IADB SIM Research Engagement Opportunity
2017 Guidance and Application

Activity and Application Guidance
In support of the Sistema Inter Americano de Metrología (SIM) Project with the Inter-America Development Bank (IADB) on "Strengthening National Metrology Institutes in the Hemisphere, in support of emerging technologies", SIM member National Metrology Institutes (NMIs) and Designated Institutes (DIs) are invited to submit joint research proposals to advance development of technical research capabilities in metrology related to emerging technologies such as advanced manufacturing, nanotechology and biotechnology.

The SIM Technical Committee Chair will accept joint research proposals from any SIM Member NMI or DI that includes at least two SIM partner institutions. All proposals will require management approval, and details on the objectives and benefits of each activity. The application may be found on Page 2 of this document.

Project requests may not exceed u$s 45.000. The requested funds can be used to support exchange of scientists, organize meetings, workshops, intercomparisons and pilot studies.

Proposals shall be send to SIM Technical Committee Chair (csanto@latu.org.uy) with copy to SIM Secretariat (Simkin@inti.gob.ar).

Application and Administrative Review Timeline

The table below includes both deadlines for applicants and other important dates that should be kept in mind when preparing associated activity arrangements.

Application Processing	Important dates & Deadlines (see explanation below)[1]
Application Announcement	26th December 2016
Application Deadline *(all applications)*	3th March 2017
Applicant(s) Notified of Final Decision	10th April 2017

Selection Criteria:

Applications will be evaluated based on need and potential impact.

Contribution to IADB project goals (see project goals at the end of this document)

Contribution to addressing measurement challenges associated with emerging technology

New collaboration or continuation or expansion of existing collaboration.

Benefit to partners and to region

Number of countries (minimum 2)

Application

Please do not exceed two pages.

<table>
<tr><td>Partner Institutions (include PI, email and address for each NMI)</td><td>Centro Nacional de Metrología CENAM
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Instituto Nacional de Metrologia, Qualidade e Tecnologia (INMETRO)
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INACAL Instituto Nacional de Calidad
Lili Jannet Carrasco Tuesta (jcarrasco@inacal.gob.pe)
Calle Camelias Nº 817
San Isidro, Lima 27, Perú</td></tr>
<tr><td>Project Description Briefly describe the research project, highlighting key objectives and expected contributions of each of the partners</td><td>Calibration of standard reference material for use in calibrating the magnification or scale of optical microscopy, scanning electron microscopy and photogrammetry.

The evolution of technology towards the micro and nano range requires the ability to measure in this range with increasing accuracy and traceability. The instruments most widely used are Photogrammetry systems, Optical Microscopes (OM) and Scanning Electron Microscopes (SEM). Calibration standards such as diffraction grids and photomask patterns are commercially available. However, they are usually sold without a calibration certificate stating uncertainties on the dimensions of the different geometric features. Some providers offer the alternative to provide it with a calibration certificate, but they become very expensive.

The purpose of this project is to develop procedures to calibrate these kind of standards. This project would give independence to our institutes in terms of traceability in the nano and micro field, we would be able to develop our own calibration standards and we could offer new CMCs in the field of nano and micro metrology to our customers.

INMETRO as well as CENAM have already made modest incursions in the nano field (development of a diffractometer for calibration of diffraction grids and AFM measurements of standards). We believe the collaboration between both institutes will be complimentary.</td></tr>
<tr><td>Potential impact/project goals: briefly describe the measurement challenge this research project is expected to address</td><td>The implementation of algorithms for image processing for metrology purposes. This will enable our instruments to operate in a semi-automatic way to determine different geometric parameters such as the center of a circle, the intersection of a line with a plane, the parameters defining a cone, etc. We would then have better instruments to measure in the nano and micro range.
The main challenge of this development is define algorithms for automatic image segmentation and image analysis procedures. Besides is also important the research on its influences and uncertainty to the measurements results.</td></tr>
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Project relevance: *briefly describe the relevance of the project to IADB/SIM Project Goals*	There is insufficient or no calibration capability of the nanometric and micrometric reference standards for the calibration of optical microscopes, scanning electron microscopes and photogrammetry system, in order to trace their measurements in the SIM region. The capacity to perform traceable measurements in the micro and nano range will benefit fields such as health sector and medicine, food industry, cosmetics and paint industries, manufacturing industry measurements as well as environmental studies.
New or Existing Collaboration *briefly explain is this is a new collaboration? or an extension or expansion of existing collaboration?*	It's not really a new collaboration. The staff of some of the institutes have been in contact and exchanged information in the past and some research visits have been made. An important collaboration between INTI, INMETRO and CENAM in relation to nanometric measurement was the construction of a diffractometer for the calibration of diffraction gratings, which was presented as a Metrology Symposium in 2010.
Tentative Dates *Expected start and end dates*	July 1st 2017- December 30th 2019
Project cost *Please provide an estimated cost (NTE 40K)*	25 000 USD.

Tabla con formato

Please describe:

Benefit to SIM:

This project will have an impact in the area of micro metrology and nano metrology through the establishment of traceability in these ranges of measurement in the participating countries, through the acquisition of commercial Standard Reference Material (SMR) and the calibration of them using national reference systems. Metrological knowledge will be generated and will be disseminated to members of the SIM region through technical training and seminars of the participating NMIs.

Benefit to Participating Metrology Institute(s):

- Establishment of the traceability in micro and nanometric measurements; and guarantee of the validity of the results of the measurements in these rages.
- To offer new CMCs in the field of nano and micro Metrology to our clients with benefits to the industrial and research sector, development in nanotechnologies; impact in the health and environment sectors, as well as in industries such as food, cosmetics, paints, and manufacturing.
- Metrological assurance to provide reliable and technically valid results through the dissemination of unit length in nano and micro ranges in the area of research and industry.

Anticipated results/impact:

- Comparison between national laboratories in the measurement of different optical patterns through calculation of measurement error and measurement uncertainty.
- Design and programming of metrological search algorithms capable of detecting interest patterns in images through descriptors found in the literature.

Objectives of SIM-IADB Project. *The General Objective is: Development and implementation of new measurement expertise available in member countries to address emerging technology needs. The three specific objectives: (i) Promote a climate of innovation, competitiveness and productivity by enhancing the delivery of advanced measurement services needed by firms for the development and adoption of emerging technologies; (ii) Facilitate public-private sector dialogue between the national measurement institutes and stakeholders in government and industry to improve the regulatory framework in the hemisphere needed to develop innovative companies bringing new products and technologies to the marketplace; and (iii) Promote the mutual acceptance of measurement results necessary not only for trade, but also to facilitate cooperative R&D projects between different member countries, and between LAC and other regions.*