



MSSA

NEWSLETTER / NUUSBRIEF

NUUSBRIEF VAN DIE MIKROSKOPIEVEREENIGING

VAN SUIDELIKE AFRIKA

NEWSLETTER OF THE MICROSCOPY SOCIETY

OF SOUTHERN AFRICA

Volume 24, number 1, January 2008

EDITORIAL

Those members of the Society who missed the December μ MSSA meeting missed a treat. For long-standing members it was like going back to the MSSA meetings of the 70's and 80's. To extract some keywords from the event I offer the following;

The dirty brigade, half-pregnant, belly dancing, neck massage - non-attenders can ask those who were there what **that** was all about !

I believe that the format - having a small panel of the speakers to debate papers after each set of papers, worked very well. Hats off to our hosts at Mintek and Luc and Mike for putting lots of effort into making it work. For more information see Luc's unbiased report on page 2.

I have no doubt that we all took something away from the meeting (and judging from some of the glazed eyes, that might be the belly dancer's wobbles) For me it was the fact that many microscopists working in industry appear to have little knowledge of variable vacuum SEM systems and the advantages which such systems carry

The current spate of **load-shedding power cuts** is having a significant impact on our operation here in KZN. With power cuts three times a week and a fiddly old instrument with an IGP which needs multiple bake outs after each power outage we are all gaining (more) grey hairs ! It feels as though the instrument is no sooner up and running and the power crashes again. We already have a UPS but that unit, though substantial (and damn expensive!) cannot take over for the full two hour period. At the time of writing we are considering two options - wiring ourselves up to an old standby generator or buying our own, independent, genset with autostart facilities running through the UPS for continuous power. I would be interested to hear what solutions have been found in other labs.

Finally, thanks to Hamamatsu for sponsoring this issue of the newsletter.

HAMAMATSU

Luc reports on the microMSSA meeting in December, 2007:

A good new year to all.

Just a quick note on how the μ MSSA meeting turned out last year December. If you remember that at the PE MSSA meeting 2006, some members were worried about missing out on the December get-together given that the next MSSA conference is to be held in 2008 July in Botswana.

Mike Lee attended a "meeting" in Europe in 2007 and said that we too should try this format of presenting local information on techniques and instrumentation. With all this in mind, we approached Mintek for a venue and got the ball rolling on holding a small December MSSA meeting.

Over the 2 days we managed to squeeze in 11 presentations, 4 one hour discussion panels on the topics presented and a targeted amount of booze at the dinner on the Thursday night was consumed with no embarrassments to note.

With the meeting having a specific targeted audience, the meeting landed up being very successful only because of the people that did attend. The format of the meeting was to encourage discussion and so when you get people who are willing to ask questions, pose arguments and suggest actions, you land up with a really interactive meeting where everyone lands up learning something.

At the cost per delegate, we were able to cover the costs of the meeting and did not have to beg one of

the suppliers for any money! I can say they were all very happy about that one this year. But their participation was really appreciated in the discussion panels. Very open discussions and information on how we will manage to keep South Africa on the way to development of applications.

It was great to see so many people from Mintek, Element 6, Anglo, Sasol and other major industrial users of microscopy at the meeting. I hope that with the further implementation of this format at MSSA, I think we may be able to keep them coming. They are just so much more professional ... at the drinking and social parts....

At the end of the meeting, I think it was well realised that South Africa needs to improve its training opportunities and to look at ways to create a career in microscopy, of all sorts, to ensure we attract new young blood into the industry. Something we need to act on now and not just talk about!

Thanks again to all who contributed.

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*This issue of the MSSA Newsletter was compiled by Tony Bruton at the Centre for Electron Microscopy at the University of KwaZulu-Natal in Pietermaritzburg. Opinions expressed in this newsletter are gained from a variety of sources and do not necessarily reflect the views of the Editor, the University, the Sponsors or MSSA. The editor may be contacted at (033) 260 5155 or by email on [bruton@ukzn.ac.za](mailto:bruton@ukzn.ac.za). Written contributions and comment on this newsletter are welcome.*

# HAMAMATSU

In her welcome to the December meeting Amanda Quadling of Mintek quoted an interesting and amusing quote gained from the 'Einstein's Emporium' site [www.einsteinemporium.com](http://www.einsteinemporium.com) which is well worth a visit. The quote reciting the early history of the microscope went like this:

**"...Although many were very suspicious of the 'artificial image' produced by the telescope, it was observable that it did enlarge distant objects. It was immediately useful. This was not the case with the microscope. Although a greatly enlarged image of everyday things was fascinating, no one could see any practical purpose for the microscope.."**

Here is the full text:

## A Short History of the Microscope

Historians disagree as to who invented the microscope. Spectacles were known in Florence, Italy in the late 1200's. In the late 1500's, Dutch spectacle-makers began experiment with lens. In 1608, Hans Lippershey, applied for a patent on his magnifying tube which enlarged distant objects. He reported also used variations of it to enlarge subjects near at hand. A few months later, Italian instrument maker Galileo made his own magnifying tube, and reported, "I have seen flies which look as big as lambs, and have learned that they are covered over with hair and have very pointed nails by means of which they keep them selves up and walk on glass, although hanging feet upwards, by inserting the point of their nails in the pores of the glass." He discovered, to his dismay, that while a telescope focused on the stars need to be only two feet long, to magnify small objects nearby required a tube two or three times that length.

As early as 1625 a member of the Academy of the Lynxes, the physician-naturalist John Faber had a name for the new device. "the optical tube... it has please me to call, after the model of the telescope, a "microscope," because it permits a view of minute things."

Although many were very suspicious of the "artificial image" produced by the telescope, it was observable that it did enlarge distant objects. It was immediately useful. This was not the case the microscope. Although a greatly enlarged image of everyday things was fascinating, no one could see any practical purpose for the microscope.

### Robert Hooke



In 1665, Robert Hooke published *Micrographia*, an enticing miscellany expounding his theory of light and color, and his theories of combustion and respiration. It included a description of the microscope and its uses. But the widespread suspicion of optical illusion would plague him. At first the "new world" he claimed to see through his lenses were the butt of ridicule, but what Galileo did for the telescope Hook did for the microscope. Fifty-seven amazing illustrations drawn by Hooke himself revealed for the first time the eye of fly, the shape of bee's sting organ, the anatomy of a flea and louse and much more. When his discovered the honeycomb structure of cork, he said it was made of "cells," thus coining the word.



Three pictures from *Micrographia*: stinging hairs on a nettle, a flea, and corks "cells." At Left: his microscope. Light provided by candle and directed by a lens on to the subject.

### Antonie van Leeuwenhoek

As the years passed, an international community of science began to grow. In 1668, the *Philosophical Transactions* of the Royal Society of London published an extract from an Italian learned journal telling how an Italian lens-maker, Eustachio Divini, using a microscope, had discovered "an animal lesser than any of seen hitherto." Five years later, Henry Oldenburg, who was in London publishing the *Philosophical*

*Transactions* received a letter from the Dutch anatomist Regnier de Graaf describing the work of a Dutchman, Antonie van Leeuwenhoek, who "has devised microscopes which far surpass those which we have hitherto seen. Antonie sold wool, cotton and other textiles and also worked as the inspector of weights and measures. He often used low-power magnifying glasses to inspect the quality of cloth, and this awakened an interest in other things. He began grinding his own lens.



Unlike Hooke and others, who used a compound microscope that combined two or lenses, Leeuwenhoek used a simple microscope, such as that shown at right. The specimen was mounted on the top of the pointer. Just above it is a tiny lens. The specimen was viewed by holding the microscope and looking at the specimen through the other side. Leeuwenhoek eventually ground some five hundred fifty lens of which the best had a linear magnifying power of 500 and a resolving power of one-millionth of a meter. Over a period of years, he reported his findings to the Royal Society through letters - one hundred and ninety of them. In 1674, he filled a glass vial cold water from a nearby lake, and found "many small animalcules. He then turned his microscope on a drop of pepper water



*"I now saw very plainly that these were little eels, or worms, lying all huddled up together and wriggling just as if you saw, with the naked eye, a whole tubful of very little eels and water, with the eels squirming among one another; and the whole water seemed to be alive with these multifarious animalcules. This was for me, among all the marvels that I have discovered in nature, the most marvelous of all; and I must say, for my part, that no more pleasant sight has every yet come before my eyes that these many thousand of living creatures seen all alive in a little drop of water, moving among one another, each several creature having its own proper motion."*

In his famous Letter 18 to the Royal Society (October 9, 1678), he concluded that "these little animals were, to my eye, more than ten thousand times smaller than the animalcule which Swammerdam has portrayed, and called by the name of Water-flea, or Water-louse, which you can see alive and moving in water with the bare eyes. Having discovered the world of bacteria, Leeuwenhoek declared that each had its full complement of bodily organs needed for life. He opened the doors to microbiology, embryology, histology, entomology, botany and crystallography.

# HAMAMATSU

Lethu Nxumalo was the winner of the coveted 'Most Promising Black Microscopist 2006' prize generously sponsored by ALS and JEOL, UK. This is an account of the exciting trip which resulted.

## **Microscopy-The trip to Glasgow!**

Passion for Microscopy in Africa, America, Asia and Europe; all over the world is the same except others are at a more advanced stage of what kind of microscopy they can do than the others. I had a chance to share my work at an international audience of microscopists, the Electron Microscopy and Analysis Group conference (EMAG) in Glasgow, Scotland in September 2007.

The adventure started with a two day advanced school on EFTEM and EELS, the theory and practical sessions. We got to learn the hardware requirements for EFTEM and EELS and how to capture images for analysis and the benefits of these tools in comparison to ordinary TEM i.e instead of a typical dark field image you are also able to colour code exactly the position of the individual elements that make up the image and you can detect lighter elements like carbon that are fairly difficult to accurately detect on conventional EDAX. After the advanced school the conference showcased different applications of EFTEM and EELS in different materials from nanomaterials, functional materials, biomaterials e.t.c. Also the use of an aberration corrected microscope in different applications was covered.

Networking with students, academics and the exhibitors also gave me an opportunity to build relations for potential collaborations in different areas and identifying the emerging technologies including the people who have the facilities either to buy from or to collaborate with. Last but not least, I also got an opportunity to see a different place and experience different people and different cultures yet the scientific interests are similar. Oh, one last thing, the shopping from the spending money was a lovely experience too!

### **In summary, the key benefits from this trip!!**

- \* The chance to experience the quality of presentations from both students and academics and the microscopy research being carried out in first world countries, which is quite high quality and depth and impressive but I must say we also compete extremely well in that regard.
- \* The chance to share knowledge and also learn from students, academics and industrial based researchers from outside of Africa.
- \* I am now aware that the focus of research in different places depends mostly on the availability of facilities, which will further determine how far a research can go, one reason why collaborations are essential because you can never have all the facilities that you require to achieve your research objective.
- \* Building relationships and being aware of which university or industry has what equipment and skills for possible future collaborations and their areas of interest areas of interest.

**Lethu Nxumalo** - Winner of Most Promising Black Microscopist 2006

*All this was made possible through the sponsorship of ALS South Africa and JEOL UK.  
Thank you for the exposure.*

## OBITUARIES

In the last few months the microscopy community has lost some significant and memorable figures. On this page we remember a member of the South African microscopy community, a popular member of the US commercial community and the former Administrator of the Royal Microscopical Society

### Professor Silvana Luyckx

Sadly Silvana passed away on 5 November 2007. Her untimely death left a huge void in both the area of hardmetals and within Wits. She will be greatly missed by her colleagues and friends both locally and overseas.

Silvana grew up in Somalia and completed her first degree in Milan. She started her PhD in 1963 under the supervision of the late Professor Nabarro. Her research concerned the fracture of WC-Co, that is, cemented carbides. Such materials became the focus of her work until her death. In more recent years, she had been investigating the effects of additions of South African primary resources, such as vanadium and ruthenium, to cemented carbides, which subsequently led to the development of new materials. Her contributions to the field of hardmetals, which she fondly referred to as her hobby, were recognized by the international hardmetals industry through her many invited papers and contributions at conferences around the world as well as her presence on advisory boards of international conferences and journals. She fully supported MSSA conferences through her presentations and attendances, and by her encouragement of her students to present.

During her time at Wits, she worked in the Physics Department, the Schonland Centre for Nuclear Sciences and the Department of Metallurgy. At the time of her death some years after her official retirement, she was Visiting Professor in the School of Chemical and Metallurgical Engineering. She supervised and mentored many postgraduate students during her time at Wits and in the Centre of Excellence for Strong Materials. Her mentoring, mothering and successful positioning of students, particularly those disadvantaged, in outside industries is to be praised.

Silvana's husband Nicky said at the requiem mass for her that sometime before her death she suggested out of the blue that they undertake a pilgrim to Italy to as it were re-affirm their faith. This they did. At the end of the trip they prayed at an underground shrine, this being a place where you pray for those departed. Nicky turned to her and said that he wondered who would be next. Sadly some two weeks later he was to know.

Silvana leaves Nicky as well as her son and daughter, Charles and Valerie. Silvana was looking forward to being a grandmother by Valerie for the first time in March this year.

To paraphrase what Professor Lesley Cornish said at the funeral, when Silvana said 'Isn't it so?' you knew that then or sometime later that she was correct. Silvana's insights, advice, unselfish support, scientific leadership and her most valued friendship will be sorely missed, isn't it so?

'Blessed are those who have died in the Lord; let them rest from their labours for their good deeds go with them.'  
Revelation 14:13

Mike Witcomb

**Infocus magazine**, the proceedings of the RMS, reports the unexpected passing of **Chuck Garber**, well-known for the energetic, worldwide marketing of his US-based company, SPI Supplies. Chuck was always a cheerful and not to be ignored part of any international conference or exhibition. What is less well-known is that Chuck was world-renowned for his work on polymer physics, the topic of his PhD from Case Institute of Technology in 1967. He died at the age of 66 after battling a brief illness due to pancreatitis.

The same publication contains a tribute to **Lt-Col Peter Fleming**, the Administrator of the Royal Microscopical Society from 1971 through to an early retirement in 1988. It is obvious that Peter Fleming was a very fondly regarded figure perhaps in spite of the fact that he was directly responsible for a major reorganization of the functions of the RMS. He was clearly warmly regarded by the staff who worked under him, as a humane touch the article also mentions Col Fleming's fondness for dogs and his well-known Sheepdog, Ben, 'which developed some antisocial habits as he aged'.

People have been querying how the Focussed Ion Beam SEM installation at Wits is going due to the delay in starting the process. It is out of the box, see photo, and initial pumpdown and bakeout of the system have been done. Load shedding permitting, it is probably a couple of months away from completion. The Spirit achieved beam and first image today (16 Jan) see photo. The ESEM is the last in the queue and will be attended to after the FIBSEM.

**Mike Witcomb**



Mike Witcomb's new microscopes  
'just out of the box'



Some pics of the social night at the recent  $\mu$ MSSA Conference. The efforts of the Belly Dancer were most professional – the imitations of the MSSA group were .....er.. less so.



## DETECTORS AND IMAGING SYSTEMS FOR ELECTRON MICROSCOPY

Hamamatsu Photonics is a world-leading manufacturer of opto-electronic components and systems. Our range of products cover the entire optical spectrum and provide solutions for a wide variety of applications including industrial and medical fields.

### MICROCHANNEL PLATES, PHOTOMULTIPLIER TUBES AND SOLID STATE DETECTORS

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Microchannel Plates show a high detection efficiency to electrons and ions and are also sensitive to a wide range of other radiation including UV, VUV, soft X-ray photons and neutrons. The MCP offers many advantages over conventional detectors, compact, light weight, good timing properties due to short length, high gain, excellent pulse height distribution. The F2223-21SH is an MCP Assembly and is ideal for EM applications.

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**46th Annual Conference**  
21 – 25 July 2008  
**University of Botswana**



***First ever to be hosted outside SA borders!***

On behalf of the **Microscopy Society of Southern Africa** and the **University of Botswana**, we have the pleasure of inviting you to attend the 46th Annual Conference of MSA.

We are looking forward receiving you!

*MSSA Pre-Conf. Workshops:*

Monday 21st – Tuesday 22nd July 2008

*MSSA Conference:*

Wednesday 23rd – Friday 25th July 2008

This bold decision to host MSA in Botswana, also resulted in the natural choice to choose the mild winter climate (0°C - 27°C ) for the event – enabling delegates to optimise the opportunity by incorporating some “safariing” through one of the finest tourist destinations on the African continent.

Gaborone, the capital of Botswana, is often cited as the world's fastest growing city. Named after Kgosi Gaborone - a leader who arrived with his people in this area at the end of the 18th century. Gabs, as it is affectionately known, lies off Botswana's safari circuit - it's in the more populous and better-watered southwest - and is usually seen as a stopover for self-drives safari's.

On the mainland and among the islands in the **Okavango Delta** lion, hyenas, wild dog, buffalo, hippo and crocodiles congregate with a teeming variety of antelope and other smaller animals - warthog, mongoose, spotted genets, monkeys, bush babies and tree squirrels.

The **Central Kalahari Game Reserve**, second largest protected area in the world, offers untamed expanses.

In the area surrounding the Okavango Delta visitors will also find unforgettable beauty of the more than 400 species of birds.

The best gateway to enter Botswana is via Johannesburg International Airport with regular connections throughout the whole world. Air

Botswana flies regularly between Johannesburg, Harare and Victoria Falls.

**Provisional Scientific Programme**

- Microscopy in nanotechnology
- Applications of Cs Corrected HRTEM in Materials Science
- Microscopy in oxidation, corrosion, wear and failure analysis
- Advances and applications in scanned probe microscopy
- Characterisation and development of platinum group alloys (precious metals)
- Microscopy in geology/mineralogy
- Advances and applications of X-ray spectrometry
- Advances in microscope instrumentation and techniques
- Specimen preparation for Microscopy
- Structural and Molecular Biology
- Morphology and Functions
- Quality control in microscopy and facility management
- Applications of EM in Materials Characterization

**INTERNATIONAL SPEAKERS:**

**Thirtieth John Matthews Memorial Lecturer:**

Prof John Humphreys, School of Materials, University of Manchester.

**Boris Balinsky Lecture:**

Prof Mark Yeager from the Department of Cell Biology Scripps Research Institute, La Jolla, USA

**Invited Speaker:**

Dr. Marek Faryna,  
Institute of Metallurgy and Materials Engineering,  
Kraków, Poland;

**PRECONFERENCE WORKSHOPS:**

Phase diagram course

Optical and thin sectioning sample polishing course.

Principles and practice of light microscopy

TEM Digital imaging (OSIS)

Conference Secretary:

Mr Stephan Coetzee, MSSA 2008  
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