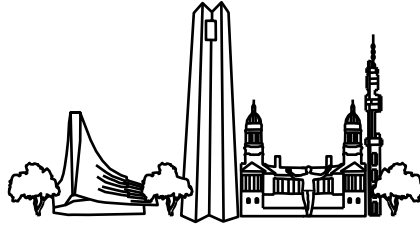


**FIINAL CIRCULAR**



# MSSA2015 29 NOV – 4 DEC

## Conference Convener:

Andre Botha  
Laboratory for Microscopy & Microanalysis  
University of Pretoria  
Tel: + 27 (0) 12 420 2075  
Fax: +27 (0) 12 362 5150  
E-mail: ajbotha@scientia.up.ac.za



## Conference Secretariat:

Carolyn Ackermann Melnick  
Scatterlings Conference & Events  
Tel: +27 (0) 21 421 0345  
Fax: +27(0) 86 620 4535  
E-mail: caro@soafrica.com

*On behalf of the Microscopy Society of Southern Africa and the Conference organizers, we take pleasure in inviting you to attend the*  
**53<sup>rd</sup> Annual Conference of MSSA**  
*hosted by the University of Pretoria*

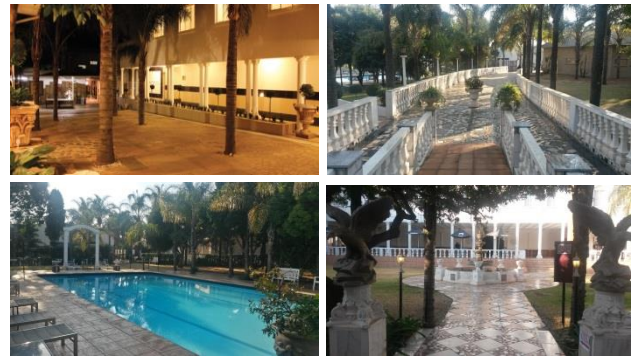
## IMPORTANT DATES

MSSA PRE-CONFERENCE WORKSHOPS	<b>28-29 NOVEMBER</b>
MSSA TECHNICAL FORUM	<b>30 NOVEMBER</b>
MSSA2015 CONFERENCE (Scientific)	<b>1-3 DECEMBER</b>
MSSA POST-CONFERENCE WORKSHOPS	<b>4 DECEMBER</b>

## IMPORTANT DEADLINES

Technical Forum	<b>30 November</b>
Scientific Conference	<b>1-3 December</b>
Pre-Conference Workshops	<b>28,29 November</b>
Conference Workshops	<b>4 December</b>

## SAINT GEORGE CONFERENCE VENUE



Welcome to The Saint George Hotel, your gateway to rest and relaxation in true Mediterranean style. Situated 20min from O.R.Tambo International Airport, the hotel is secluded with its lush green gardens and classical Greek influenced buildings.



## REGISTRATION

Delegates will be able to register for the MSSA Conference at the St George's Hotel, at the following times:

Monday, 30 November 2015 07h00– 17h00  
Tuesday, 1 December 2015 07h00 – 17h00  
Wednesday, 2 December 2015 07h30 – 17h00  
Thursday, 3 December 2015 07h30 – 15h00

Wednesday 2<sup>nd</sup> December



**Traditional Braai**  
*Braai , music, mampoer  
and much more  
The South African way*

Thursday 3<sup>rd</sup> December

## SPONSORED EVENING EVENTS

Monday 30<sup>th</sup> November



**Ice Breaker and Cocktail**  
*The German way*

Tuesday 1<sup>st</sup> December



**Student Evening**  
*Socializing, food and alcoholic beverages..  
The party way as part of the culture of  
MSSA.*



**Formal Greek Gala Dinner**  
*Ancient practice of ritually “killing” plates  
The Greek way*

## NON-SPONSORED EVENING EVENTS

Sunday 29<sup>th</sup> November



**Rovos Rail Steam Trip & Dinner**  
*Sit-down dinner on the Most Luxurious  
Train in the world ( R2000 p/p )  
The Elegant way*

## INTERNATIONAL INVITED SPEAKERS

### 30<sup>th</sup> BORIS BALINSKY lecture

The 30<sup>th</sup> Boris Balinsky Lecture will be delivered by Dr Brian Metscher from the Department of Theoretical Biology, University of Vienna, Austria. <http://theoretical.univie.ac.at/people/metscher/>

His main research interests are in using morphological and process-based approaches to address problems in evolution and development. In his research, Dr Metscher and his colleagues are applying x-ray micro tomographic imaging (micro CT) to a variety of research problems in development and evolution, including comparative embryology, functional morphology, and morphometric studies.

### 37<sup>th</sup> JOHN MATTHEWS Memorial Lecture

The 37<sup>th</sup> JOHN MATTHEWS Memorial Lecture will be delivered by Prof. L. J. Allen, ARC Australian Professorial Fellow Group Leader, Theoretical Condensed Matter Physics, School of Physics, The University of Melbourne, Australia.

Les Allen is an Australian Research Council (ARC) Australian Professorial Research Fellow and he leads the Theoretical Condensed Matter Physics Group at the University of Melbourne. He obtained a PhD degree in theoretical physics from the University of South Africa. His research interests are in the area of atomic resolution electron microscopy and spectroscopy and his research group is a world leader in these areas. He was awarded the John Sanders Medal of the Australian Microscopy and Microanalysis Society in 2006. He has published over 150 papers in scientific journals. Prof. Allen is a member of the editorial board of the journal Ultramicroscopy.

### MSSA2015 Pre- & Post-conference Workshops

#### Workshop 1:

#### TEM IMAGING

Friday 27<sup>th</sup> Nov 2015 & Friday 4<sup>th</sup> Dec 2015.

The digital camera is an essential part of any TEM. It acquires the final data and the performance of the camera is critical to the success and productivity of the TEM. World class data can be obtained from older TEMs which have been upgraded with a modern, high specification camera. Participants will learn about the choices in camera hardware, techniques of digital imaging and image processing.

Workshop presented by *Dr Roland Fleck - Kings College London*, *Dr Andy Yarwood - Jeol UK*

**Time: 8:30**

**Place: EM LAB, NW2 Building, University of Pretoria**

**Cost: No cost**

#### Workshop 2:

#### CRYO TEM & CRYO SEM

Saturday 28<sup>th</sup> Nov 2015      Sunday 29<sup>th</sup> Nov 2015

**Time: Sat 8:30-17:00 Sunday 8:00- 15:00**

**Place: EM LAB, NW2 Building, University of Pretoria**

**Cost: R500/day**

Recent developments in hardware and accompanying software have greatly contributed to the employment of cryo-techniques for the preservation of cells for electron microscopy.

A TEM- and SEM course in cryo-techniques from sample preparation to microscope images, will be held in parallel on Saturday, 28<sup>th</sup> November 2015 at the Laboratory for Microscopy and Microanalysis, University of Pretoria. These courses will be repeated on Sunday, 29<sup>th</sup> November 2015.

Workshop presented by **Dr Roland Fleck** - Kings College London, **Dr Andy Yarwood** - Jeol UK and **Andreas Nowak** - Leica Microsystems, Vienna

**Workshop 3: EBSD & EDS**

**Saturday 28<sup>th</sup> Nov 2015 & Sunday 29<sup>th</sup> Nov 2015**

**Time: Sat 8:30-17:00 Sunday 8:00- 15:00**

**Place: EM LAB, NW2 Building, University of Pretoria**

**Cost: R500/day**

Saturday 28<sup>th</sup> Nov 2015: Theory and practice of EBSD. Pattern generation and the importance of sample preparation. Kikuchi band detection and indexing. Phase identification. Considerations for angular accuracy. Simultaneous EDS and EBSD. EBSD in transmission - Transmission Kikuchi Diffraction (TKD); spatial resolution ~10x improvement. Sunday 29<sup>th</sup> Nov 2015: Theory and practice of EDS. Theory of characteristic x-Ray production. Interaction volume and spatial resolution. Considerations for acquisition conditions. The pulse processor; process time and 'dead time'. Peak Identification, overlap deconvolution. Quantitative analysis. Fast and efficient mapping.

Workshop presented by **Keith Dicks** - Oxford Instruments [www.oxford-instruments.com](http://www.oxford-instruments.com)

**Workshop 4: WORKSHOP IN CRYSTALLOGRAPHY**

**Saturday 28<sup>th</sup> Nov 2015 & Sunday 29<sup>th</sup> Nov 2015**

**Time: Sat 8:30-17:00 Sunday 8:00- 15:00**

**Place: EM LAB, NW2 Building, University of Pretoria**

**Cost: R500/day**

The aim of Workshop in crystallography is to bring basic crystallographic knowledge to experts and young researchers working in a field of geosciences and material science. Through the historical development of crystallography and investigating minerals and crystallized materials different methods for investigation crystals, will be presented. Student and fellow participation are strongly encouraged.

Historical view – what is a crystal – definition of mineral and crystal, regularities, optical indices, angles between the crystal faces, crystal zones, macroscopic symmetry, – center, axes, mirrors – 3 hours

Symmetry – crystallographic axes, possible combinations of symmetrical operators, crystal classes, physical properties, projections: stereographic and gnomonic, different optical instruments and possibility for symmetry identification – optical indicatrix: microscope, spindle stage, goniometers - 6 hours

Crystallometry, goniometers, real crystals, choosing the crystals for measurement, crystal size, axial ratio, Miller's indices, indexing of crystal faces, idealized crystals, crystal habit, crystal drawing, mistakes, computer programs for drawing, modern automatic goniometers – 5 hours

Workshop presented by **Prof Vladimer Bermanec** - University of Zagreb, Croatia

**Workshop 5: TUTORIAL on Electron Diffraction Applications in TEM**

**Friday 4<sup>th</sup> Dec 2015**

**Time: 8:30**

**Place: St George's Hotel**

**Cost: No cost**

This workshop/tutorial will be focused on the applications of precession electron diffraction in TEM / from crystal structure determination to orientation imaging and strain mapping at nm scale. TEM orientation imaging, NBD strain mapping and solving ab-initio crystal structures using electron diffraction intensities. There will be also software demonstration for orientation imaging (ASTAR).

Workshop presented by **Dr Thanos Galanis** - NanoMEGAS [info@nanomegas.com](mailto:info@nanomegas.com)

**Workshop 6: Insight in 3D Non-destructive X-ray Microscopy**

**Friday 4<sup>th</sup> Dec 2015**

**Time: 8:30**

**Place: St George's Hotel**

**Cost: No cost**

3D X-ray microscopy has emerged as a powerful imaging technique that can obtain information from a variety of materials under a wide range of conditions and environments. Observing the evolution of microstructure in 3D on the identical region of a single sample can rapidly benefit microstructure modeling techniques. This is largely a unique capacity of X-ray tomography and several examples of in situ and '4D' experiments will be presented, including crack propagation in ceramics, porosity and permeability characterization of porous functional materials, deformation of polymer foams under load and the evolution of defects in lithium ion battery materials and fuel cells, and others.

Workshop presented by **Pete Lander** - X-Ray Microscopy, Carl Zeiss Pty Ltd [pete.lander@zeiss.com](mailto:pete.lander@zeiss.com)

**Workshop 7: "The Geoscientists' Micro-analytical Toolbox" **CANCELLED****

**Friday 4<sup>th</sup> Dec 2015**

**Workshop 8: New Silicon Drift Detector technology speeds up EDS, EBSD and WDS spectroscopy: seeing data you could never see before**

**Friday 4th Dec 2015**

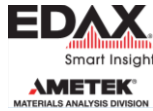
**Time: 8:30**

**Place: St George's Hotel**

**Cost: No cost**

Recent advances in SDD technology enable remarkable improvements in EDS data collection, both in signal throughput and low energy sensitivity. This is made possible by the incorporation of CUBE Technology EDS modules with a new extremely robust Silicon Nitride ( $\text{Si}_3\text{N}_4$ ) window. This new hardware extends the analytical capability of the EDAX TEAM system, a platform where all three technologies EDS, EBSD and WDS are integrated. In this workshop the CUBE SDD technology will be discussed together with innovative mapping algorithms that allow quick determination of phase distributions and gives the user the possibility to search through a custom built spectrum library to find similar spectra and identify the unknown. The same algorithms are used in EBSD mapping to strongly increase the indexing success on poor quality patterns using the patented NPAR scan reprocessing function. The new features will be highlighted using a live connection with our demo facility in Germany.

Workshop presented by **Dr. Rene de Kloe & Andreas Makat** – EDAX BU of Ametek; [info.edax@ametek.com](mailto:info.edax@ametek.com)



## MSSA2015 TECHNICAL FORUM

The Technical Forum has been allocated a full day stand alone session which will take place on Monday 30 November. This will allow interested delegates to fully participate ( without clashes ) in the scientific sessions.

Themed sessions will include commercial / trade app-lications, and delegates are invited to present a 20 min talk on commercial sales promotions ( new equipment ) or technical presentations.

## MSSA2015 SCIENTIFIC PROGRAMME

The scientific programme will take place from 1-3 December 2015.

There will be separate parallel oral sessions for Materials Sciences and Life Sciences. Oral presentations will be 15 minutes plus 5 minutes for discussion. Poster sessions form an integral part of the conference. Presenters are requested to be at their posters during the formal sessions for a 5 min presentation (3 min plus 2 min discussion). Poster size should be 1,2m high by 1m wide (smaller than A0 size) Posters will be displayed prominently for the duration of the meeting.

## GAUTENG TOURISM

### THE CRADLE OF HUMANKIND.....54km

An unforgettable journey of exploration of the origin of humankind. The cradle of Humankind achieved World Heritage status in 1999. The Taung and Makapan valley were added in 2005. It is the worlds richest source of fossil evidence of the origin and development of early humans.

### STERKFORTEIN CAVES.....50km

Home of the well-preserved fossil skull, "Mrs Ples" aged at 2,3 million years, extracted in 1947 by Dr Robert Broom. In 1997 Dr Ron Clarke discovered "Little Foot", an almost complete skeleton aged at 4,1 million years.

### RHINO AND LION NATURE RESERVE...60km

The Rhino & Lion Game Reserve offers a wealth of wildlife to visitors, showing off wild and beautiful animal species. The home of the white lion and is one of only about 40 white lions known to exist. The nearby Wonder Caves are also worth a visit.

### TSWAING METEORITE CRATER.....75km

220 000 year old meteorite impact crater (1,4km in diameter and 200m deep).

### SAMMY MARKS MUSEUM.....30km

The Sammy Marks Museum is a Victorian mansion called Zwartkoppies Hall, situated about 23 km outside Pretoria. The father of the industrial revolution in South Africa.

## **CULLINAN MINE.....50km**

The Cullinan Diamond, the largest diamond ever found, a staggering 3,106.75 carat. It is also the richest source of rare blue diamonds in the world. Surface, village and underground tours of the Cullinan Diamond Mine are offered.

## **PRETORIA NATIONAL BOTANICAL GARDEN**

A diverse range of plants, animals, 200 bird species and more than 50% of South Africa's tree species are to be found here.

## **VOORTREKKER MONUMENT.....20km**

The majestic Voortrekker monument which commemorates the Pioneer history of Southern Africa and the history of the Afrikaner and in a beautiful setting. It is one of the top ten cultural historical visitor attractions in the country.

## **GROENKLOOF Nature Reserve.....20km**

The first proclaimed game sanctuary on the African continent.

# *The Most Luxurious Train in the World*

Rovos Rail has earned an international reputation for its truly world-class travel experience



Rovos Rail harks back to a simpler, more elegant era encompassing the timeless grace and high romance of African exploration. Hosting, with full bar facilities, a sit-down dinner for 72 guests on the Sunday night before the MSSA2015 conference on a first come, first served basis.

### **Evening Itinerary**

#### **18H00 to 19H00**

Champagne, orange juice and canapés will be served on arrival, with musicians playing light classical music in the background. A Rovos Steam Locomotive will be parked on the platform adjoining the station lounge, allowing for numerous photographic opportunities.

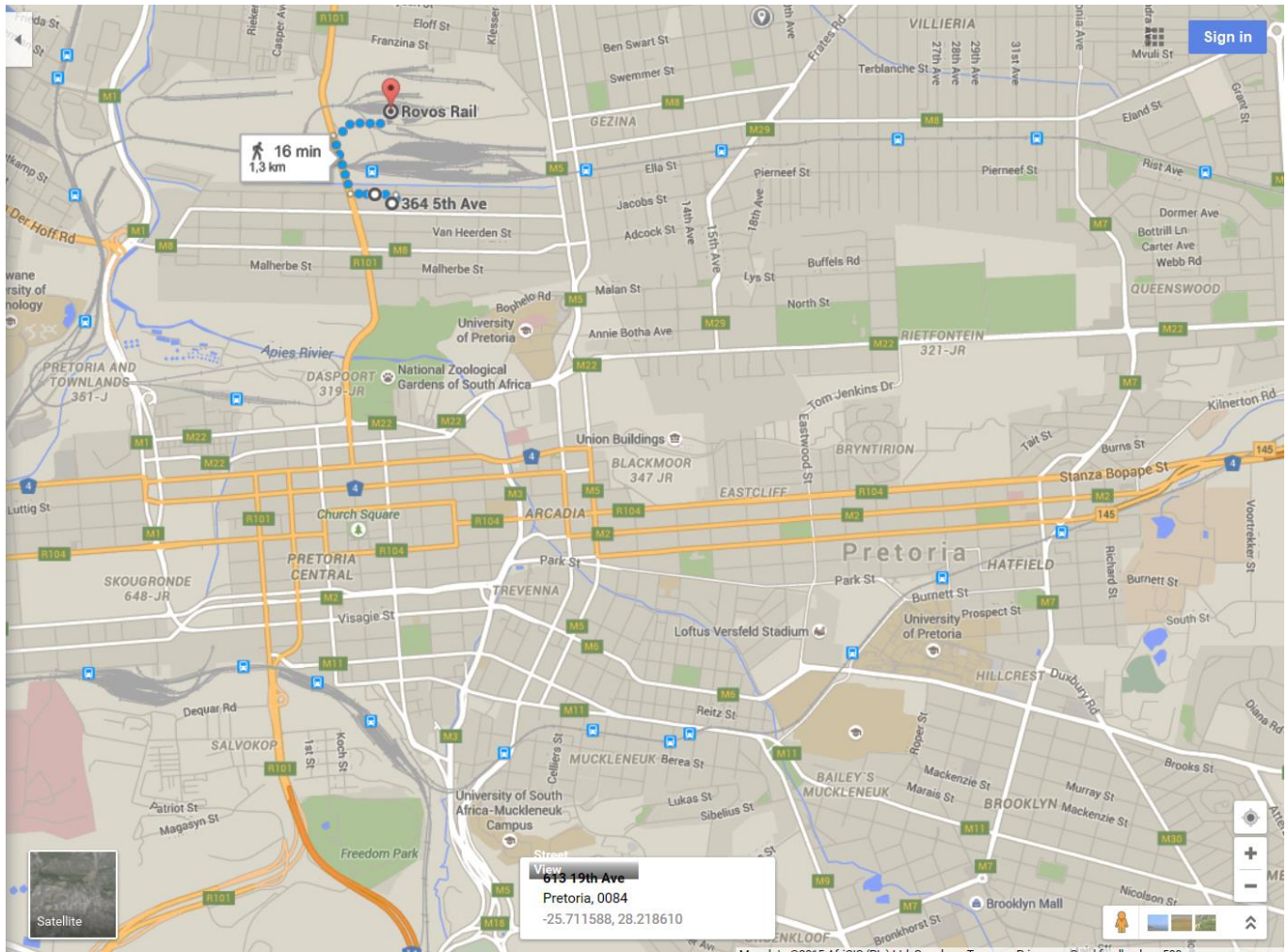
#### **19H00 to 22H00**

3 Hours on board Rovos Rail on a round trip of Pretoria. A discreet and friendly service, five-star cuisine and a selection of South Africa's finest wines will be provided.

**Date:** Sunday 29 Nov. 2015    **Time:** 18H00 to 22H00    **Dress Code:** Black Tie /Dark Suit    **Cost:** R2000 per person

For queries and booking, please email: [ajbotha@scientia.up.ac.za](mailto:ajbotha@scientia.up.ac.za)

**ROVOS RAIL STATION, Paul Kruger Street, Capital Park, Pretoria ....S 25° 43' 06", E 28° 11' 20"**



**INTERNATIONAL YEAR OF LIGHT**



**INTERNATIONAL YEAR OF SOIL**

