

FRAMEWORK AND FUNDING GUIDE

Funding Instrument: South Africa – Joint Institute for Nuclear
Research Student Practice

Functional Domain: Human and Infrastructure Capacity
Development

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1. BACKGROUND

In 2005, the Republic of South Africa (RSA) and the Russian Federation (RF) signed a Memorandum of Agreement (MoA) that led to South Africa becoming an associate member of the Joint Institute for Nuclear Research (JINR). Amongst other things, the agreement enabled research opportunities and training of South African postgraduate students in the following research areas of JINR:

- I. Accelerator Technology - This thematic area includes the development of technologies associated with producing accelerated ion-beams, including: ion-sources, charge breeders, mass selectors, beam cooling, accelerators, and beam optics of stable as well as radioactive ion-beams.
- II. Focal Areas of Heavy Ion Physics Research Theme under the SA-JINR agreement- Heavy-ion physics research is undertaken with the suite of accelerators located at the Flerov Laboratory for Nuclear Reactions (FLNR) at the JINR. Focal areas are: (i) nuclear-reactor materials modification by swift heavy ions; (ii) Nuclear Structure Theory.
- III. Applied nuclear thematic- The focus will be on development and applications of technologies using ion bombardment with swift heavy ions. The applications could be, for instance: in track etched polymeric films for gas separation membranes; or super hydrophobic surfaces; stress testing of electronic circuits for space technologies; creation of anti-bogus labelling; volt-ampere characteristics of semiconducting polymers for sensors; secondary structured surfaces; improved adhesion between metal and polymers, etc.
- IV. Theoretical physics and computing- The thematic area will involve Few-body problems in nuclear physics including multi-cluster nuclear systems and hypernuclei, dense and hot nuclear matter, simulations for nuclear collisions in the NICA energy region and Statistical methods applied to nuclear physics.
- V. Education - Covers all aspects of education within the SA-JINR framework and these include the SA-JINR Student Practice which is a 3 week educational even aimed at exposing South African students to world class scientific equipment, scientific research and expert international rated scientists JINR. This also includes conferences and student visits and supervision at the JINR. The thematic area (Education) is also concerned with facilitating the placement of students and research scientist in various projects and laboratories as part of its response to human capital development.

As part of the SA-JINR agreement, the National Research Foundation (NRF) facilitates an annual Student Practice that is held in June at the JINR laboratories in Dubna, Russia. The goal of the Student Practice is to build a critical mass of students that may later advance in the various nuclear research activities offered by JINR to the benefit of South Africa. Through previous experiences with

students who attended the Student Practice at JINR, it was observed that most South African students still require hands-on training related to the basics of Nuclear and Materials Sciences. This may be attributed to some universities offering science courses but are unable to provide hand-on practical training due to the unavailability of laboratory equipment for practical training in nuclear and materials sciences. Given the cost of acquisition of such instruments, students from the lower resourced historically disadvantaged institutions (HDIs) are mostly affected by this lack of science laboratory equipment at their institutions. The consequence is that many students, particularly those from HDIs, lack the requisite skills on instrumentation techniques and related knowledge to gain maximum benefit from the student practice training offered at Dubna. It is for this reason that a two-phase approach to the student practice initiative has been implemented:

Phase 1: Students attend a Summer School at iThemba LABS, Cape Town in January of each year. The school is organized by SAINTS (Southern African Institute for Nuclear Technology and Sciences) at iThemba LABS.

Phase 2: A cohort of students participating in Phase 1 will be selected, on a merit basis, to participate in the SA-JINR Student Practice, which will take place at JINR, Dubna in June of each year.

2. SAINTS@TLABS SUMMER SCHOOL AT ITHEMBA LABS, CAPE TOWN

2.1. Scope and Objectives

In addressing the lack of science laboratory equipment at the HDIs and related skills-shortage in the students, iThemba LABS, Cape Town (<http://tlabs.ac.za/>) will be hosting a physical sciences summer school commencing in 2019. This will provide students with exposure to techniques and methodologies that will equip them to participate in the SA-JINR student practice. The primary focus of the summer school will be on lectures as well as hands-on training in nuclear related applications and instrumentation techniques.

Students will be selected through a competitive call which will be open to all students based at higher education institutions in South Africa and other African countries, intending to pursue postgraduate training in nuclear sciences, to obtain introductory theory lectures on instrumentation and hands-on experience on the equipment available at iThemba LABS. The summer school will comprise of a three-week training program. To ensure that the training offered at the summer school is aligned with the JINR research areas, researchers from JINR will also be invited to present lectures at the summer school.

2.2. Eligibility Criteria

To qualify for consideration, applicants must comply with the following eligibility criteria:

- All applicants must be citizens or permanent residents of an African country;
- All applicants must currently be registered at any South African or African Higher Education Institution and completing an Undergraduate, Honours or Masters Degree.
- Students must be provisionally accepted for Honours, Masters or Doctoral Degree in the above-mentioned disciplines for 2019 at any South African or African Higher Education Institution.
- All applicants must be completing their studies in the following disciplines:
 - Mathematics;
 - Physical sciences;
 - Chemistry;
 - Engineering;
 - Computer sciences; and/or
 - Any related nuclear sciences discipline(s).

Preference will be given to female students and students from historically disadvantaged institutions.

No full-time researcher, who is registered for a part-time postgraduate degree, namely honours, masters or doctoral degree, is eligible to apply.

2.3. Application Requirements

The NRF issues a Call for Proposals, which is placed on the NRF website and is disseminated to the Research Offices of the various institutions. All applications must be duly authorised and approved by the institution's Designated Authority (DA), who in turn, submits the application to the NRF.

The Call for Proposals will be open from
Monday, 12 November 2018 to Monday, 26 November 2018
No late applications will be considered.

The following attachments, in PDF format, must accompany all applications, for the application to be deemed complete:

- I. A provisional acceptance for studies in 2019.
- II. A letter of motivation from the supervisor or the head of department (on an institution letterhead) with a clear indication of how the student will benefit from the summer school.
- III. Proof of registration for 2018 academic year.
- IV. Latest academic transcript for Undergraduate; Honours and/or Masters Studies.
- V. Full *Curriculum Vitae* (CV).
- VI. Copy of South African identity document or passport. Students who are currently not in possession of a passport are encouraged to apply for one before joining the summer school.

Applications that do not have all the required supporting documents will be deemed incomplete and will not proceed for review.

2.4. Evaluation Processes and Criteria

For a fair and objective selection process, a two-step evaluation process will be undertaken:

Step 1: Pre-screening

All submitted applications will be screened for eligibility, based on the criteria specified in this section.

Applications will be pre-screened against the following requirements:

- All applications must be endorsed by the applicant's supervisor or the head of department.
- All applications must have the six mandatory attachments, as specified in this document.
- Demonstrated commitment, to pursue an Honours, Masters or Doctoral Degree in the specified disciplines in 2019 (A provisional acceptance letter for 2019 must form part of the mandatory attachments).
- Students applying from universities from other African countries must ensure that the university has an existing collaboration and co-supervision with iThemba LABS.

Applications that are unable to meet the above-mentioned requirements, will be deemed incomplete and will not proceed to the review process.

Step 2: Review process

A panel consisting of independent reviewers will assess eligible applications using the following criteria:

Table 1: Evaluation Dimensions for the Saints@tlabs Summer School at iThemba LABS

EVALUATION DIMENSION	WEIGHTING	DESCRIPTOR
Academic potential of the student in the case of undergraduates and ability to independently undertake a research project in the case of Honours' and Masters applicants	20%	<i>The academic transcript and CV will be used to evaluate this criterion.</i>
Scientific merit of the proposal	20%	<i>The information presented in the application form, will be used to evaluate this criterion.</i>
Alignment of the proposed research to JINR thematic areas	20%	<i>The information presented in the application form, will be used to assess this criterion.</i>
Student experience in using same or similar equipment	10%	<i>The information presented in the application form, will be used to assess this criterion.</i>
Strength of the supervisor/HOD motivation	30%	<i>The supervisor/HOD motivation that forms part of the six attachments will be used to evaluate this criterion.</i>

A maximum of 30 applicants will be selected for the 2019 summer school.

The selection of students for participation in the iThemba LABS Summer School will be based on the recommendations of the merit review of applications and on the: *Ministerial Guidelines on improving equity in the distribution of bursaries and fellowships made through the National Research Foundation and funded by the Department of Science and Technology (2013)*. These guidelines are summarised as follows:

- 86% to South African (including permanent residents);
- 10% to students from the South African Development Community (SADC) region; and
- 4% to students from the rest of Africa.

The overall student target is 55% women, 80% Black (African, Coloured and Indian) and 4% students with disabilities.

In addition to the demographic targets above, *preference will be afforded to students from historically disadvantaged institutions.*

The final approval of students for participation in the iThemba LABS Summer School will be made by the Managing Director: iThemba LABS and the Executive Director: HICD.

2.5. Reporting Requirements

All summer school attendees must submit to the NRF a completion report one month after the completion of the summer school in the NRF prescribed template. This report will be used to shortlist students for participation in the SA-JINR Student Practice, in Dubna, Russia.

3. STUDENT PRACTICE AT JINR, DUBNA

3.1. Scope and Objectives

The Student Practice at JINR is a three-week programme aimed at attracting talented young people to the Institute and building awareness of the possibilities of studying and conducting scientific research at JINR. The Practices have been held since 2004 on the initiative of the JINR University Centre. The aim of the Practice is to give interested students an opportunity to:

- Obtain information about the range of scientific research conducted at JINR as possible;
- Perform a research project at the basic experimental facilities of the Institute under the guidance of specialists;
- Meet with the staff members of the Institute and choose a scientific supervisor for the case of visiting JINR for a longer period to prepare a thesis;
- Learn from the lectures by the leading JINR scientists about new problems of modern physics; and
- Get acquainted with the Russian culture.

3.2. Eligibility Criteria

To qualify for consideration, students must comply with the following eligibility criteria:

- Students must have attended the Saints@itlabs Summer school.
- All students must be citizens or permanent residents of an African country.
- Students must be registered for Honours, Masters or Doctoral Degree in the below-mentioned disciplines for 2019 at any South African or African Higher Education Institution.
- All students must be completing their studies in the following disciplines:
 - Mathematics;
 - Physical sciences;

- Chemistry;
- Engineering;
- Computer sciences; and/or
- Any related nuclear sciences discipline(s).

Only those candidates attending the iThemba LABS Summer school will be eligible for selection to participate in the SA-JINR student practice.

3.3. Evaluation Processes and Criteria

A selection panel comprising RISA and iThemba LABS representatives will be constituted to assess the performance of attendees of the Phase 1: Summer School using the following criteria:

Table 2: Evaluation Dimension for the SA-JINR Student Practice at JINR, Dubna

EVALUATION DIMENSION	WEIGHTING	DESCRIPTOR
Potential of the student to independently undertake a research project using same or similar equipment	50%	<i>The information presented in the summer school completion report, will be used to evaluate this criterion</i>
Strength of the iThemba LABS summer school completion reports	50%	<i>The information presented in the summer school completion report, will be used to evaluate this criterion</i>

Students meeting the criteria in Table 2 will be shortlisted for participation in the SA-JINR Student practice in Dubna by an internal NRF: RISA and NRF: iThemba LABS committee. Final approval of students selected will be by the Managing Director: iThemba LABS and Executive Director: HICD.

Preference will be afforded to female students and students from historically disadvantaged institutions in accordance to the Ministerial Guidelines on improving equity in the distribution of bursaries and fellowships made through the National Research Foundation and funded by the Department of Science and Technology, Pretoria.

3.4. Reporting Requirements

All JINR student practice attendees must submit to the NRF a completion report one month after the completion of the student practice training in Dubna, Russia in the NRF prescribed template.

Contact Details

For any queries related to this funding instrument please use the following contact details:

NRF		
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