

NANO NEWS-SOUTH AFRICA

Volume 3, August 2009

Edited by: Patience Iyuke

Co-edited by: Neil Coville & Tanya Capecci

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Editorial

Another month plus some days has passed by since our last newsletter. Patience Iyuke who is the editor of the Newsletter was ill this last month but fortunately she is back on her feet once again. Without her all slows down! So, herewith the belated August version of the Newsletter, giving readers some new information on the Nanotechnology scene in South Africa (SA). The contents include numerous articles that have been written by our community and these give a flavour of happenings in SA. Feel free to send any stories/news on nanotechnology/science that has taken place in SA to Patience for addition in latter monthly newsletters.

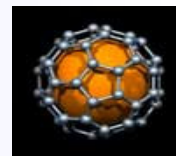
The Community will be happy to hear that the output of the NanoAfrica event held in Cape Town in December 2006 will appear in the August version of the South African Journal of Science. It even has a commentary on some nanotechnology issues. More in the September edition of the Newsletter

Neil Coville

Matter over Mind: Professor Viness Pillay and Professor Girish Modi Apply Nanotechnology to Give Neuropharmaceutics a Dynamic Edge



It is the largest potential growth sector of the pharmaceutical industry, and it is at a precipice - neuropharmaceutics is spurring investigators to take that leap enabling the generation of innovative therapeutic challenges. Professor Viness Pillay's and Professor Girish Modi's team are one such group willing to exercise this forward-thinking approach applying nanotechnology to achieve neuropharmaceutical innovation.



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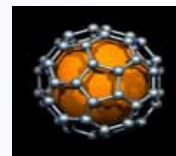
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Nanotechnology encompasses engineered materials or devices with the smallest functional organization on the nanometer scale (1–100 nm), and may provide an avenue for the manipulation of complex biological systems such as the blood–brain barrier with greater selectivity and responsiveness than conventional pharmacological approaches.

The team's research is cultivated on the knowledge that nanotechnology has a potentially revolutionary impact on the basic understanding and therapeutic approaches of neuroscience. The power of nanotechnology must be channelled towards the development of nano-enabled drug delivery systems for the treatment of neurodegenerative diseases, exploiting the nanoscale structures of neural cells. Furthermore an interdisciplinary approach will ensure a thorough exploitation of nanotechnology applications directed towards neurodegenerative diseases. The involvement of neurologists, neurosurgeons and pharmaceutical scientists is key for the alignment of technological advancements with basic and clinical neuroscience advancements.

This successful amalgamation of ideas within Professor Viness Pillay's and Professor Girish Modi's team, evident in the credentials of the team leaders, generates a unique viewpoint for the conceptualisation of novel neurotherapeutic systems. Professor Viness Pillay, a Fulbright Scholar, is currently a South African Research Chair in *Pharmaceutical Biomaterials and Polymer-Engineered Drug Delivery Technologies* hosted by the University of the Witwatersrand, funded by the Department of Science and Technology and administered by the National Research Foundation. He is also a Personal Professor of Pharmaceutics, Head of the Division of Pharmaceutics and Contract Research within the Department of Pharmacy. Receiving a R11,6 million grant from BioPAD, a Biotechnology Regional Innovation Centre and an initiative of DST, Prof. Pillay is the Director of the newly launched Wits Drug Delivery Platform, being the only Platform in its domain in the country. The Platform encompasses the research, development and eventual commercialization of innovative drug delivery systems currently under development by the research team. Professor Pillay is a member of several prestigious academic associations, some of which include the ACS (USA), AAPS (USA), APSSA (SA) and the PSSA (SA). He is a co-founding executive member of the Biomaterials Association of South Africa (BioMatASA) and an ex-President of the Association. Mr Yahya Choonara and Ms Lisa du Toit are key to the design of novel nano-enabled formulations for their application in the team's endeavours. Professor Girish Modi is a neurologist who is currently Chair of the Division of Neurology and Academic Head of the Department of Neurosciences at the University of the Witwatersrand. He is the President of the Neurology Association of South Africa (NASA) and his expertise is in HIV



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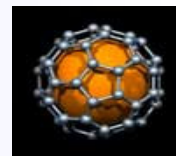
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Neurology, Multiple sclerosis and neurology of pain. He is a founding executive member of Pain SA. He also represents SA at the council of delegates of the world federation of neurology (WFN) and is treasurer and executive of the WFN Africa committee. He has published widely in International Neurology Journals and runs an active research program. Dr. Dinesh Naidoo, the team's expert neurosurgeon, has transformed surgical concepts to real techniques, bringing the team a step closer to practical solutions to overcoming severe debilitations inherent in neurodegenerative diseases. He is a consultant neurosurgeon at the Charlotte Maxeke Johannesburg Academic Hospital and an academic lecturer at Wits. He has special interests in neurovascular surgery (including interventional endovascular techniques) and brain tumours. Dr. Naidoo is also particularly interested in developing minimally invasive, cost-effective and easily accessible techniques for the delivery of nano-structures. Furthermore and quite commendably, he has a very special interest in neurosurgical education in the developing world.

Supported by a useful armamentarium of cutting-edge research equipment including a zetasizer, nanotensile tester, electrospinning rig, and ultrasonicators for nanosystem design and testing, this team are generating significant research publications (submissions, in press and published), many of which are invited reviews due to their cutting-edge research, in leading, high impact factor journals in terms of their areas of focus such as *Progress in Neurobiology*, *International Journal of Molecular Science*, *Annals of the New York Academy of Sciences*, *Expert Opinion in Drug Delivery*, and *Advanced Drug Delivery Reviews*. They are collaborating on numerous (postgraduate) projects concerned with nanotechnological approaches to neurological disorders such as Parkinson's disease, Alzheimer's disease and AIDS Dementia Complex. The design of diverse nano-architectures combining in-built mechanisms of bioresponsiveness, targetability, and controlled release evidently enhances the therapeutic efficacy and reduces the inherent toxicity of the presented neurotherapeutic agent. In recent developments, their nanorevolutionary vision has motivated them to investigate the potential of self-assembling nanofibres to promote healing in patients paralysed due to spinal cord injury. Overall this new era of research promises to herald exciting new developments from this dynamic team of scientists at Wits Medical School.

Professors Pillay and Modi may be contacted at viness.pillay@wits.ac.za or gmodicns@mweb.co.za respectively.

Submitted by Prof. Pillay Viness and Prof. Girish Modi, Wits.



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Nanoparticle coating could bring relief to denture wearers

June 24th, 2009 by Marie Powers under [Tech Transfer](#)

A research team from the University of Liverpool, U.K., has developed a nanoparticle silica coating that inhibits the adhesion and proliferation of cells and microorganisms, including those that cause oral thrush, which affects many denture wearers. The technology received the U.K.'s Armourers & Brasiers Venture Prize, an annual award in the form of an investment to foster early commercialization of promising research. More than one-fourth of the U.K. population wears dentures, according to the most recent adult dental survey. A quarter of these are likely to develop denture stomatitis or fungal induced stomatitis — mainly *Candida albicans*, commonly known as oral thrush. Lab tests have demonstrated that the nanoparticulate silica coating developed at the university inhibits the build-up of *Candida albicans*. Using proof of concept funds awarded by Ulive, the university's TTO, Rachel Williams, PhD, senior lecturer and materials scientist, and colleagues developed a transparent solution containing the nanoparticles. Adhesive patches on each particle promote attachment to the denture, and denture wearers can use the solution as part of their normal cleaning procedure. "Our approach will reduce the need for sufferers of oral thrush to be treated by drug therapy," Williams says. "Our product aims to prevent the occurrence of oral thrush and maintain a healthy mouth via continual renewal of the nanoparticle coating." The team plans to use the Armourers & Brasiers prize to move the product to clinical trials. "We see significant potential for this product as a regular denture cleaning product," Williams says. "Worldwide market opportunities are significant — especially in the developed world — due to an aging population leading to an increasing number of denture wearers."

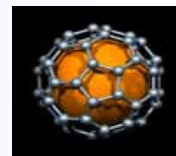
Go to: Nanotechnology Now: http://www.nanotech-now.com/news.cgi?story_id=33550 and Tech Transfer: <http://www.technologytransfertactics.com/content/2009/07/29/nc-state-researchers-building-a-better-battery/>

Submitted by: Robert Caveney, Wits Enterprise.

Singapore Scientists discover method to synthesize nanoparticles

July 15th, 2009 by Marie Powers under [Tech Transfer](#)

Researchers at the Institute of Bioengineering and Nanotechnology (IBN) in Singapore have discovered an environmentally friendly method to synthesize a wide variety of nanoparticles inexpensively. They developed a protocol to transfer metal ions from an aqueous solution to an organic solution such as toluene. The researchers successfully transferred metal ions rapidly from water to an organic medium by mixing a solution of metal salts dissolved in water with an ethanol solution of dodecylamine (DDA). The new approach is a simple, room-temperature process that does not produce toxic chemicals.



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The metals bind with the DDA and can then be extracted with an organic solvent. The transfer of metal ions from the aqueous phase to the organic phase was successfully applied to the synthesis of a variety of metallic, alloy, and semiconductor nanoparticles. The method is efficient and easily used to derive many types of nanoparticles with interesting applications, including metal-semiconductor nanocomposites and hybrid nanoparticles. The IBN researchers published their findings in [Nature Materials](#).

Besides IBN's focus on applying this method to the nanocrystalline synthesis of metals, semiconductors, and hybrids, the extraction of metals dissolved in water would be significant for applications in environmental remediation, such as extraction of heavy metals from water and soil. "Water pollution from heavy metals is a major long-term economic and health care problem that has global implications," observes Jun Yang, IBN research scientist and co-author of the paper on the new technique. "Once contaminated, it is often difficult and expensive to purify the affected environment and extract the pollutants." Besides highly toxic metals such as mercury and lead, valuable metals such as gold, silver, iridium, and osmium that are soluble in water also may be extracted using the new protocol, adds Jackie Y. Ying, IBN executive director and principal investigator.

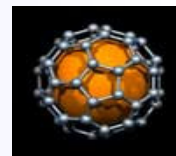
Go to: Bio-Medicine : <http://www.bio-medicine.org/biology-news-1/Facile-synthesis-of-nanoparticles-with-multiple-functions-advanced-in-Singapore-9247-1/> and Tech transfer: <http://www.technologytransfertactics.com/content/2009/07/15/singapore-scientists-discover-method-to-synthesize-nanoparticles/>

Submitted by: Robert Caveney, Wits Enterprise.

Nanoscience Young Researcher Symposium

The first Nanoscience Young Researcher Symposium on nanoscience and nanotechnology for Gauteng region will be held at the CSIR, Pretoria on 18 September 2009. The symposium sets out to showcase cutting-edge research and product development in nanoscience and nanotechnology. The symposium will provide a platform for young candidate researchers in Gauteng to present and exchange recent advances on various aspects related to nanoscience and nanotechnology. This will hone presentation skills amongst students.

It is envisaged that the symposium will help expand awareness about what nanoscience is about; who is doing what and where; what facilities do we have for use in nanoscience and nanotechnology in the country; which university offers what courses in the subject area and what educational opportunities are available for students.



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Active participation of students in activities relating to nanoscience and nanotechnology is particularly essential for the creation of cohesive effort dedicated to delivering nanotechnology manufacturing solutions, nano-devices and nanomaterials to a wide range of industries in South Africa and the world over. Whilst pharmaceutical development, nano-electronics and the creation of novel materials are among the initiatives and potential applications of nano-research, knowledge dissemination and generation are also the focal point of active research.

Who should attend?

NYRS is designed for postgraduate students or candidate researchers working in the field of nanoscience and nanotechnology. The aim is to provide opportunity to share knowledge and state-of-the-art advancements in nanotechnology. Student participation will be limited to universities and research councils. Universities will include TUT, UP, UNISA, MEDUNSA, UJ, WITS and VUT whilst councils will include CSIR and Mintek.

All Universities and research councils around Gauteng will provide 3 names of students who will take part in the oral presentations. The 3 students will then send through their abstracts for final selection. The organising committee will select two students from each university or research councils. This will be done on the basis of project diversity. Audience from institutions involved must RSVP.

A panel of judges will be appointed for the symposium. Three best presentations for Masters and PhDs will receive accolades.

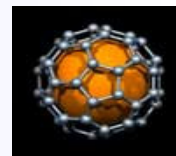
Long term vision

It is anticipated that NYRS will take place annually at provincial level. NYRS will also be launched in other provinces as needed. It is also envisaged that NYRS will later be incorporated into SANI for effective operation. Further discussion by the organising committee with SANI executive committee will be imperative.

Organising Committee

1. Dr. Sabelo Mhlanga : (012)8412464, smhlanga@csir.co.za
2. Ms. Nosipho Moloto: (012)8413137, nmoloto@csir.co.za
3. Dr. Lucky Sikhwivhilu: (012)8412887, lsikhwivhilu@csir.co.za
4. Ms. Simphiwe Mcineka:(012)8413702, smcineka@csir.co.za

Submitted by: Nosipho Moloto, CSIR.



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Call for Proposal in the field of Nanotechnology

The European Commission has published a number of calls for proposals under the specific programmes Cooperation and Capacities of the Seventh Framework Programmes (FP7). One of them covers theme on nanoscience, nanotechnology, material science, new production technologies.

For more information on the call please visit: <http://cordis.europa.eu/fp7/dc/index.cfm> or ESASTAP website at www.estastap.org.za

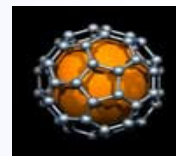
International Recruitment in the Area of Nanotechnology

1. Post-doctoral Position in Bacterial Nanomechanics- The Department of Chemistry, the University of Porto, Portugal. Please go to:
<http://www.nanopaprika.eu/profiles/blogs/postdoctoral-position-in> or
<http://www.fc.up.pt/pessoas/peter.eaton/>
2. A PhD students who would work on Modeling and simulation from the nano to the meso-scale of ferromagnetic materials – Grenoble, France. All information can be found here: http://www.fondation-nanosciences.fr/RTRA/en/62/post-doc_scanning_gate.html

List of Forthcoming Nano Conferences

Local conferences

- i) The 7th Congress of the Toxicology in Developing Countries, Sun City, adjacent to Pilanesberg Game Reserve National Park, South Africa, 6th-10th September 2009. <http://www.7ctdc.co.za/>
- ii) First conference of the Biomaterials Associations of South Africa (BioMATASA), The CSIR International Convention Centre, Pretoria, 20th-23rd September 2009 <http://www.biomatasa.org.za>
- iii) The First Nanoscience Young Researcher Symposium, CSIR National Centre for Nanostructured Materials, Pretoria, Gauteng, 18th September 2009.
- iv) South African Nanoscience & Nanotechnology Summer School, Farm Inn Lodge, Pretoria, 22nd November-2nd December 2009; www.sananoschool2009.co.za

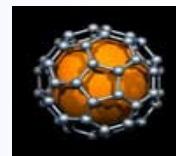


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International conferences

- i) ChinaNano 2009, Beijing, China, 1st-3rd September 2009
<http://www.chinanano.org/>
- ii) Training Courses: Growth and Structural Characterization of Semiconductor Nanostructures (FIB-TEM), CEA, Grenoble, France, 1st-14th September 2009
<http://www.prominas.eu/Training-Courses-TC-4.html>
- iii) 4th International Conference on the Environmental Effects of Nanoparticles and Nanomaterials, Vienna University, Austria, 6th-9th September 2009 : <http://nano2009@univie.ac.at>
- iv) 1st International Workshop on Si Based Nano-electronics and Photonics SiNEP -09 Universidade de Vigo, Vigo, Spain, 20th-3rd September 2009
<http://www.sinep.uvigo.es/>
- v) Fall Courses Program & Workshop on Nanotechnology, Cairo, Egypt, 28th-30th September 2009: <http://esamnt-egypt.org/> or <http://esamnt-egypt.org/units.php?id=1>
- vi) 5th IUPAC International Symposium on Novel materials and their Synthesis (NMS-V) & 19th International Symposium on Fine Chemistry and Functional Polymers (FCFP-IXX) & 3rd Symposium on Power Sources for Energy Storage and their Key Materials (PS-III: International), Shanghai, China 18th-22nd October, 2009
<http://www.nms-iupac.org>
- vii) MM Live 2009 – The Micro, Precision and Nano Manufacturing Event, Ricoh Arena, Coventry, UK, 20th – 21st October 2009
<http://www.micromanu.com/x/exhibition.html>
- viii) NANOCON 2009, Rožnov pod Radhoštěm, Czech Republic, 20th-22nd October 2009: <http://www.nanocon.cz/>
- ix) Indo-US Workshop on Nanotechnology: Applications and Implications, Indian Institute of Chemical Technology, Tarnaka, Hyderabad, India, 10th-12th November, 2009: <http://www.iictindia.org/nano/>
- x) The Nano Petro, Gas and Petro-Chemical Industries Conference, Cairo, Egypt, 13th-15th November 2009: <http://www.npg.sabrycorp.com>
- xi) NanoBio-Tech, Montreux, Switzerland, 16th-18th November 2009
<http://www.nanotech-montreux.com/>



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- xii) NanoEurope Symposium 2009, Rapperswill, Switzerland, 25th-26th November 2009: <http://www.nanoeurope.com>
- xiii) Nanotech Business Summit, Cairo, Egypt, 4th-7th December, 2009
<http://www.nanobus.sabrycorp.com/conf/nanobus/09/>
- xiv) The 5th International Conference of the African Materials Research Society and the 8th Nigerian Materials Congress, Abuja, Nigeria, 14th-18th December 2009: http://mri63.adtech.icair.org/pls/portal/docs/PAGE/IVI_IUMRS/DOC/5TH%20AFRICA-MRS%20CONFERENCE%20POSTER.PDF
- xv) Nanotech 2010: International Nanotechnology Exhibition & Conference, 17th-19th February 2009, Tokyo, Japan.
<http://www.nanotechexpo.jp/en/>
- xvi) Nanotech Conference & Expo 2010, Anaheim Convention Centre, Anaheim, California, USA, 21st-25th June, 2010
<http://www.techconnectworld.com/Nanotech2010/>