

## **Report on Advanced Nuclear Science Technology and Techniques (ANSTT) Workshop**

**iThemba LABS, Cape Town, 5-9 March 2018**

The workshop was opened by Dr Faïçal Azaiez the Director of iThemba LABS and Mr Ed Roman, the British Consul-General in Cape Town. Mr Tony Medland from the STFC also gave a brief overview of the UK's Global Challenge Research Fund. The week's discussion was focused in themes entitled:

Environmental measurements, metrology and applications;  
Development of digital data acquisition and pulse shape analysis techniques;  
Techniques for lifetime measurements using LaBr<sub>3</sub>(Ce) detectors;  
Environmental measurements;  
Techniques for neutron/gamma discrimination;  
New and future experiments, detector and arrays;  
Future experimental programmes at iThemba LABS, FAIR, and beyond.

At the end of the workshop Prof Harakeh introduced the ENSAR2 (European Integrated Activity with International Dimension) funding stream and Mr Richard Atkinson from the UK British Consulate-General, Cape Town outlined the UK Newton Fund and Global Challenge Research Fund. Following this there was a feedback session where members of the programme advisory committee reported on discussions held through the week and on opportunities for future collaboration and capacity building.

### **Facts and figures:**

The workshop was attended by 64 participants from 10 countries (Australia, Botswana, Cameroon, Japan, Nigeria, Norway, South Africa, Tanzania, UK, USA).

There were 31 (27 men, 4 women) staff talks and 11 (5 men, 6 women) student talks.

A full list of participants can be seen here:

<https://indico.tlabs.ac.za/event/70/registrations/participants>

### **Immediate outcomes:**

4 researchers from Nigeria who work on the same topic but have not met before will start a collaboration. They are discussing setting up an MoU between their universities and iThemba LABS.

11 students (including 7 from South Africa and 1 from Nigeria) were able to present their work in front of an international audience.

A good discussion on South African Institute of Nuclear Technology and Science (SAINTS) was facilitated between staff from Botswana, Nigeria, SA, UK.

Researchers from the National Metrology Institute of South African (NMISA) and UK National Physical Laboratory (NPL) are discussing collaborating.

Staff at Botswana, Cameroon, Nigeria, South African and Tanzanian universities were introduced to the 'Binding Blocks' public engagement tool.



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## **Future possibilities identified:**

### *Training:*

Good possibilities for shared masters courses/modules.

### *Environmental measurements and standards:*

Identified need for IAEA standards courses and NPL/NMISA link to be established

The need to reference materials and the importance of NMISA (only provider of primary radiation standards in all of Africa) was noted. Additional manpower and collaboration between iThemba LABS and NMISA is clearly needed.

### *Experimental programme:*

Excellent training possibility in building a plunger in collaboration with University of Manchester, UK for experiments at iThemba LABS.

Expanding the particle detector and neutron detector capabilities at iThemba LABS in collaboration with University of West of Scotland, UK.

iThemba LABS may join experiments at FAIR, and may participate with in-kind contributions at this and other facilities.

## **How to proceed?**

### *Training:*

SAINTS discussions will continue

Consider summer schools (inviting overseas experts). Look at the Oslo/Berkeley/iThemba model for arranging how people get credit at their respective universities.

Consider setting up:

MSc degrees in nuclear (1 year);

MSc level one-week long lectures;

PhD level one-week lectures;

Short courses on specialised topics: Coulomb excitation,  $\gamma$ -ray spectroscopy, conversion electron spectroscopy, FLUKA, GEANT4, environmental radioactivity, primary standards etc.

African PhD students to attend UK summer school (every second year) and/or spend time in other labs (similar to the programs with Oslo and France, possibilities with RIKEN?).

UK PhD students to spend 6-12 months at iThemba LABS so that they have the opportunity to set up equipment etc. for real experiments (funded via STFC long-term attachment grant)

Dr Mohammad (Tanzania) to copy the Nigerian model where students come to iThemba LABS to train or they send their samples to be measured at iThemba LABS.



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*Environmental measurements and standards:*

Information on the existing training by the IAEA (e.g. on Nuclear Data Evaluation @ Trieste) and/or other organisations should be made known to as many people as possible.

Suggest to the IAEA to run 1-2 week training course on nuclear metrology (could be based on U. Surrey – NPL, 1 week MSc module). IAEA course would be similar with the existing 2 week Nuclear Data Course.

Consider setting up a pan-African fast NAA Network using neutrons at iThemba LABS. The data from these experiments could be 'sent back' to the home institutions in Tanzania, Nigeria, Cameroon, Sudan etc. for off-line analysis and sorting and/or MSc/PhD students could be based for some period at iThemba LABS.

*Outreach:*

Roll out the 'binding blocks' activity, by training outreach leaders and/or PhD students.

*Experimental programme:*

Set-up a wider African collaboration on medical isotope standardisations (iThemba LABS/ NMISA) for measurements of nuclear data ( $P_{\gamma}$  (%) values etc.) on medical isotopes produced at iThemba LABS.

Request funding for UK groups to collaborate on developing a plunger and/or expanding the particle detector and neutron detector capabilities at iThemba LABS.

Encourage UK groups to submit proposals to run experiments at iThemba LABS.

Invite African PhD students to collaborate on experiments at e.g. GSI/FAIR.



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