

RESUMĚ and CURRICULUM VITAE



*Dr. Ncholu I Manyala
Deputy Chair: SARCHI in Carbon
Technology and Materials
Department of Physics
Institute of Applied Materials
University of Pretoria*

Personal Data

Name: MANYALA, I. Ncholu
Date of Birth: 14 July 1964
Citizenship: Lesotho
Work Address: Department of Physics, University of Pretoria, 0002, RSA
Telephone: (012) 420-3549
E-mail: ncholu.manyala@up.ac.za
Present position: Senior Lecturer and Deputy Chair of SARCHI in Carbon Technology and Materials

Resumé

Ncholu I Manyala a materials scientist born on 14 July 1964 and originally from Mokhotlong District in Lesotho holds an undergraduate degree in physics and mathematics from National University of Lesotho, Maseru, Lesotho and MSc degree in physics from The University of Witwatersrand, Johannesburg, South Africa.. His desire to study physics let him to pursue his doctoral degree in physics in Louisiana State University, Baton Rouge, USA. It was during his PhD studies that he developed his interest in materials science where he developed research interest in the strongly correlated materials, specifically the synthesis, characterization, transport and magnetic measurements of the $\text{Fe}_{1-x,y}(\text{Co}_x, \text{Mn}_y)\text{Si}$ alloy for $0 \leq x \leq 0.4$ and $0 \leq y \leq 0.08$ which are the concentration ranges of cobalt in FeSi that the system becomes magnetic and Mn in FeSi produces unusual insulator-metal transition. This work managed to produce three publications in Nature publishing group, i.e. two in Nature and one in Nature Materials. Manyala continued with this work even after his PhD studies where the last publications in Nature Materials (2004) and Nature (2008) came out four and eight years respectively after the completion of his studies where he joined National University of Lesotho in 2000. However, because of limited resources at the National University of Lesotho, Manyala maintained his research activities through collaboration with South African, USA and European institutions of a higher learning through which he was able to develop other new research interest in materials science. He first developed research collaboration on oxide nano-structures for photonics and solar cell conversion/modulation applications with Prof. Malik Maaza, who was then at the University of Witwatersrand, Johannesburg, RSA and now a senior scientist at iThemba LABS, Cape Town, NRF sponsored user facilities center.

Manyala was involved indirectly on co-supervision of two PhD and three MSc students at iThemba LABS during his one and half years sabbatical leave at iThemba LABS. It was during this period that Manyala had opportunity to develop nano-structured materials of $\text{Fe}_{1-x}\text{Co}_x\text{Si}$ in the same concentration range as the bulk counterpart where the interest was to produce nano-structured materials that have the same crystal structure as the bulk which was done in collaboration with Prof. J. F. DiTusa of Department of Physics and Astronomy, Louisiana State University, Prof. André Strydom of Department of Physics, University of Johannesburg, Prof. A. T. Charlie Johnson of Department of Physics and Astronomy, University of Pennsylvania, USA and Prof. Andrew Forbes of National Laser Centre, CSIR, RSA. The result of this work was published in Applied Physics Letters which one of the reputable journal with impact factor of 4. Manyala has also established collaboration with Prof. Giovanna Hearne of Department of Physics, University of Johannesburg, RSA and Prof. Mohsen Abd-Elmeguid, Department of Physics, University of Cologne, Germany on the high pressure measurements of FeSi. This work has just been published in Physical Review B in 2011 and has been chosen as one of Editor's suggestions.

Manyala, because of his excellent record on material science was recruited as a Deputy SARCHI Chair in Carbon Technology and Materials at the University of Pretoria in 2009 even though he had little background on carbon materials except the work he had just started on carbon nanotubes in collaboration with Prof. A. T. Charlie Johnson during his three times visit to the University of Pennsylvania while he was still at National University of Lesotho. He joined the SARCHI group in Carbon Technology and Materials under the mentorship of Prof. Brain Rand, world expert in carbon materials who is also NRF A - rated scientist. Within the two years that Manyala has been at the University of Pretoria, he developed a new line of research within the SARCHI Chair dealing with graphene – one atom thick graphite materials which is the topic that has just won the Noble price for physics, less than a decade since it has been discovered in 2004. This work is being done in collaboration with Prof. A. T. Charlie Johnson of Department of Physics and Astronomy, University of Pennsylvania. Manyala is supervising four students in the research related to graphite starting from nano to bulk; three PhDs and one MSc.

Manyala is the recipient of the following awards: Fulbright scholarship to study PhD in USA, Foundation for research development of South Africa (FRD) for his MSc

studies at University of Witwatersrand and National manpower development secretariat of Lesotho (NMDS) for his BSc studies at National University of Lesotho. He is the member of the following international and local organizations: Founding and board (till 2007) member of African laser centre (ALC), Council member of Nano-Sciences for African NetWork (NANOAFNET), regular associate member of International centre for theoretical physics (ICTP), member of South African institute of physics (SAIP) and member of American physical society. Manyala served in many local organizing committees for international and local conferences. Manyala has produced substantial ISI scientific publications, three of which are published in one of the most reputable journals, Nature and Nature Materials and he is serving as a reviewer for Nano letters journal.

Manyala is a well established materials scientist with NRF rating of C2 and is currently supervising five graduate students: two PhD, two MSc and one Post Doc.

Education

- PhD in Experimental Physics, Louisiana State University, USA, (1994 - 2000)
- BSc Honors & MSc, University of Witwatersrand, South Africa, (1990 – 1992)
- BSc., National University of Lesotho (1985 – 1989)

Work Experience

- Senior Lecturer and Deputy Chair of SARCHI in Carbon Technology and Materials at Department of Physics, University of Pretoria (2009 – present)
- Senior Lecturer at Department of Physics, National University of Lesotho (2004 – 2008)
- Lecturer at Department of Physics, National University of Lesotho (1992 – 2003)

Institutional and Departmental Service

- Deputy Chair of SARCHI in Carbon Technology and Materials, University of Pretoria (2009 – present)
- Chairman of the Physics Department Committee for restructuring of undergraduate physics curriculum, National University of Lesotho (2005)
- Library Board Member representing Faculty of Science, national University of Lesotho (2003 – 2008)
- Faculty of Science 2nd year tutor, National University of Lesotho (1992 –1994)

Scholarships and Awards

- Nano-Sciences for African-Network (NANOAFNET) Award for Sabbatical leave at iThemba LABS, South Africa (2006 – 2007)
- African Laser Center (ALC) Award for Sabbatical leave at iThemba LABS, South Africa (2006 – 2007)
- Fulbright Scholarship, PhD degree at Louisiana State University, USA (1994 – 2000)
- Foundation for Research and Development (FRD), MSc degree at University of Witwatersrand, South Africa (1991 – 1992)
- Manpower Development Secretariat Scholarship [Lesotho Government], BSc. Honors degree at University of Witwatersrand, South Africa (1990 – 1991)
- Manpower Development Secretariat Scholarship [Lesotho Government], BSc. Degree at National University of Lesotho, Lesotho (1985 – 1989)

International / Local / Commissions Membership

- Abdus Salam International Center for Theoretical Physics (ICTP) Regular Associate (Current)
- Nano Letters Reviewer (current)
- Member of South African Institute of Physics (Curent)
- Serve on selection panel for THRIP materials science projects (current)
- Member of local organizing committee of International conference in Frontiers in Polymers and Advanced Materials (ICFPAM) at University of Pretoria, South Africa (Current till May 2011)
- Member of local organizing committee for SANHARP graduate students conference at iThemba LABS, South Africa (23rd – 25th August 2009)
- Member of local organizing committee for workshop on Nanotechnology Regional Networking at iThemba LABS, South Africa 20th – 22nd August (2008)
- Member of Board of Directors of African Laser Centre (ALC) (June 2007 – June 2009)
- Member of local organizing committee for African Regional College on Science at Nanoscale at iThemba LABS, South Africa (18th – 30th November 2007)
- Member of local organizing committee for 6th Edward Bouchet – Abdus Salam Institute international conference at iThemba LABS (23rd – 26th January (2007)
- Member of local organizing committee for 1st US – Africa Nano-Science Workshop at iThemba LABS, South Africa (27th – 28th January 2007)
- Founding member of African Laser Centre (2005 – 2008)
- Council member and Southern African coordinator of Nano-Sciences African NetWork (NANOAFNET) (2005 – present)
- Lesotho representative of the Lasers, Atoms and Molecular NetWork (LAMNETWORK) (2005 -2008)
- Member of American Physical Society (APS) (1994 – 2004)

International and national collaborations

- Prof. John F. DiTusa, Department of Physics and Astronomy, Louisiana State University, USA (Current)
- Prof A. T. Charlie Johnson, Department of Physics and Astronomy, University of Pennsylvania, USA (current)
- Prof Mohsen Abd-Elmequid, Department of Physics, University of Cologne, Germany (current)
- Prof. Malik Maaza, iThemba LABS, Cape Town, South Africa (current)
- Prof André Strydom, Department of Physics, University of Johannesburg, South Africa (current)
- Prof. Giovanni Hearne, Department of Physics, University of Johannesburg, South Africa (current)
- Prof Andrew Forbes, National Laser Center (NLC), CSIR, South Africa (current)

Research Interests

My research interests are generally on materials science synthesis, characterization, optical and physical measurements. The specific research interests in materials science are as follows:

- Graphene synthesis and characterizations for solar cells applications and supercapacitors for energy storage
- Irradiation effects on graphitic materials from nano to macroscopic size by ions and fast neutrons
- Transport and magnetic measurements of strongly correlated materials of $\text{Fe}_{x,y}(\text{Co}_x, \text{Mn}_y)$ alloys at nano-structures synthesised by pulsed laser deposition for spintronics applications

Invited Talks

- Colloquium, Department of Physics, University of Cologne, (December, 2008)
- Colloquium, Department of Physics and Astronomy, Louisiana State University (July, 2007)
- Colloquium, Department of Physics and Astronomy, University of Pennsylvania, USA (June, 2007)
- Colloquium, National Laser Centre, CSIR, South Africa (2006)
- Conference on US – Africa Studies Institute: Phonons Interactions with Atoms and Molecules, University of Natal, Durban, South Africa (May, 2005)
- The international conference on fundamentals and applied aspects of modern physics, Luderitz, Namibia (June, 2000)

Research Students

- Mr. Mopeli Fabiane, co-supervised by Prof. A. T. Johnson, PhD degree; research topic: “Defects and reconstruction effects in irradiated graphene”
- Co-supervising Mr. Phillemon Magampa supervised by Prof. Brian Rand, PhD degree; research topic: “Fabrication, structure and properties of the HRT graphite composites”.
- Miss Phathutshedzo Murovhi, co-supervised by Prof. Brian Rand, MSc degree, research topic: “Comparison of thermal and electrical properties of unirradiated and irradiated graphite”.
- Dr. David Dodoo-Arhin, Post Doc; research topic: “Graphene: Production and photovoltaic applications”.
- Mr. Happyson Gavi, co-supervised by Prof. S. Vallabhapurapa, MSc degree; research topic: “Low-field microwave absorption in pulsed laser deposited FeSi thin films”.

Publications

1. “Pressure-induced quantum phase transition in $\text{Fe}_{1-x}\text{Co}_x\text{Si}$ ($x = 0.1, 0.2$)”: M. K. Forthaus, G. R. Hearne, **N. Manyala**, O. Heyer, R. A. Brand, D. I. Khomskii, T. Lorentz and M. M. Abd-Elmeguid, *Phys. Rev. B* **83**, 085101 (2011).
2. “Influence of Plasma dynamics on the growth of $\text{Sm}_{0.55}\text{Nd}_{0.45}\text{NiO}_3$ solid solution during pulsed laser deposition”: B. D. Ngom, A. Dioum, **N. Manyala**, S. Abdelli-Messaci, R. T. Kerdja, R. Madjoe, R. Nenutudi, M. Maaza and A. C. Beye, *J. Phys. and Chem. Solids*, Doi: 10.1016/j.jpics.2011.07.006
3. “Temperature-dependent growth mode of W-doped ZnO nanostructures”: B. D. Ngom, M. Chaker, **N. Manyala**, B. Lo, M. Maaza and A. C. Beye, *Applied Surface Science* **257**, 6226 (2011)
4. “Photon-induced and reversible wettability of pulsed laser deposited W-doped ZnO nanorods”: B. D. Ngom, O. Sakho, S. Ndiaye, R. Bartali, A. Diallo, M. B. Gaye, S. Bady, **N. Manyala**, M. Maaza and A. C. Beye, *Eur. Phys. J. Appl. Phys.* **55**, 20501 (2011)
5. “Structural evolution and epitaxial stabilization of pulsed laser deposited $\text{Sm}_{0.55}\text{Nd}_{0.45}\text{NiO}_3$ solid solution nano-structured films on undoped Si (100) and NdGaO_3 substrates”: B. D. Ngom, R. Madjoe, S. Fall, J. B. Kana Kana, **N. Manyala**, A. Forbes, R. Nemutudi, A. Y. Fasasi, M. Maaza and A. C. Beye, *J. Phys. And Chem. Solids* **71**, 722 (2010)
6. “Thermochromic nanocrystalline Au- VO_2 composite thin films prepared by radiofrequency inverted cylindrical magnetron sputtering”: J. B. Kana Kana, J. M. Ndjaka, B. D. Ngom, **N. Manyala**, O. Nemraoui, A. Y. Fasasi, R. Nemuduti, A. Gibaud, D. Knoesen and M. Maaza, *Thin Solid Films* **518**, 1641 (2010)
7. Structural and magnetic properties of $\epsilon\text{-Fe}_{1-x}\text{Co}_x\text{Si}$ thin films via pulsed laser deposition (PLD)”: **N. Manyala**, B. D. Ngom, A. C. Beye, R. Bucher, M. Maaza, A. Strydom, A. Forbes, A. T. Johnson and J. F. DiTusa, *Applied Physics Letters* **94**, 232503 (2009)

8. “Structural and optical properties of nano-structured tungsten-doped ZnO thin films grown by pulsed laser deposition”: B. D. Ngom, T. Mpahane, **N Manyala**, O. Nemraoui, U. Buttner, J. B. Kana Kana, A. Y. Fasasi, M Maaza and A. C. Beye, *Applied Surface Science* **255**, 4153 (2009)
9. “Structural, morphological and photoluminescence properties of W-doped ZnO nano-structures”: B. D. Ngom, O. Sakho, **N. Manyala**, J. B. Kana Kana, N. Nkosi, L. Gerbous, A. Y. Fasasi, M. Maaza and A. C. Beye, *Applied Surface Science* **255**, 7314 (2009)
10. “Nonlinear optical absorption properties of porphyrins confined in Nafion membrane”: Girma Hailu, Genene Tessema, Balla, D. Ngom, **Ncholu Manyala**, and Malik Maaza, *Applied Physics A Materials Science and Processing* **96**, 685 (2009)
11. “Doping a semiconductor to create an unconventional metal”: **N. Manyala**, J. F. DiTusa, G. Aeppli, and A. P. Ramirez, *Nature* **454**, 976 (2008)
12. “Pulsed laser liquid solid interaction synthesis of Pt, Au, Ag, and Cu nano-suspension and their stability”: M. Maaza, H. C. Chambalo, S. Ekambaram. O. Nemraoui, B. D. Ngom and **N. Manyala**, *Int. J. Nanoparticles* **1**, 122 (2008).
13. “Thermochromic VO₂ thin films synthesized by RF-inverted cylindrical magnetron sputtering”: J. B. Kana Kana, J. M. Ndjaka, P. Owono Ateba, B. D. Ngom, O. Nemraoui, **N. Manyala**, A. C. Beye and M. Maaza, *Applied Surface Science* **254**, 3959 (2008)
14. “Characterization of Fe_{1-x}Co_xSi thin films deposited via pulsed laser deposition”: **N. Manyala**, B. Ngom, J. B. Kana Kana, R. Bucher, M. Maaza and J. F. DiTusa, *AIP Conf. Proc.* **1047**, 127 (2008)
15. “Infrared active Sm_{1-x}Nd_xNiO₃ based nano-switching for high power laser sources”: B. D. Ngom, J. B. Kana Kana, O. Nemraoui, **N. Manyala**, M. Maaza, R. Madjoe and A. C. Beye, *AIP Conf. Proc.* **1047**, 280 (2008)
16. “Combined thermochromic and plasmonic: Optical response in novel nano-composite Au-VO₂ films prepared by RF inverted cylindrical magnetron sputtering”: J. B. Kana Kana, J. M. Ndjaka, **N. Manyala**, O. Nemraoui, A. C. Beye and M. Maaza, *AIP Conf. Proc.* **1047**, 255 (2008)
17. “Large anomalous Hall effect in silicon-based magnetic semiconductor”: **N. Manyala**, Y. Sidis, J. F. DiTusa, G. Aeppli, D. P. Young, and Z. Fisk, *Nature Materials* **3**, 255 (2004)
18. “Magnetoresistance from quantum interference effects in ferromagnets”: **N. Manyala**, Y. Sidis, J. F. DiTusa, G. Aeppli, D. P. Young, and Z. Fisk, *Nature* **404**, 581 (2000)

Referees

1. Prof. J. F. DiTusa, Department of Physics and Astronomy, Louisiana State university, USA, ditusa@www.phys.lsu.edu
2. Prof. A. C. Beye, Department of Physics, University of Cheikh Anta Diop de Dakar, Senagal, acbeye@refer.sn
3. Prof. Srinivasu Vallabhapurapu, UNISA, South Africa, vallavs@unisa.ac.za
4. Prof. A. T. Charlie Johnson, Department of Physics and Astronomy, University of Pennsylvania, USA, cjohnson@physics.uppen.edu
5. Prof. André Strydom, Department of Physics, University of Johannesburg, South Africa, amstrydom@uj.ac.za .