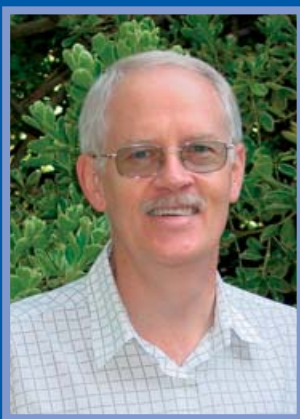




Centres



Prof. Pieter van Wyk

Centre for Confocal and Electron Microscopy

Overview

Research and educational outputs at the Centre for Confocal and Electron Microscopy, as a service to departments in the faculty and to external institutions, are determined by the usage times of all apparatuses and laboratories of the centre.

In 2007 the logged time at the scanning electron microscope (SEM) was 632 hours, at the transmission electron microscope (TEM) 149 hours and at the confocal laser scanning microscope (CLSM) 62 hours. The total microscope usage for 2007 was 844 hours compared to the 751 hours of 2006.

The average logged time per year calculated over the past four years for all of the microscopes is 430 hours for the SEM, 83 hours for the TEM and 80 hours for the CLSM. There has been an increase in the usage of the microscopes compared to the averages as calculated per year of research at the centre. Variation in the usage times is representative of the utilisation as students and researchers completed projects and new projects commenced.

The abovementioned usage only represents time spent while operating the microscopes. Time involved in experimental planning and preparative procedures is not included in the calculated assessment. Material preparation is an important element of microscopic research and occupies the majority of the time involved in utilising the facilities at the centre. The total usage of the centre, which includes material preparation and all other apparatuses amounts to 178 days of the potential 240 average university working days per year.

Research highlights of 2007 were the training of overseas students who continued their projects in South Africa. The Shimadzu scanning electron microscope with the EDX was specifically used in this case: three students from Germany, Ms Antje Wildau from the Martin Luther University in Halle (Saale), Mr Sebastian Fuchs from the University of Leipzig, and Ms Ulrike Rantzsch of the University of Leipzig all with Dr Christoph Gauert of the Department of Geology at the UFS made use of the facilities, each for the completion of an M.Sc. degree.

Other students who used the centre were an exchange student from India, Ms A. Parmeswaran Meera, with Prof. Riaan Luyt, Department of Chemistry at the UFS (Qwaqwa Campus) and Mr Joseph Katangole, a student from Uganda at the Department of Microbial, Biochemical and Food Biotechnology

with Prof. Bennie Viljoen. Part of his project included an ultrastructural study on the formation of biofilms on ethnic clay pots used for a sorghum beer product.

Research was also done for Dr Huang Zongjie of the School of Mechanical Engineering and Applied Mathematics, Central University for Technology (CUT) with the Jeol scanning electron microscope on nano structure, testing for strong but lightweight microcomputer components.

Another highlight for the centre was the upgrading of the Jeol scanning electron microscope, leading to this older model SEM now producing quality images similar to those of the newer Shimadzu SEM. A new high resolution digital image capture card with computer was installed and the existing computer programs were updated. Unfortunately the direct control of the Jeol SEM by computer could not be restored.

An additional highlight was that Ms Beanélrí Janecke represented the centre at the South African Wildlife Management Association's annual symposium by delivering a seminar with the title: *Application of scanning electron microscope technology in the identification of mammal species from hair remains in leopard scats*. This project in collaboration with the Department of Animal, Wildlife and Grassland Sciences, aroused a great deal of interest at the symposium.

Prof. Pieter van Wyk, Director of the centre, attended the 26th International Specialised Symposium on Yeasts (ISSY 26) in Sorrento, Italy, with Prof. Lodewyk Kock from the Department of Microbial, Biochemical and Food Biotechnology, where a poster was presented about research mainly done with the confocal microscope entitled: *Oxylipin production, inhibition and function in fermentative and other yeasts: a review*.

The standard courses of the centre were presented on material preparation and handling of the apparatus to honours students of departments Zoology and Entomology (DRK/ENT614); Genetics (GEN686); Medical Microbiology and Virology (MKM601); Microbial Biochemical and Food Biotechnology (MKB/BOC614) and Plant Sciences (PWS614). The duration of these courses is three days and they are presented to each group individually. Students of the Department of Physics attended an additional EDX lecture at the centre.

The second-year students of the Department of Zoology and Entomology attended an introductory course in microscopy. A beginners and/or refresher course was presented from 30 July-2 August 2007 in the practical handling of electron microscopes for students and researchers. Individual training was carried out for researchers wishing to prepare samples and to work with the microscopes independently.

The centre was also involved in three school projects. Hannelene Badenhorst, a Grade 11 learner from Northern Cape High School, Kimberley did a project on the application of gold in scanning elec-

tron microscopy. Willem and Niel van Schalkwyk, Grades 5 and 7, respectively, both from Grey College Primary School, did projects on scale patterns of hairs from pets and humans as observed with the SEM.

The centre had a learner from the C&N Oranje Meisieskool, Chantel Carroll, for two days as part of the school's guidance service concerning future career choices. Grade 10 learners had the opportunity to visit one or more institutions for a week, to consider various occupations as an aid in future decision-making on their careers.



Staff

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Ms Beanélri Janecke from the centre, and students from the Department of Hematology in the Faculty of Health Sciences during a course on the functioning of the transmission electron microscope.

Research outputs

Research articles

Guduri, B.R. & Luyt, A.S. 2007. Comparison of the influence of different compatibilizers on the structure and properties of ethylenevinyl acetate copolymer/modified clay nanocomposites. *Journal of Applied Polymer Science* 105: 3612-3617.

Kock, J.L.F., Sebolai, O.M., Pohl, C.H., Van Wyk, P.W.J. & Lodolo, E.J. 2007. Oxylin studies expose aspirin as antifungal. *FEMS Yeast Research* 7: 1207-1217.

Krupa, I., Miková, G. & Luyt, A.S. 2007. Phase change materials based on low-density polyethylene/paraffin wax blends. *European Polymer Journal* 43: 4695-4705.

Krupa, I., Mikova, G. & Luyt, A.S. 2007. Polypropylene as a potential matrix for the creation of shape stabilized phase change materials. *European Polymer Journal* 43: 895-907.

Leeuw, N.J., Swart, C.W., Ncango, D.M., Pohl, C.H., Sebolai, O.M., Strauss, C.J.,

Botes, P.J., Van Wyk, P.W.J., Nigam, S. & Kock, J.L.F. 2007. Acetylsalicylic acid as antifungal in *Eremothecium* and other yeasts. *Antonie van Leeuwenhoek* 91: 393-405.

Radhakrishnan, T., Georges, M.K., Nair, P.S., Luyt, A.S. & Djokovic, V. 2007. Study of sago starch-CdS nanocomposite films: fabrication, structure, optical and thermal properties. *Journal of Nanoscience and Nanotechnology* 7: 986-993.

Reed, C., Basson, L., Van As, L.L. & Dyková, I. 2007. Four new myxozoans (Myxosporea: Bivalvulida) from intertidal fishes along the south coast of Africa. *Folia Parasitologica* 54: 283-292.

Sebolai, O.M., Pohl, C.H., Botes, P.J., Strauss, C.J., Van Wyk, P.W.J., Botha, A. & Kock, J.L.F. 2007. 3-Hydroxy fatty acids found in capsules of *Cryptococcus neoformans*. *Canadian Journal of Microbiology* 53: 809-812.

Strauss, C.J., Van Wyk, P.W.J., Lodolo, E.J., Botes, P.J., Pohl, C.H., Nigam, S. & Kock, J.L.F. 2007. Mitochondrial associated yeast flocculation – the effect of acetylsalicylic acid. *Journal of the Institute of Brewing* 113: 42-47.

Van As, L.L. & Van As, J.G. 2007. *Lamproglana hepseti* n. sp. (Copepoda, Lernaeidae) gill parasite of the African Pike, *Hepsetus odoe* (Bloch, 1794) from the Okavango River and Delta, Botswana. *Systematic Parasitology* 67: 19-24.

Van Heerden, A., Van Wyk, P.W.J., Botes, P.J., Pohl, C.H., Strauss, C.J., Nigam, S. & Kock, J.L.F. 2007. The release of elongated, sheathed ascospores from bottle-shaped asci in *Dipodascus geniculatus*. *FEMS Yeast Research* 7: 173-179.

Venter, H.J.T. & Verhoeven, R.L. 2007. A re-appraisal of *Cryptolepis sinensis* subsp. *africana* (Apocynaceae: Periplocoideae) and a



Prof. Pieter van Wyk, Director of the centre, and students from the Department of Genetics during a course on the functioning of the confocal laser scanning microscope.

description of the pollen apparatus. *South African Journal of Botany* 73(1): 40-42.

Venter, H.J.T., Winter, P.J.D., Verhoeven, R.L. & Archer, R.H. 2007. *Raphionacme villicorona* (Apocynaceae: Periplocoideae), a new species from the Sekhukhuneland Centre of plant endemism, South Africa. *South African Journal of Botany* 73(1): 97-101.

Conference contributions

Basson, L. & Van As, J.G. 2007. An enigmatic relationship between fish trichodinids (Ciliophora: Peritrichia) and other hosts. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 123.

Christie, J., Basson, L. & Van As, L.L. 2007. *Mantoscaphidia* (Ciliophora: Peritrichia) of gastropods in a marine environment. Paper presented at the 36th Annual Conference of the Parasitological Society of southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Ells, R., Kock, J.L.F., Botes, P.J., Van Wyk, P.W.J. & Pohl, C.H. 2007. Effect of arachidonic acid on *Candida dubliniensis*. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Goldblatt, M.E., Van Wyk, P.W.J., Pohl, C.H. & Kock, J.L.F. 2007. Ascospore release and oxylipin production in the yeast *Dipodascopsis*. Poster presented at the Asian

Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Groenewald, H., Basson, L. & Van As, J.G. 2007. Trichodinid ectoparasites of Anuran larvae. Paper presented at the 36th Annual Conference of the Parasitological Society of southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Kock, J.L.F., Sebolai, O.M., Pohl, C.H., Van Wyk, A., Van Wyk, P.W.J. & Lodolo, E.J. 2007. Oxylipin production, inhibition and function in fermentative and other yeasts. Poster presented at the 26th International Specialised Symposium on Yeasts (ISSY26), Sorrento, Italy. 3-7 June.

Kock, J.L.F., Sebolai, O.M., Pohl, C.H., Van Wyk, P.W.J. & Lodolo, E.J. 2007. Oxylipins in yeast - a review. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Leeuw, N.J., Swart, C.W., Ncango, D.M., Pohl, C.H., Sebolai, O.M., Strauss, C.J., Botes, P.J., Van Wyk, P.W.J. & Kock, J.L.F. 2007. Acetylsalicylic acid as antifungal in *Eremothecium* and other yeasts. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Ncango, D.M., Kock, J.L.F., Swart, C.W., Pohl, C.H., Strauss, C.J., Van Wyk, P.W.J. & Botes, P.J. 2007. Oxylipin and mitochondrion probes to track asci of Ascoidea. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Reed, C.C., Basson, L. & Van As, L.L. 2007. Coelozoic myxozoans from the south coast of Africa. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 168.

Sebolai, O.M., Pohl, C.H., Botes, P.J., Strauss, C.J., Van Wyk, P.W.J. & Kock, J.L.F. 2007. Oxylipin release in *Cryptococcus neoformans*. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Swart, C.W., Pohl, C.H., Van Wyk, P.W.J. & Kock, J.L.F. 2007. Oxylipin accumulation in fermentative and non-fermentative yeasts. Poster presented at the Asian Mycology Congress and 10th International Marine and Fresh Water Mycology Symposium, Penang, Malaysia. 2-6 December.

Terry, S., Jordaan, A.J. & Horak, I.G. 2007. The geographic distribution and a taxonomic description of ticks in the Free State Province. Poster presented at the 36th Annual Conference of the Parasitological Society of southern Africa, Pestana Kruger Lodge, Malelane, South Africa. 18-20 September.

Van As, L.L. & Van As, J.G. 2007. Crustacean ectoparasites of fishes from the Okavango River and Delta, Botswana. Proceedings of the 7th International Symposium on Fish Parasites (ISFP VII): Fish Parasitology in the 21st Century: From Biodiversity and Ecosystem to Global Warming, Viterbo, Italy. 24-28 September. Volume 49: 194.