

Curriculum Vitae

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CV – WD ROOS

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1 GENERAL INFORMATION

Surname	ROOS		Maiden name		
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Organisation	UNIVERSITY OF THE FREE STATE, BLOEMFONTEIN				
Department	PHYSICS				
Faculty	NATURAL AND AGRICULTURAL SCIENCE		Position	Professor	
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Date of appointment	1 JANUARY 1984		Full-time permanent	<input checked="" type="checkbox"/>	Full-time temporary
Current Employer	UNIVERSITY OF THE FREE STATE				
ACADEMIC QUALIFICATIONS OBTAINED					
Degree	Field of study	Higher education institution		Year	Distinctions
B.Sc.	Physics, Applied Mathematics	University of the Free State		1982	Physics Appl. Maths
B.Sc. Hon.	Physics	University of the Free State		1984	Cum laude
M.Sc.	Physics	University of the Free State		1987	Cum laude
Ph.D.	Physics	University of the Free State		1996	
EXPERIENCE TO DATE					
Name of employer		Capacity and/or type of work		Period	
University of Natal		ASSISTANT RESEARCHER (SANA E ANTARCTICA) ATMOSPHERIC PHYSICS AND SEISMOLOGY		1977 - 1979	
University of the Free State		PROFESSIONAL OFFICER (PHYSICS)		1983 - 1984	
University of the Free State		JUNIOR LECTURER RESEARCH (PHYSICS)		1985 - 1987	
University of the Free State		LECTURER RESEARCH (PHYSICS)		1988 - 1996	
University of the Free State		SENIOR LECTURER (PHYSICS)		1997 - 2001	
University of the Free State		ASSOCIATE PROFESSOR		2001 - 2012	
University of the Free State		ACTING DEPARTMENTAL CHAIRMAN		June 2003 - Dec 2003	
University of the Free State		PROFESSOR		January 2013	

2. RESEARCH OUTPUT

2.1 Publications and Proceedings

1. Van Wyk GN and WD Roos. "*Silicon diffusion in an Fe-based amorphous alloy*", 1986. Applied Surface Science, Vol. 26, pp 317.
2. Roos WD, GN van Wyk and J du Plessis. "*Diffusion of Si in Fe based amorphous and crystalline alloys*", 1990. Applied Surface Science. Vol. 40 pp 303-307
3. Van Wyk GN, S Priggemeyer, WD Roos and W Heiland. "*The diffusion behaviour of Pb in yttrium iron garnet films*", 1991. Applied Surface Science, Vol. 52, pp 351.
4. Van Wyk GN, WD Roos, J du Plessis and E Taglauer. "*Sputtered induced concentration profile in binary alloys*". 1992. X-ray Optics and Microanalysis, IPC nr 130, pp 427.
5. Roos WD, and GN van Wyk. "*Influence of Silicon on the oxidation of iron-based amorphous alloys*", 1992. Journal of Material Science, Vol. 27, pp 1193.
6. Roos WD, GN van Wyk and J du Plessis. "*Use of AES to determine sputter-induced concentration profiles in Cu-Ni alloys*", 1993. Surface and Interface Analysis. Vol. 20, pp 95.
7. Roos WD, RP Henson and GN van Wyk. "*A Voltage Control Unit for Ion-Scattering Spectroscopy Analyzers*". 1993. Rev. Sci. Instrum. Vol. 64 (4) pp 966.
8. Berning GLP, HC Swart and WD Roos. "*The Oxidation of Terbium Silicide*". 1993. Applied Surface Science. Vol. 73, pp 305.
9. Roos WD, RP Henson and GN van Wyk. 1993. Physics Auxiliary Publications. Document No: RSINA -94-0966-08.
10. Van Wyk GN, WD Roos, J du Plessis and E Taglauer. 1993, Inst. Phys. Conf. Ser. No. 130. Ch 6, pp 435.
11. Roos WD, GN van Wyk and J du Plessis. "*Weight function for linear least squares fit of binary CuNi and PtPd alloy Auger spectra*", 1994. Surface and Interface Analysis. Vol. 22, pp 65.
12. Viljoen PE, WD Roos, HC Swart and PH Holloway. "*Carbon Auger Peak Shape Measurements in the Characterization of Reactions on (001) Diamond*". 1996. Applied Surface Science. Vol. 101, pp 612.
13. Roos WD, J du Plessis, GN van Wyk, E Taglauer and S Wolf. "*Surface-Structure and Composition of NiAl(100) by Low-Energy Ion-Scattering*". 1996. Journal of Vacuum Science and Technology A, Vol. 14/3, pp 1648.
14. Berning GLP, HC Swart, WD Roos and B de Witt. "*ISS and AES studies of the initial oxidation of Dy, Tb and their silicides*", 1999. Materials Chemistry and Physics, 58 (1999) pp 26-30.

15. Abrams BL, WD Roos, PH Holloway and HC Swart. "***Electron beam-induced degradation of zinc sulfide-based phosphors***", 2000. Surface Science, Vol. 451, p74.
16. Hilly KT, WD Roos and HC Swart. "***On the degradation of ZnS:Cu, Al, Au phosphor powder: The effect of temperature***", Radiation Effects and Defects in Solids, Vol 154, Iss 3 – 4, p373, 2001.
17. Asante JKO, WD Roos and MF Maritz, "***Quantification from overlapping Auger peak-to-peak heights***", Surface and Interface Analysis, 2001, 31: 856
18. Conradie R, WD Roos and HC Swart. "***Room-temperature oxidation of Fe(100), Fe(100)–3.5 wt.% MoN and segregated MoN: a mathematical analysis***", Surface and Interface Analysis 2002, 33, 8, 704.
19. Conradie R, WD Roos and HC Swart. "***The influence of a segregated MoN layer on the room temperature oxidation of a Fe(100)–3.5 wt.% Mo–N specimen***". Corrosion Science 2003, 45/2, 339
20. Swart HC, A J Jonker, C H Claassens, R Chen, L A Venter, P Ramoshebe, E Wurth, JJ Terblans, W D Roos. "***Extracting inter-diffusion parameters of TiC from AES depth profiles***". Applied Surface Science 205 (2003) 231 – 239.
21. Asante JKO, WD Roos, JJ Terblans. "***Sequential segregation of Sn and Sb in a Cu(111) single crystal***". Surface and Interface Analysis, 2003, 35, Iss5, 2003.
22. Asante JKO, JJ Terblans, WD Roos, Proceedings of the 4th International Workshop on Surface and Interface Segregation, p 6 – 7, Faure, RSA, 17-22 August 2003.
23. Olivier GJ, WD Roos and JJ Terblans. "***Surface segregation simulations of a ternary copper-silver-tin alloy***". Proceedings of the second International Conference of the African Materials Research Society. Johannesburg, SA, December 2003.
24. Swart HC, WD Roos and JJ Terblans. "***Surface segregating kinetics in a ternary system***". Surface and Interface Analysis, 2004, 36, 4, 285 - 289.
25. Diale, M., Auret, F.D., Van Der Berg, N.G., Roos, W.D, "***Analysis of. GaN cleaning procedure***". Applied Surface Science, Volume 246, Issues 1-3, 15 June 2005, Pages 279-289.
26. Asante JKO, JJ Terblans, WD Roos. "***An AES study of Sn surface segregation in Cu single crystals***". Surface and Interface Analysis, 37, 517 – 521, 2005.
27. Asante JKO, JJ Terblans, WD Roos. "***Segregation of Sn and Sb in a ternary Cu(1 0 0)SnSb alloy***". Applied Surface Science, Volume 252/5, January 2005, pp 1674 – 1678.
28. Diale, M., Auret, F.D., Odendaal, R.Q., Roos, W.D, "***Studies of carbon behaviour on GaN surface in ultra high vacuum (UHV)***". Surface and Interface Analysis, 37, 1158 – 1160, 2005.

29. Asante JKO, JJ Terblans , WD Roos, “*Segregation of Sn in the binary CuSn and ternary CuSnSb alloy systems*”, Surface and Interface Analysis, 38, Iss 9, 1249 – 1251, 2006.
30. S. Cronje, R.E. Kroon, W.D. Roos, T.J. Cloete and J.H. Neethling. Microscopy Society of Southern Africa, Vol 36, 18, 2006.
31. S. Cronje, R.E. Kroon, W.D. Roos and J.H. Neethling. Microscopy Society of Southern Africa – Proceedings, Vol 36, 32, 2006.
32. W D Roos and JKO Asante. “*A procedure to determine the segregation parameters in ternary systems from experimental data of a linear temperature run*” Surface Review and Letters, 14, Iss 4, 681 – 685, 2007.
33. W D Roos, G J Olivier and JJ Terblans. Surface Review and Letters, “*Estimating the segregation energies in Cu binary systems.*”, 677 – 680, 2007.
34. CJ Jafta, WD Roos and JJ Terblans. “*n Gebruikersvriendelike uitgloeisisteam* “ SA Journal for Natural Science and Technology. 28, No 3, 248, 2009.
35. CJ Jafta, WD Roos, JJ Terblans and AB Hugo. “*A pressurized Ar-filled annealing system*”, Journal of Instrumentation Science and Technology, 38: 4, 261 - 267, 2010.
36. RE Kroon, S. Cronje, WD Roos and TJ Cloete. “*Annealing-Induced Softening of Copper and Molybdenum for High Strain Rate Deformation*”, Met. Mater. Int., Vol. 17, No. 4, 671, 2011.
37. CJ Jafta, WD Roos, JJ Terblans, J.K.O. Asante and K.I.Ozoemena. “*The Surface Orientation Dependence of the Pre-Exponential Factors Extracted from the Segregation Profiles of a Cu(111/110) Bi-crystal* “, Proceedings of SAIP2011, 111, 2011.
38. HAA Seed Ahmed, WD Roos , OM Ntwaeaborwa, HC Swart and RE Kroon. “*Effect of annealing on the Ce³⁺/Ce⁴⁺ ratio measured by XPS in luminescent SiO₂:Ce*”, Proceedings of SAIP2011, 280, 2011.
39. S Cronjé, WD Roos, RE Kroon and JKO Asante. “*Measuring the effect of surface evaporation on the segregation process*”, Proceedings of SAIP2011, 68, 2011.
40. GF Ndlovu,JKO Asante, WD Roos and KT Hillie. “*The decoration of vicinal copper polycrystalline surfaces by Antimony* “, Proceedings of SAIP2011, 249, 2011.
41. G.F. Ndlovu, JKO Asante, WD Roos and KT Hillie. “*Investigation of broken symmetry of Sb/Cu(111) surface alloys by VT-STM* “, Proceedings of SAIP2011, 243, 2011.
42. Gebhu F Ndlovu, Wiets D Roos, Zhiming M Wang, Joseph KO Asante, Matete G Mashapa, Charl J Jafta, Bonex W Mwakikunga and Kenneth T Hillie. “*Epitaxial deposition of silver ultra-fine nanoclusters on defect-free surfaces of HOPG-derived few-layer graphene in a UHV multi-chamber by in situ STM, ex situ XPS, and ab initio calculations* “. Nanoscale Research Letters 2012, 7:173 1-8.
43. JKO Asante and WD Roos. “*Comparing segregation profiles of Sn and Sb in single and polycrystalline Cu*”. Surface Review and Letters, Vol. 19, No 1, 1-4, 2012.

44. Charl J. Jafta, Kenneth I. Ozoemena, Mkhulu K. Mathe and Wiets D. Roos. “**Synthesis, Characterisation and Electrochemical Intercalation Kinetics of Nanostructured Aluminium-Doped $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.54}\text{Ni}_{0.13}\text{Co}_{0.13}]\text{O}_2$ Cathode Material for Lithium Ion Battery**” *Electrochimica Acta*, 85, 411-422, 2012.
45. S. Cronje, RE. Kroon, J. Neethling and WD Roos. “**Twinning in copper deformed at high strain rates**”. *Bull. Mater. Sci.*, Vol. 36, No. 1, pp. 157–162, 2013.
46. CJ Jafta, WD Roos and JJ Terblans. “**Modification to an Auger Electron Spectroscopy system for measuring segregation in a bi-crystal**”, *Journal of Instrumentation*, 8, P03020 March 2013,
47. Ozoemena, Kenneth; Jafta, Charl; Mathe, Mkhulu; Manyala, Ncholu; Roos, Wiets: “**Microwave-Assisted Synthesis of High-Voltage Nanostructured $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$ spinel: Tuning the Mn^{3+} Content and Electrochemical Performance**” : American Chemical Society: *Appl. Mater. Interfaces* 2013, 5, 7592–7598.
48. Cronje S, WD Roos, RE Kroon en JKO Asante. “**Die invloed van verdamping op die segregasieproses**”. *Suid Afrikaanse Tydskrif vir Natuurwetenskap en Tegnologie* 32(1) Art #407, 2013.

2.2 Publications in preparation

1. WD Roos, C J Jafta, S Cronje and JKO Asante. “**Die invloed van Sb-dotering op die korrelgroei van polikristallyne Cu**”.
2. CJ Jafta, WD Roos and JJ Terblans. “**Sb segregation in a Cu (111/110) bi crystal**”.
3. Gebhu F Ndlovu, Aimé Lay-Ekuakille, Wiets D Roos, Joseph K O Asante, Bonex W Mwakikunga Kenneth T Hillie. **In situ and atomic scale observation of Cu(111)-Sb surface structural transitions at various temperatures by VT-STM.**
4. **Asante JKO, S Rasidi and WD Roos**, 2012, *XPS analysis of surface modification of Cu-Ru composites for interconnect applications*,

2.3 Technical reports

1. CSIR Project Report: *AES and XPS investigations of Aluminide coatings on Ni-based superalloys*. (March 1988).
2. CSIR Project Report: *The diffusional behaviour of Chromaluminized MAR M 002 investigated by Auger Electron Spectroscopy* (October 1988 Part I).
3. CSIR Project Report: *The diffusional behaviour of Chromaluminized MAR M 002 investigated by Auger Electron Spectroscopy*. (July 1989 part II).
4. Mintek report: *An AES and XPS investigation of RuCl_3 and/or H_2IrCl_6 layers on a Ti substrate*. (September 1993).

5. Mintek Project Report: *Surface Composition of Alloy VF 865*. (August 1993).
6. Mattek report I: *Surface and interface studies of the NiAl system*, (September 1995).
7. The Institute for Polymer Science, Stellenbosch report: *The characterisation of unfluorinated and fluorinated PVDF specimens by XPS*, (December 1995).
8. Mattek report II: *Surface and interface studies of the NiAl system*, (February 1996).
9. Mattek report III: *Surface and interface studies of the NiAl system*, (February 1997).
10. Delta Project: *Elemental measurements on battery specimens with Auger electron spectroscopy* , (March 2002).
11. Somchem (Pty) Ltd. 2002 Study on the heating effect of pure Titanium due to oxidation.
12. Somchem (Pty) Ltd. 2003 Study on the heating effect of pure Titanium due to oxidation – Part II
13. Delta Project (New) I: *Proposals for the characterization of the high and low temperature behaviour of 253 MA and 321 SX stainless steels in different atmospheres*. (May 2005).
14. Delta Project (New) II: *Calculations of the Chromium oxide thickness on 253 MA stainless steel as a function of time and temperature*. (July 2005).
15. Delta Project (New) III: *Summary of the results: AES depth profiles of 253 MA stainless steel annealed in air at 500 °C for 24 and 48 hours*. (July 2005).
16. Delta Project (New) IV: Preliminary report on the segregation behaviour of 253 MA stainless Steel. December 2005.
17. Delta Project (New) V: Preliminary report III on the integrity of the protected layer of 253 MA stainless Steel. August 2006.
18. Delta Project (New) VI: Preliminary report III on the influence of SO₂ on the integrity of the protected layer of 253 MA stainless Steel. October 2006.
19. Delta Project (New) VII: Final report and recommendations on 253 MA stainless Steel. November 2006.

2.4 Other contributions

2.4.1 Conference participation

1. WD Roos, RP Henson and GN van Wyk. *A Control Unit for Spherical Sector Analysers used in Low Energy Ion Scattering Experiments*. QSA, Guildford, UK 1992.

2. WD Roos, GN van Wyk and J du Plessis. *The Use of AES to Determine Sputter Induced Concentration Profiles in Cu-Ni Alloys*. QSA, Guildford, UK, 1992.
3. GN van Wyk, WD Roos, J du Plessis and E Taglauer. *Sputter-induced Concentration Profiles in Binary Alloys*. ICXOM, Manchester, UK 1992.
4. GLP Berning, HC Swart and WD Roos. *The oxidation of Tb and TbSi_{1.7}*. European Workshop on Refractory Metals and Silicides, De Ruwenberg, The Netherlands 1993.
5. WD Roos, GN van Wyk and J du Plessis. *Weight function for linear least squares fit of binary CuNi and PtPd alloy Auger spectra*, ECASIA, Italy 1993.
6. PE Viljoen, WD Roos, HC Swart and PH Holloway, *Carbon Auger Peak Shape Measurements in the Characterisation of Reactions on (001) Diamond*, Ninth International Conference on Solid Surfaces, Yokohama, Japan, September 1995.
7. GN van Wyk, WD Roos, S Wolf and E Taglauer, *The Surface Structure and Composition of NiAl(100) by Low energy Ion Scattering*, 42nd National Symposium of Applied Vacuum Science and Technology, October, Minneapolis, Minnesota, USA 1995.
8. WD Roos, Maritz MF and Swart HC. *A Method to Construct Real Auger Depth Profiles of C/Ti Thin Layers*. The 21st Annual Symposium on Applied Surface Analysis. Waukesha, Wisconsin, USA. 1999
9. BL Abrams, WD Roos, HC Swart and PH Holloway. *Cathodoluminescent Degradation Mechanism for ZnS-Based Phosphors and the Impact on Field Emission Displays*. The 46th International Symposium of the AVS. Seattle, Washington, USA 1999.
10. BL Abrams, WD Roos, PH Holloway and HC Swart. *Electron Beam Induced Degradation of Zinc Sulphide-Based Phosphors*. 8th International Workshop on Desorption Induced by Electronic Transitions. San Alfonso Conference and Retreat Centre, New Jersey, 27 Sept 1999.
11. BL Abrams, WD Roos, LC Williams and PH Holloway. *Temperature dependence of Cathodoluminescent Degradation of ZnS Phosphor*. 6th International Conference on Science and Technology of Display Phosphors, San Diego, California, USA, Nov 6-8 2000.
12. BL Abrams, , WD Roos, LC Williams and PH Holloway. *Temperature dependence of Cathodoluminescent Degradation of ZnS Phosphors*. 47th International Symposium of AVS, Boston, Massachusetts, USA 2000.
13. PH. Holloway, WD Roos, BL Abrams and J Thomes. *Effects Of Vacuum Partial Pressures On Electron Stimulated Surface Chemical Reactions On Coated And Uncoated Cathodoluminescent Phosphors*, SYMPOSIUM Electron-Emissive Materials and Vacuum Microelectronics, San Francisco, California. April 25 - 27, 2000
14. LC Williams, BL Abrams, WD Roos and PH Holloway. *Cathodoluminescence from Thin Film versus Powder Phosphors*. 47th International Symposium of AVS, Boston, Massachusetts, USA 2000

15. JKO Asante, WD Roos, J du Plessis and JJ Terblans. *Co-segregation in a Cu(111),Sn,Sb ternary single crystal*. Asia-Pacific Surface and Interface Analysis Conference, Beijing China, 2000.
16. JKO Asante, WD Roos and MF Maritz. *Extracting Auger Yield Contributions from the combined peak to peak height of Overlapping peaks using only the spectra of the standards*. Asia-Pacific Surface and Interface Analysis Conference, Beijing China, 2000.
17. JKO Asante, Terblans, J.J., Roos, W.D. *Finding the equilibrium segregation parameters in a Cu(111),Sn,Sb ternary system*, 4th International Workshop on Surface and Interface Segregation, Faure, RSA, 17-22 August 2003.
18. MW Diale, FD Auret, NG van der Berg and WD Roos. *Surface chemical treatment for the cleaning of GaN*. 10 th ECASIA, , Berlin, Germany, October 2003.
19. GJ Olivier, WD Roos and JJ Terblans. *Surface segregation simulations of a ternary copper-silver-tin alloy*. The Second International Conference of the African Materials Research Society. Johannesburg, South Africa, December 2003.
20. S. Cronje, R.E. Kroon, W.D. Roos, T. Cloete and J.H. Neethling *TWINNING IN COPPER DEFORMED AT HIGH STRAIN RATES*. 45th Annual Conference of the Electron Microscopy Society of Southern Africa. November 2006, Nelson Mandela Metropolitan University. Port Elizabeth.
21. S. Cronje, R.E. Kroon, W.D. Roos and J.H. Neethling *OXIDE GROWTH ON COPPER TEM SAMPLES*. 45th Annual Conference of the Electron Microscopy Society of Southern Africa. November 2006, Nelson Mandela Metropolitan University. Port Elizabeth.
22. W D Roos and JKO Asante *Determining the segregation parameters in ternary systems from a linear temperature run*. Asian Pacific Conference on Surface Science and Engineering, Hong Kong Baptist University, Hong Kong, December 2006.
23. W D Roos, G J Olivier and JJ Terblans *Estimating the segregation energies in Cu binary systems*. Asian Pacific Conference on Surface Science and Engineering, Hong Kong Baptist University, Hong Kong, December 2006.
24. JKO Asante and WD Roos. *Comparing segregation profiles of Sn and Sb in single and polycrystalline Cu*. 23rd International Conference on Atomic Collisions in Solids Phalaborwa, South Africa, August 2008.
25. CJ Jafta, JJ Terblans and WD Roos. *'n Gebruikersvriendelike uitgloeisistiem*. 8st Simposium SA Akademie vir Wetenskap en Kuns, Universiteit van Johannesburg, Oktober 2008
26. JKO Asante and WD Roos. *Comparing segregation profiles of Sn and Sb in single and polycrystalline Cu*. ICACS-23 conference, Hans Merensky Estate, Phalaborwa, August 2008.
27. S Cronje, RE Kroon, WD Roos and JH Neethling. *Korrelgroottes en tweelingstrukture in vervormde koper*. 9^{de} Simposium SA Akademie vir Wetenskap en Kuns, Universiteit van die Vrystaat, Oktober 2009.
28. GF Ndlovu, WD Roos and KT Hillie. *Spin Splitting with surface alloys*. The 4th Korea-South

Africa joint workshop on Nanotechnology, Korea Institute of Science and Technology, Seoul, Korea, October 2009.

29. CJ Jafta, WD Roos and JJ Terblans. *Sb segregation in a Cu(111/110) bi-crystal*. 11th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures ACSIN 2011, St Petersburg, Russia, October 2011.
30. WD Roos, CJ Jafta and JJ Terblans. *Measuring segregation on a Cu bi-crystal using AES*. 11th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures ACSIN 2011, St Petersburg, Russia, October 2011.
31. CJ Jafta, KI Ozoemena, MK Mathe, OO Fashedemi, M Kebede¹ and WD Roos *Physico-electrochemical Properties of Nanostructured High Voltage $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.54}\text{Ni}_{0.13}\text{Co}_{0.13}]\text{O}_2$ Cathode Material for Lithium Ion Batteries*, Joint South Africa Japan discussions on fuel cells, September 2011, Cape Town.
32. Charl J. Jafta, Kenneth I. Ozoemena, Omobosede O. Fashedemi, Mkhulu K. Mathe, Mesfin Kebede, and Wiets Roos. *Physico-electrochemical Properties of Disordered $\text{LiMn}_{1.5}\text{Ni}_{0.5}\text{O}_4$ Obtained in the Presence of Carbon Nanotubes Using the Modified Pechini Method*. 220th Electrochemical Society Meeting, Boston, Massachusetts, 9 – 14 October 2011
33. G.F. Ndlovu, J.K.O. Asante, W.D. Roos, B.W. Mwakikunga and K.T. Hillie. *Showcasing the unprecedented resolution of the variable temperature scanning tunneling microscopy*. 49th Conference of the Microscopy Society of Southern Africa, Pretoria, South Africa, 5 – 9 December 2011.
34. G.F. Ndlovu, J.K.O. Asante, W.D. Roos, B. W. Mwakikunga and K.T. Hillie. *Variable temperature scanning tunnelling microscopy study of Sb growth on copper (111) surfaces*. 49th Conference of the Microscopy Society of Southern Africa, Pretoria, South Africa, 5 – 9 December 2011.
35. Charl J Jafta, Kenneth I Ozoemena, Omobosede O Fashedemi, Mkhulu K Mathe, Mesfin Kebede and Wiets Roos *Microwave-assisted Pechini Synthesis of $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.54}\text{Ni}_{0.13}\text{Co}_{0.13}]\text{O}_2$ Cathode Material for Lithium Ion Battery*. 6th Africa Materials Research Society, Victoria Falls, Zimbabwe, 11 – 16 December 2011
36. S Cronje, WD Roos, RE Kroon, en JKO Asante. *Die invloed van verdamping op die segregasie proses* 11^{de} Simposium SA Akademie vir Wetenskap en Kuns, Unisa, Oktober 2011.
37. Gebhu Ndlovu, Bonex Mwakikunga, Wiets Roos, Joseph Asante and Kenneth Hillie. *Structural and Electronic Properties of $\text{Cu}(111)\text{-Sb}$ Surface Alloys*, The 4th Interbational Conference on Nanoscience and Nanotechnology, University of the Free State, Bloemfontein, 1 – 4 April, 2012.
38. Gebhu Ndlovu, Bonex Mwakikunga, Wiets Roos, Joseph Asante and Kenneth Hillie. *Growth of $<1\text{ ML}$ Sb on HOPG and Cu substrates studied by VT-STM*, The 4th International Conference on Nanoscience and Nanotechnology, University of the Free State, Bloemfontein, 1 – 4 April, 2012.
39. Charl J. Jafta, Kenneth I. Ozoemena, Mkhulu K. Mathe, Mesfin Kebede and Wiets D. Roos.

Understanding the impact of Al-doping on the electrochemical kinetics of layered lithium-ion battery cathode nanomaterial, the 4th International Conference on Nanoscience and Nanotechnology, University of the Free State, Bloemfontein, 1 – 4 April, 2012.

40. Charl J Jafta, Kenneth I. Ozoemena, Mkhulu K. Mathe, Mesfin Kebede and Wiets D. Roos. “*The Effect of Microwave Treatment on the Mn³⁺ Concentration of Spinel Cathode Material Studied by XPS, XRD and Electrochemical methods*”, South African Spectroscopy Society - Young Scientist Symposium, Pretoria, CSIR, 12 September 2013.
41. Asante JKO and WD Roos. *Sn, Sb segregation in single and polycrystalline Cu*. The 12th International Conference on Atomically Controlled Surfaces, Interfaces and Nanostructures, Tsukuba, Japan, 4 – 8 November 2013.

2.4.2 South African Institute of Physics.

42. GN van Wyk, DJ de Wet and WD Roos. *Oxidation and diffusion studies in amorphous alloys*. Potchefstroom, 1985.
43. WD Roos and GN van Wyk. *Diffusion of evaporated Cr-layers in Fe-based amorphous alloys*. Potchefstroom 1985.
44. GN van Wyk and WD Roos. *Determining the fall time with a laser beam and microcomputer*, Potchefstroom, 1985.
45. WD Roos and GN van Wyk. *Diffusion studies of Si in Fe-based amorphous alloys*. University of Natal, Durban. 1987.
46. WD Roos and GN van Wyk. *Diffusion of Si in Fe-based amorphous and crystalline alloys*. Rhodes University, Grahamstad, 1988.
47. WD Roos and GN van Wyk. *Influence of Si on the oxidation behaviour of Fe-based amorphous alloys*. University Port Elizabeth, 1990.
48. WD Roos, GN van Wyk and J du Plessis. *Sputtered induced concentration profiles in Ni-Cu alloys*, University of the Free State, Bloemfontein, 1991.
49. GN van Wyk, WD Roos and E Wentzel. *Interdiffusion of Ti-Pt Layers*. University of the Witwatersrand, Johannesburg, 1992.
50. WD Roos, GN van Wyk and R Henson. *A Control unit for a Half-Spherical sector Analyser in ISS*. University of the Witwatersrand, Johannesburg, 1992.
51. WD Roos, GN van Wyk and J du Plessis. *The use of AES to determine Concentration profiles in sputtered Cu-Ni Alloys*. University of the Witwatersrand, Johannesburg, 1992.
52. WD Roos, GN van Wyk and J du Plessis. *A Weight function for linear least squares fit of binary Auger spectra*. University of Stellenbosch, Stellenbosch, 1993.
53. GN van Wyk, WD Roos and J du Plessis. *New surface facilities at the University of the*

Orange Free State. University of Stellenbosch, Stellenbosch, 1993.

54. GLP Berning, HC Swart and WD Roos. *The oxidation of Terbium Silicide*. University of Stellenbosch, Stellenbosch, 1993.
55. PE Viljoen, WD Roos and PH Holloway. *Carbon Auger peak shape measurements in the characterisation of reactions on (001) diamond*. University of Bophuthatswana, Mabatho, 1994.
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57. HC Swart, EC Viljoen, WD Roos and J du Plessis. *A Personal computer programme for upgrading an AES apparatus*. University of Bophuthatswana, Mabatho, 1994.
58. GN van Wyk, WD Roos, JC Mostert, JP Roux, JJ Terblans, J du Plessis and E Taglauer. *NiAl Alloys: The Surface and Beyond*. University of the Western Cape, Bellville, 1995.
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60. JC Mostert, JP Roux, WD Roos and GN van Wyk. *The surface structure and composition of NiAl (100) as determined by LEED and ISS*. University of the Western Cape, Bellville, 1995.
61. PE Viljoen, WD Roos, HC Swart and PH Holloway. *Carbon Auger Peak Shape Measurements in the Characterisation of Reactions on (001) Diamond*. University of the Western Cape, Bellville, 1995.
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69. JKO Asante, JJ Terblans, J Du Plessis and WD Roos, *Linear Programmed Heating applied to ternary alloys - preliminary calculations*. University of Port Elizabeth, 1999.
70. JKO Asante, WD Roos, J du Plessis and JJ Terblans. *Co-segregation in a Cu(111),Sn,Sb ternary single crystal*. Rand Afrikaans University, Johannesburg. 2000.
71. JKO Asante, WD Roos and MF Maritz. *Extracting Auger Yield Contributions from the combined peak to peak heights of Overlapping peaks using only the spectra of the standards*. Rand Afrikaans University, Johannesburg. 2000.
72. R Conradie, HC Swart and WD Roos. *Room Temperature oxidation of segregated Mo and N on an Fe(100)-3.5at%Mo-N specimen*. University of Natal, Durban. 2001.
73. R Conradie, HC Swart and WD Roos. *Determining the thickness of an oxide layer on Fe(100)-Mo-N using Auger electron spectroscopy*. University of Natal, Durban. 2001.
74. JKO Asante, WD Roos and JJ Terblans. *A mathematical fit procedure to determine segregation parameters from experimental data of a linear temperature run*. University of Natal, Durban. 2001.
75. JKO Asante, WD Roos and JJ Terblans. *A Reliable method for finding the equilibrium segregation parameters in a ternary system*. University of Potchefstroom, Potchefstroom 2002.
76. R Conradie, WD Roos, CJ Greyling and HC Swart. *Phosphated electrogalvanised steel: Investigating white spotting*. University of Potchefstroom, Potchefstroom 2002.
77. A J Jonker, C H Claassens, R Chen, L A Venter, P Ramoshebe, E Wurth, JJ Terblans, W D Roos and H C Swart. *AES-study on TiC thin films to determine interdiffusion parameters*. University of Potchefstroom, Potchefstroom 2002.
78. OM Ntwaeaborwa, GN van Wyk, WD Roos, JJ Terblans, AP Greeff and HC Swart. *All Systems go at Kovsies*. University of Potchefstroom, Potchefstroom 2002.
79. JKO Asante, WD Roos and JJ Terblans. *Kinetic segregation parameters from constant temperature runs in a Cu,Sb,Sn (111) crystal*. University of Stellenbosch, Stellenbosch, 2003.
80. GJ. Olivier, JJ Terblans and WD Roos. *The Darken surface segregation simulation of a ternary Copper-Silver-Antimony alloy*. University of Stellenbosch, Stellenbosch, 2003.
81. Diale, M., Auret, F.D., Van Der Berg, N.G., Roos, W.D, *A surface analytical study of GaN cleaning procedures*, 48th Annual Conference of the South African Institute of Physics, Stellenbosch, S.A., 2003.
82. JKO Asante, JJ Terblans and WD Roos, *An AES study of Sn surface segregation in the low index planes of Cu single crystals*. 49th Annual Conference of the South African Institute of Physics, University of the Free State, Bloemfontein, S.A., 2004.
83. E.Wurth, WD Roos, BY Tesfamichael and JJ Terblans. *Extracting an individual Auger peak from a complex Auger spectrum*. 49th Annual Conference of the South African Institute of

Physics, University of the Free State, Bloemfontein, S.A., 2004.

84. GJ Olivier, JJ Terblans and WD Roos. *The effect of concentration on the kinetics of surface segregation in a ternary copper(111)-silver-antimony alloy*. 49th Annual Conference of the South African Institute of Physics, University of the Free State, Bloemfontein, S.A., 2004.
85. GJ Olivier, JJ Terblans and WD Roos. *A more accurate method to estimate the segregation energy in binary systems using surface tension data*. 49th Annual Conference of the South African Institute of Physics, University of the Free State, Bloemfontein, S.A., 2004.
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88. BY Tesfamicael, WD Roos, JJ Terblans, and JY Wang. *Adding preferential sputtering to a model that simulates sputter depth profiles in Auger electron spectroscopy*. 49th Annual Conference of the South African Institute of Physics, University of the Free State, Bloemfontein, S.A., 2004.
89. JKO Asante, JJ Terblans and WD Roos. *Segregation parameters of Sn and Sb in a Cu single crystal*. 50th Annual Conference of the South African Institute of Physics, University of Pretoria, Pretoria, S.A., 2005.
90. GJ Olivier, WD Roos, JJ Terblans. *Segregation in a ternary copper-antimony-silver system*. 50th Annual Conference of the South African Institute of Physics, University of Pretoria, Pretoria, S.A., 2005.
91. E Wurth, AB Hugo, HC Swart, WD Roos, JJ Terblans. *An improved heater system for high-temperature Auger electron spectroscopy*. 50th Annual Conference of the South African Institute of Physics, University of Pretoria, Pretoria, S.A., 2005.
92. S Cronje, WD Roos, RE Kroon. *Spark erosion cutting of materials*. 50th Annual Conference of the South African Institute of Physics, University of Pretoria, Pretoria, S.A., 2005.
93. JKO Asante, JJ Terblans and WD Roos. *Comparing Sn and Sb segregation in Cu(100)-Sn,Sb and Cu(111)-Sn,Sb alloys*. 51st Annual Conference of the South African Institute of Physics, University of the Western Cape, Bellville, S.A. 2006.
94. JKO Asante and WD Roos. *Comparing segregation profiles of Sn and Sb in single and polycrystalline Cu*. 52nd Annual Conference of the South African Institute of Physics, University of the Witwatersrand, Johannesburg, S.A., 2007.
95. S Cronje, R.E. Kroon, WD Roos and J.H. Neethling *Oxide growth on copper TEM samples*. 52nd Annual Conference of the South African Institute of Physics, University of the Witwatersrand, Johannesburg, S.A., 2007.

96. CJ Jafta, WD Roos and JJ Terblans. *An argon filled user-friendly annealing system*. 53rd Annual Conference of the South African Institute of Physics, University of Limpopo, Mankweng, S.A., 2008.
97. GF Ndlovu, KT Hillie and WD Roos. *Scanning Tunneling Microscopy (STM) studies of spin-splitting monolayer alloys*. 53rd Annual Conference of the South African Institute of Physics, University of Limpopo, Mankweng, S.A., 2008.(cancelled)
98. S Cronje, R.E. Kroon and WD Roos. *The effect of surface evaporation on contemporary segregation models*. 54th Annual Conference of the South African Institute of Physics, University of KwaZulu-Natal, Durban, S.A., 2009.
99. G.F. Ndlovu, W.D. Roos and K.T. Hillie. *Calibration of the variable temperature scanning tunnelling microscopy for high atomic resolution imaging*. 54th Annual Conference of the South African Institute of Physics, University of KwaZulu-Natal, Durban, S.A., 2009.
100. G.F. Ndlovu, T. Malwela, W.D. Roos and K. T. Hillie. *Atomic resolved Ag nano clusters on HOPG: a VT-STM study*. 55th Annual Conference of the South African Institute of Physics, CSIR, Pretoria, S.A., 2010.
101. C J Jafta, W D Roos, S Cronjé and JKO Asante. *Influence of Sb doping on grain growth of polycrystalline Cu*. 55th Annual Conference of the South African Institute of Physics, CSIR, Pretoria, S.A., 2010
102. G.F. Ndlovu, JKO Asante, WD Roos and KT Hillie. *The decoration of vicinal copper polycrystalline surfaces by Antimony*. 56th Annual Conference of the South African Institute of Physics, UNISA, Pretoria, S.A., 2011.
103. G.F. Ndlovu, JKO Asante, WD Roos and KT Hillie. *Investigation of broken symmetry of Sb/Cu(111) surface alloys by VT-STM*. 56th Annual Conference of the South African Institute of Physics, UNISA, Pretoria, S.A., 2011.
104. C.J. Jafta, WD Roos, JJ Terblans, JKO Asante and KI Ozoemena. *The Surface Orientation Dependence of the Pre-Exponential Factors Extracted from the Segregation Profiles of a Cu(111/110) Bi-crystal*. 56th Annual Conference of the South African Institute of Physics, UNISA, Pretoria, S.A., 2011.
105. S Cronje, WD Roos, R E Kroon, and JKO Asante. *Measuring the effect of surface evaporation on the segregation process*. 56th Annual Conference of the South African Institute of Physics, UNISA, Pretoria, S.A., 2011.
106. G.F. Ndlovu, JKO Asante, B Mwakikunga, WD Roos and KT Hillie. *Surface structure modification of Cu(111) by Sb dopants for temperature sensing application*. 57th Annual Conference of the South African Institute of Physics, University of Pretoria, Pretoria, S.A., 9-13 July 2012.
107. JKO Asante and WD Roos. *Sn, Sb segregation in single and polycrystalline Cu*. 58th Annual Conference of the South African Institute of Physics, University of Zululand, 8 – 12 July 2013

2.4.3 Research - overseas laboratories.

1. Max Planck Institute for Plasma Physics, Garching, Germany, November and December 1994.
2. Dept of Material Science and Engineering University of Florida, Gainesville, Florida, January 1999 – December 1999.

2.4.4 Short courses and workshops

1. Workshop on applications of analytical electron microscopy: 13 - 15 October 1993, CSIR, Pretoria.
2. Course in Surface Analysis on the techniques XPS, SAM and SIMS. Department of Materials Science and Engineering, University of Surrey, Guildford, England. March 1996.
3. Seminar - Physical Electronics TRIFT II - Time Of Flight SIMS, Johannesburg. January 1997.
4. Course in Material Science - University of Cape Town, Material Science and Engineering, June 2000.
5. Fourth Korea-South Africa Joint Workshop on Nanotechnology. Korea and South Africa (CSIR/UFS). Korea Institute of Science and Technology, Seongbuk-Gu, Seoul, Korea, October 2009.

2.4.5 Invited Lectures

1. Asante, JKO and WD Roos - *Comparing segregation profiles of Sn and Sb in single and polycrystalline Cu*. Physics department, University of Pretoria, May 2008.
2. Roos WD - *Basic Principles of XPS* Workshop on the new surface facilities at the University of the Free State, Physics Department, University of the Free State, August 2009

2.4.6 Internal Publications/Study guides

- AES and XPS, WD Roos, HC Swart and GN van Wyk. Department of Physics, UFS, 1996
- Study guide: FSK 122 – Quantity Surveying, Department of Physics, UFS, – Distance learning – 2002
- Study Guide: FSK 324 – Solid State Physics, Department of Physics, UFS, 2000 –
- Practical - Study Guide: FSK 114/FSK 134, Department of Physics UFS
- Practical – Study Guide: FSK 124/FSK 144, Department of Physics, UFS.
- Practical – Study Guide: FSK 362, Department of Physics, UFS. 2009 -
- Study Guide: FSK 603 – Experimental Techniques, Department of Physics, UFS 2003 –
- Study Guide FSK700, MSc in Nano Sciences Module 5 - An Introduction to X-ray Photoelectron Spectroscopy, Department of Physics, 2012.

2.4.7 Referee to the following Journals/Proceedings/Ratings:

1. X-ray Spectrometry Journal. John Wiley and Sons.
2. Chemical Reviews. American Chemical Society. ACS Publications.
3. South Africa Institute for Mining and Metallurgy Journal.
4. Surface and Interface Analysis. Published by John Wiley & Sons Limited.
5. South African Institute of Physics.
6. National Research Foundation South Africa.
7. CSIR (various divisions) evaluation, refereeing, progress reports, - personnel and projects

2.4.8 Other outputs

- Chairman to Session 8, at the SAAST symposium - University of the Free State 30 October 2009.
- Designed a vacuum chamber to accommodate a spherical electrostatic energy analyser for low energy Ion scattering spectroscopy. The analyser is mounted on a circular plate that allows the scattering angle to be varied. The project also involved the assembling and positioning of the analyser, multiplier and collector as well as designing a control unit for the analyser. 1995.
- Part of a team of three faculty members that were responsible for dismantling, packing, shipping and assembling two surface technique spectrometers successfully: a Phy AES 600 and a Phy XPS 5400 from a location at the Max Planck Institute in Stuttgart to the Physics department in Bloemfontein South Africa. 2001.
- Co-chair of the organizing committee for the 49th Annual Conference of the South African Institute of Physics at the University of the Free State, Bloemfontein, S.A., 2004.
- Standing in as chairman in the department on a regular basis since 2002 .
- Acting chairman of the Faculty of Natural and Agricultural Science Building committee – 2010.
- Listed in Marquis Who's Who in the World publication 2012 (28th edition).
- Co-founder of a Finishing School for top EXPO learners in the Free State – 20-21 March 2012.
- Acting as secundus for the Director of the Microscopy Centre at UFS
- Rated as C2 researcher by the National Research Foundation of South Africa 2009.

3. Education

3.1 Lecturing Experience

Is/was responsible for the following courses (teaching in both English and Afrikaans):

FSK 900 PhD (Physics full thesis)

FSK 700 (MSc Physics – full thesis)

FSK 700 (Inter disciplinary/inter university Nano science
FSK 602 (Honours - Solid State)
FSK 603 (Honours - Techniques – Surface analysis)
FSK 604 (Honours - Material science)
FSK 605 (Honours - Solid State)
FSK 691 (Honours - Practical course)
FSK 692 (Honours - Practical course)
FSK 326 (Third year - Solid State)
FSK 362 (Third year - Solid State)
FSK 134 (First year - Botany students)
FSK 112 (First year - Building sciences) distance learning
FSK 114 (First year - Physics students)
FSK 104 (First year - Architect students)

3.2 External examiner

QwaQwa University FSK 702 (Solid State)
Durban College of Education PHY 200
Nelson Mandela Metropolitan University, PHY6004, Solid State Physics

3.3 Moderator

FSK 112
FSK 232
FSK 605
FSK 114
FSK 323
FSK 224

3.4 Post Graduate involvement

3.4.1 Study leader/Co-Study leader (MSc) -

1. *THE DETERMINATION OF TERNARY SEGREGATION PARAMETERS USING A LINEAR HEATING METHOD.* JKO Asante. 1998 – 2000.
2. *OXIDATION OF A SEGREGATED MoN LAYER GROWN ON Fe(100)-3.5at%Mo-N.* - R Conradie.2000 – 2001

3. *SIMULATING ION SPUTTERED DEPTH PROFILES IN AUGER ELECTRON SPECTROSCOPY.* – Biniam Yohannes Tesfamicael , 2002 – 2004.
4. *THE INFLUENCE OF PHOSPHOUR CONTENT IN STAINLESS STEELS ON THE SEGREGATION BEHAVIOUR.* C Vermaak. 2001 – 2003.
5. *THE SEGREGATION BEHAVIOUR OF Sn AND Ag IN A Cu SINGLE CRYSTAL.* G Olivier January 2002 – May 2006.
6. *TEM INVESTIGATION OF RAPIDLY DEFORMED Cu AND Mo SHAPED CHARGE LINER MATERIAL.* Shaun Cronje. 2005 – 2007.
7. *ORIENTATIONS DEPENDENCY OF SUBSTITUTIONAL DIFFUSION IN COPPER.* C J Jafta January 2008 - 2010

3.4.2 Examiner (MSc)

1. *SURFACE ROUGHNESS OF InP AFTER N₂ BOMBARDMENT: ION AREIC DOSE DEPENDENCE* by SOS Osman, Department of Physics, University of Pretoria, FEBRUARY 2004.
2. *TEM INVESTIGATION OF RAPIDLY DEFORMED Cu AND Mo SHAPED CHARGE LINER MATERIAL* by S Cronje. Department of Physics University of the Free State, Bloemfontein South Africa. JUNE 2007.

3.4.3 Promoter/Co-Promoter (PhD) -

1. *'N ISS STUDIE VAN DIE [110],[111] EN [100] ENKELKRISTAL-VLAKKE VAN NiAl.* JC Mostert, 1998 -2000.
2. *SURFACE SEGREGATION OF Sn AND Sb IN THE LOW INDEX PLANES OF COPPER.* JKO Asante. 2002 – 2005.
3. *WHITE SPOTTING ON STEELS FOR THE AUTOINDUSTRY.* - R Conradie.2002 – 2006.
4. *GROWTH OF ANTIMONY ON COPPER: A SCANNING TUNNELING MICROSCOPY STUDY* – GF Ndlovu. 2010 - 2012
5. *ADDING A THIRD FLUX OF ATOMS TO THE SEGREGATION MODEL.* S Cronje, 2008 –

3.4.4 Examiner (PhD)

1. *SURFACE SEGREGATION OF Cu(Ag) ALLOYS* by Jiang Yong Wang, Department of Physics, University of the Free State, Bloemfontein , December 1997.
2. *'N ISS STUDIE VAN DIE [110],[111] EN [100] ENKELKRISTAL-VLAKKE VAN NiAl.*

by JC Mostert, Department of Physics, University of the Free State, Bloemfontein ,
December 2000.

3. *A MONTE CARLO SIMULATION OF THE EFFECT OF A ZnO LAYER ON THE CATHODOLUMINESCENCE GENERATED IN A ZnS PHOSPHOR POWDER.* by A P GREEFF, Department of Physics, University of the Free State, Bloemfontein , JUNE 2001
4. *MODULERING EN EKSPERIMENTELE ONDERSOEK VAN Sb_OPPERVLAK SEGREGASIE IN Cu-ENKELKRISTALLE.* by JJ TERBLANS, Department of Physics, University of the Free State, Bloemfontein , JUNE 2001.
5. *GROWTH OF ANTIMONY ON COPPER: A SCANNING TUNNELING MICROSCOPY STUDY* – GF Ndlovu. February 2012

4. Community and other

4.1 Committees

4.1.1 National

- ❑ Member of the management of the South African Spectroscopy Society (2012)

4.1.2 Faculty Natural- & Agricultural science

- ❑ Library committee
- ❑ Division of Electronics committee
- ❑ Numerous Nomination committees.
- ❑ Division of Instrumentation Committee
- ❑ Centre of Confocal and Electron Microscopy Task team.
- ❑ Microscopy Centre Committee
- ❑ Buildings committee (acting as chairman during 2010)

4.1.3 Department of Physics

- ❑ Research apparatus committee
- ❑ Under graduate practical committee
- ❑ Computer committee
- ❑ Personnel development committee.
- ❑ Financial committee
- ❑ Safety committee

4.1.4 Ad Hoc

- ❑ Committee interviewing and making recommendations on electing a new dean for faculty of Natural and Agricultural sciences 1996.

- ❑ Committee investigating mutual co-operation between the University of the Free State and The Free State Technikon on the issue of implementing an engineering degree. 1997.
- ❑ Faculty Committee on Research Apparatus. Allocating more than R10 M over a period of 3 years to departments in the faculty Natural- & Agricultural Science. 2005.
- ❑ Invited as member of the fourth Korea-South Africa Joint Workshop on Nanotechnology between Korea (KIST) and South Africa (CSIR/UFS) by Dr Jong-Ku Park, Director of Nano-Science Research Division, KIST. October 2009.

4.2 Community services

- ❑ Involved in the yearly activities, promoting the university to school pupils.
- ❑ Taking visitors on a regular basis on a tour of the department.
- ❑ Was involved in teaching at institutions outside the university (Hillside View College, Technical College (Free State Technikon now the Central University of Technology))
- ❑ Giving advice and assistance to scholars concerning scientific projects (EXPO).
- ❑ Participating as judge/convenor at the regional Scientific EXPO since 1997 - .
- ❑ Computerising a cyclic Voltammetry apparatus in the Chemistry department at UFS.2002 renew 2010.
- ❑ Member of a 3 men committee judging best EXPO projects in 5 different categories. 2008, 2009, 2010, 2011, 2012, 2013.
- ❑ Advising students on the National Innovation competition, 2009.
- ❑ Co-founder of a finishing school for top EXPO learners in the Free State – 2012.

4.3 Student awards

1. MSc student (CJ Jafta) won first prize in the Solid State poster presentations at the 8th SAAWK Student symposium, University of Johannesburg, November 2008.
2. MSc student (CJ Jafta) won second prize in the local branch of the National Innovation Competition. 2009.
3. MSc student (S Cronje) won second prize in the Solid State Oral presentations at the 9th SAAWK Student symposium, University of the Free State, November 2009.
4. MSc student (CJ Jafta) won first prize for the most outstanding poster presentation in the field of Condensed Matter Physics and/or Materials Sciences delivered at the annual SAIP Conference by a Masters Student at a South African Institution for tertiary education, 2009.
5. MSc student (S Cronje) won second prize in the Solid State Oral presentations at the 9th SAAWK Student symposium, University of the Free State, November 2009.

6. MSc student (CJ Jafta) won first prize for the most outstanding poster presentation in the field of Condensed Matter Physics and/or Materials Sciences delivered at the annual SAIP Conference by a Masters Student at a South African Institution for tertiary education 2010.
7. MSc student (CJ Jafta) won first prize in the category Masters Publication Award for the best Publication from a MSc thesis in the field of Condensed Matter Physics and Materials Sciences at the annual SAIP Conference in Pretoria 2011.
8. PhD student (GF Ndlovu) won jointly first prize in the category Doctorate Oral for the best oral presentation in the field of Condensed Matter Physics and Materials Sciences at the annual SAIP Conference in Pretoria 2011.
9. PhD student (S Cronje) won the first prize in the category Doctorate Poster for the best poster presentation in the field of Condensed Matter Physics and Materials Sciences at the annual SAIP Conference in Pretoria 2011.
10. PhD student (S Cronje) won third prize in the Solid State Oral presentations at the 11th SAAWK Student symposium, Unisa, Pretoria, October 2011.
11. PhD student (GF Ndlovu) won the Wirsam Tescan Prize for the Most Exceptional Presentation at the 49th Annual Meeting of the Microscopy Society of Southern Africa. CSIR, Pretoria 6 - 9 December 2011.
12. PhD student (GF Ndlovu) won the SMM Prize for the Best Paper on an Innovative Microscopy Technique at the 49th Annual Meeting of the Microscopy Society of Southern Africa. CSIR, Pretoria 6 - 9 December 2011.
13. PhD student (GF Ndlovu) won jointly first prize in the category Doctorate Oral for the best oral presentation at the 4th International Conference on Nanoscience and Nanotechnology, University of the Free State, Bloemfontein, 1 – 4 April 2012.

4.4 Institutions

- Member of the South African Institute of Physics.
- Member of the executive of the South African Spectroscopy Society