poster presentations. Workshop full papers will be published in internal conference proceedings.

Tentative Program:

| | |
|--|---|
| Reception: | 6 th December 2010 (afternoon) |
| Scientific Conference: | 7 th -8 th December 2010 |
| Poster Presentation & Panel Discussion: | 7 th December 2010 (afternoon) |
| Safari tour: | Plan to arrange on the 9 th of December 2010 |

For more information visit workshop website: <http://www.csir.co.za/nano>

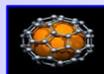
Contact person:

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Submitted by: Prof. Suprakas Sinha Ray, CSIR.



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Call for Proposal in the Field of Nanoscience & Nanotechnology

The European Commission has published a number of calls for proposals under the specific programmes Cooperation and Capacities of the Seventh Framework Programme (FP7). Some of the calls cover topics in Nanoscience and Nanotechnology, Material Sciences and new Production Technologies. The call was published on the 20th of July 2010 and closes on the 2nd of December 2010. For more details on the call, please visit ESASTAP website at : www.esastap.org.za or <http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.FP7CallsPage&rs> or http://cordis.europa.eu/fp7/dc/index.cfm?fuseaction=UserSite.FP7DetailsCallPage&call_id=339

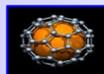
Source: ESASTAP [vene@studiovene.co.za]

Harvard Engineers Use Cotton Candy Machine as Inspiration to Create Nanofibers

Bioengineers at Harvard University have developed a technology to fabricate nanofibers that postdoctoral fellow and lead author Mohammad Reza Badrossamay, PhD, describes as a “cross between a high-speed centrifuge and a cotton candy machine.” The device literally — and just as easily — spins, stretches, and pushes out 100 nanometer-diameter polymer-based threads using a rotating drum and nozzle. The invention, reported in *Nano Letters*, has potential applications ranging from artificial organs and tissue regeneration to production of clothing and air filters. The researchers have filed a patent on their discovery.

The most common method of creating nanofibers is through electrospinning — sending a high voltage electric charge into a droplet of polymer liquid to draw out long wisps of nanoscale threads. The Harvard researchers turned to a simpler solution, using rotary jet spinning. Quickly feeding and rotating the polymer material inside a reservoir atop a controllable motor offers more control and greater yield than electrospinning, they report. Just as in cotton candy production, the nanofibers are extruded through a nozzle by a combination of hydrostatic and centrifugal pressure. The resulting pile of extruded fibers forms into a bagel-like shape about 10 cm in diameter. As it dries, the spun material stretches like molten sugar into thin, silky ribbons. The shape of the fibers also can be altered, ranging from beaded to textured to smooth.

The researchers tested the device using a variety of synthetic and natural polymers, such as polylactic acid in chloroform — a biodegradable polymer created from corn starch or sugarcane that has been used as an eco-friendly alternative to plastic in items like disposable cups. They also used the technology to form tissue engineering scaffolds, or artificial structures upon which tissue can form and grow.



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Sources: **Tech Transfer:** <http://www.technologytransfertactics.com/content/2010/06/09/harvard-engineers-use-cotton-candy-machine-as-inspiration-to-create-nanofibers/> and **Science Daily:** <http://www.sciencedaily.com/releases/2010/05/100525094925.htm>

Submitted by Robert Caveney, Wits Enterprise

Nanotechnology Competition for Secondary School Students

Call for entries

The International NanoScience Community - TINC launches "Nanotechnology at Home 2010" a competition for secondary school students around the world (from 14 to 18 years)

Aim

The aim of the competition is to find out what high school students think about nanotechnology, and the new products created using nanosciences.

The nano-competition categories:

1st "Nanotechnology at Home 2010" - drawing competition.

(Only electronically submitted drawings /computer graphics, photo montage, sketch with pencils,.../ will be accepted.)

2nd "Nanotechnology at Home 2010" - essay competition.

(At least 5 typed pages /A4 page, Times New Roman, size 14/ in .PDF format)

3rd "Nanotechnology at Home 2010" - nanosciences related video

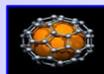
(The video should be min. 3 max. 5 minutes long.)

Application Deadline: 1st November 2010

The presentation and evaluation of applications will take place on the webpage of The International NanoScience Community (<http://www.nanopaprika.eu>). The winners /two in each category/ will win gift parcel related to nanotechnology and sciences; The works received will be published on the website. An international jury from the members of The International NanoScience Community has been assembled to judge all applications entered into the competition.

More information on <http://www.nanopaprika.eu/group/nanocompetition> website and editor@nanopaprika.eu e-mail address.

Drawings, short videos, and essays should be sent to the following address in electronic form before 1st November 2010: editor@nanopaprika.eu



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Source: The International NanoScience Community (TINC)

Posted May 18, 2010 at 7.55pm

http://www.nanopaprika.eu/profiles/blog/show?id=1612324%3ABlogPost%3A68516&xgs=1&xq_source=msg_share_post

The World Market for Carbon Nanotubes, Carbon Nanofibers, Fullerenes, POSS and Graphene

Brief Summary

The market for carbon nanotubes (CNTs), nanofibers, fullerenes and POSS and graphene grew at an annual rate of 30% per year up to 2008; however the market slowed down due to the global recession but picked up again in the fourth quarter of 2009, driven by demand from the semiconductors, electronics and energy markets. These will continue to be the main application markets through to 2015, when the market for these nanomaterials will account for an estimated US\$2912million in revenues. Main market drivers include the need to improve the performance and speed of semiconductors and electronics, reduce costs and increase safety in aerospace and military applications, and increase the efficiency of renewable energy devices.

There are over 100 companies producing carbon nanotubes, carbon nanofibers, fullerenes, POSS and graphene, with many more companies utilizing these materials for incorporation into new products and processes across a raft of industries. Main producers and application developers are Arkema, Bayer, Showa Denko, NEC, Hyperion Catalysis, Mitsui, Nanocyl, Shenzhen Nanotech Port, Iijin Nanotech and Mitsubishi Chemical. This new 110 page report from leading technology publisher Future Markets, Inc. provides a comprehensive analysis of these exciting new markets through to 2015 and beyond.

Published: April 2010

Price: £900

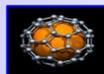
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Source: The International Nanoscience Community (TINC)

http://www.nanopaprika.eu/group/soccernanotechnology?xq_source=msg_invite_group



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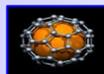
Forthcoming Nanoscience and Nanotechnology Events

Local Event

- i) CATSA 2010, the annual Conference of the Catalysis Society of South Africa, Bloemfontein, Free State, 7th-10th November 2010:
<http://www.catsa.org.za/> or <http://www.ufs.ac.za/apps/congress/index.php?FCODE=10>
- ii) Nanosciences Young Researchers Symposium, University of the Western Cape, Belville, Western Cape, South Africa, 17th September 2010:
sani.studentchapter@gmail.com.
- iii) An International Workshop on Advance Materials and Technologies for Global Energy and Environmental Challenges, CSIR, Pretoria, South Africa, 6th-9th December 2010. For more information, please contact **Prof. Suprakas Sinha Ray**, CSIR. E-mail: rsuprakas@csir.co.za: Website <http://www.csir.co.za>
- iv) South African Institute of Physics (SAIP) Annual Conference. The 55th Annual Conference of the SAIP, CSIR International Convention Centre, Pretoria, 27th-1st October 2010: <http://www.saip.org.za/SAIPConferences.html>
- v) The 40th SACI Convention Incorporating the 3rd FASC Congress, University of Witwatersrand, Johannesburg, South Africa, 16th-21st January 2011
<http://www.saci2011.org.za/>

International Events

- i) NANOTECHNOLOGY-PL, Plac Politechniki 1, Warsaw, 14th September 2010
<http://www.nanopaprika.eu/events/nanotechnologypl-1>
- ii) 1st Adriatic School on Nanoscience, Dubrovnik, 19th-23 September 2010
<http://www.nanopaprika.eu/profiles/blogs/1st-adriatic-school-on> or
<http://www.rathanea.hr/ason-1>
- iii) Innovation in Food Science and Nutrition: Future Challenges, El-Behoos, Cairo 27th-29th September 2010: <http://www.nanopaprika.eu/events/innovation-in-food-science-and> or <http://www.cunrc.org/>
- iv) Taiwan Nano Exhibition, Taipei World Trade Centre, Hall 1, Taipei, Taiwan, 7th- 9th October 2010 : <http://nano.tca.org.tw/index.php?lang=e>



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- v) NanoSmat, 5th International Conference on Surfaces, Coating and Nanostructure Material, Reims, France, 19th-21st October 2010.
[http:// www.nanosmat-conference.com/](http://www.nanosmat-conference.com/)
- vi) The 3rd International Nanotechnology Festival (IRAN NANO 2010), Tehran-Iran, 25th-29th October 2010: <http://festival.nano.ir>
- vii) ThalesNano User Group Meeting, Budapest, Hungary, 21st-22nd October 2010. To register, please send your contact information via e-mail to registration@thalesnano.com or via fax to 00-36/1-8808-501
- viii) The 2nd International Nanotechnology Conference & Exhibition Dan Panorama Hotel, Tel Aviv, Israel, 8th-9th November, 2010.
<http://www2.kenes.com/nano/pages/home.aspx>
- ix) Nanosafe 2010, Minatec, Grenoble (France) 15th-19th November 2010. More information: <http://www.nanosafe.org/>
- x) Nano Safe 2010, Minatec, France, 16th-18th November, 2010,
<http://www.nanosafe.org/scripts/home/publigen/content/templates/show.asp?L=EN&P=55&vTicker=alleza>
- xi) The 2010 International Chemical Congress of Pacific Basin Societies (Pacifichem), Honolulu, Hawaii, USA, 15th-20th December 2010
<http://www.pacifichem.org/>
- xii) ImagineNano, Bilbao Exhibition Centre, Bilbao, Spain, 11th-14th April 2011
<http://www.nanopaprika.eu/profiles/blogs/imagenano-one-of-the-largest>