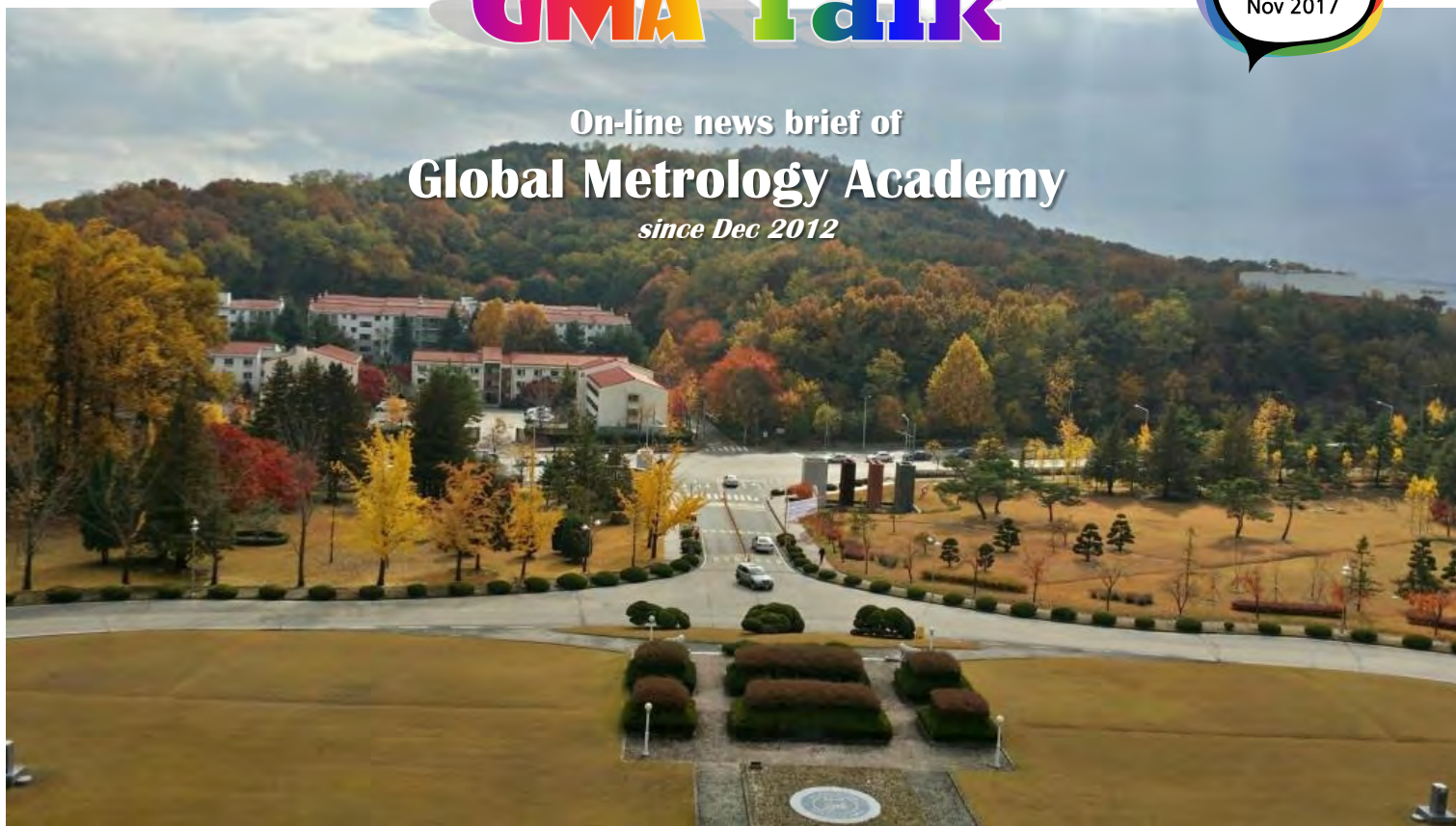


GMA Talk

Volume 4
Issue 5
Nov 2017

On-line news brief of
Global Metrology Academy
since Dec 2012



KRISS
GMA GLOBAL METROLOGY ACADEMY

WARMEST GREETINGS & BEST WISHES!

FROM THE EDITOR-IN-CHIEF

GMA

Dear Readers and GMAsters:

A hearty welcome to our precious readers and GMAsters! GMA is pleased to extend our warmest greetings to you all with the new issue of GMA TALK #5, the news brief of Global Metrology Academy of KRISS, Korea.

With its primary mission to serve our customers with quality services of metrology training and education, GMA has been developing and offering group and individual course for customers both at home and from abroad. Its priority value to create for our customers should among others be the *better performance of learning* for each and every participant who is coming to enjoy the services of GMA's HRD in metrology. Analyzing the reports of participating institutes, collecting and finding solutions to technical and quality problems faced by each participant are a part of our effort to bring forth better performance to our customers. As a result, the customer satisfaction of GMA's services for local programs has steadily been rising up for the past six years. When it comes to our services for foreign customers, the satisfaction level has always been staying at higher scores. All my colleagues and I are confident that such an excellent achievement has only been possible thanks to the close cooperation among all of GMA and KRISS and our precious partners at home and abroad.

GMA TALK #5 presents you what we have achieved in 2017 with our services for foreign and local customers. More than 70 people from 24 countries of different regions came to KRISS and enjoyed opportunities of improving their capability as metrologists. GMA's group course features its session of metrology in general (MiG), which is followed by intensive laboratory sessions of the technical subjects of each course. MiG presents the very fundamentals that every people in the metrology laboratories should have, such as NQI, revised SI, CIPM MRA, and uncertainty in measurement.



The issue #5 delivers a couple of articles written by those studying at KRISS sharing what they do and the way they enjoy their life at KRISS and Korea. A couple of group courses to be offered in 2018 cover the subjects of Photometry and Radiometry (PR), and Gas Analysis (GA). Both of them will be offered for the first time since GMA was launched its services in 2013.

More than welcome your valuable comments and advice, until the day when GMA stands up as the global center of excellence in HRD in metrology, being with you as a most productive and friendly partner for improving your capability as metrologists. Partnerships allow us to do more and better than anyone can do alone. It is my sincere wish that your steps in the new year 2018 will be blessed with health, wealth, wisdom and love. Be happy!

Sincerely,

Jongseon PARK, Ph.D.

Editor-in-Chief, Head of Measurement and Training Services

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STATISTICS: GMA 2017



Service for foreign customers in 2017

72 people from 24 countries have enjoyed metrology HRD services offered by the GMA of KRISS.

45 people in Group courses

27 people for Individual/graduate studies

IN 2017 there were 72 customers from 24 countries in different regions of AFRIMETS, APMP, COOMET, GULFMET, and SIM. They came to KRISS to join in the group and individual metrology courses offered by GMA.

TO the group courses, 45 people from 22 countries participated to study the key subjects of metrology in mass and related quantities (MRQ), length and dimensional metrology (LDM), and thermometry and humidity (TH). Chemistry (MiC), Under the program of UST-KRISS graduate school of metrology, 25 students who are studying with five newly admitted in 2017.

GMA was able to continue delivering its service of high satisfaction to the customers. Thanks to the close cooperation extended by metrology communities all over the globe. BIPM, APMP and all RMOs, and NMIs including PTB of Germany have kindly shared effort and resources with KRISS. It has helped GMA to promote its services so as to create better value for strengthening the national quality infrastructure of the developing world, in particular. Next pages will take you to a walking through what GMA has done this year in the spirit of sharing the fruits of shared effort.

Group courses	Individual courses	Graduate Studies (*)	Total	Subjects covered
45 Participants	2 Participants	25 In progress	72 Participants	Mass and Related Quantities, Length and Dimensional Measurement, Thermometry and Humidity, Total station calibration.
22 Countries	1 Countries	5 Joined (in 2017)	24 countries	

* There are 25 students under the UST-KRISS Graduate School of Metrology: 16 for doctoral courses.

STATISTICS: GMA 2017



Services for Local customers in 2017

To enhance measurement capabilities of industries including SMEs & calibration laboratories, and to spread measurement science deep into the classrooms of middle and high schools

208 people in
11 group courses
(ordinary program)

184 people for
20 individual courses
(tailored program)

24 science teachers
at the metrology
school

AS for its metrology HRD services for local customers in Korea, GMA received 352 Korean people with its local programs that consist of ordinary group courses and tailored individual courses.

HRD in metrology services of GMA places priority on delivering better values for customers from small industries, among others. For that purpose, GMA endeavors to develop new and practical approaches that will lead to better performance in learning. Collecting and providing solutions to the technical

problems faced on site by each participant is the one that GMA has been employing for each course operation.

AS part of its effort to spread measurement science deep into the classrooms of middle and high schools, GMA has been offering Metrology School for science teachers. In 2017 GMA has reorganized the program contents by introducing practical experiments where teachers could do measurement and evaluation by themselves in the selected laboratories of KRISS. In addition,

metrology school opens twice in summer and winter vacation so that opportunities could be provided to more teachers.

IN close cooperation with KOLAS (Korea Laboratory Accreditation Scheme) and KASTO (Korea Association of Standards and Testing Laboratories), GMA has developed training courses that are not available in Korea while needs are growing bigger. The service will be expanded in the years to come.

Ordinary Group courses	Tailored Individual courses	Outreaching services (on-site *)	Metrology School for Science Teachers	Total
208 Participants	184 Participants	29 Participants	24 Participants	416 participants
102 organizations	66 Organizations	5 Organizations	24 Middle/high schools	192 organizations

STATISTICS: GMA 2017



PARTICIPANTS BY REGION (GROUP/INDIVIDUAL)

APMP	AFRIMETS	COOMET	GULFMET	SIM	Total
12	3	3	1	2	22 countries
26	6	3	6	5	47 participants

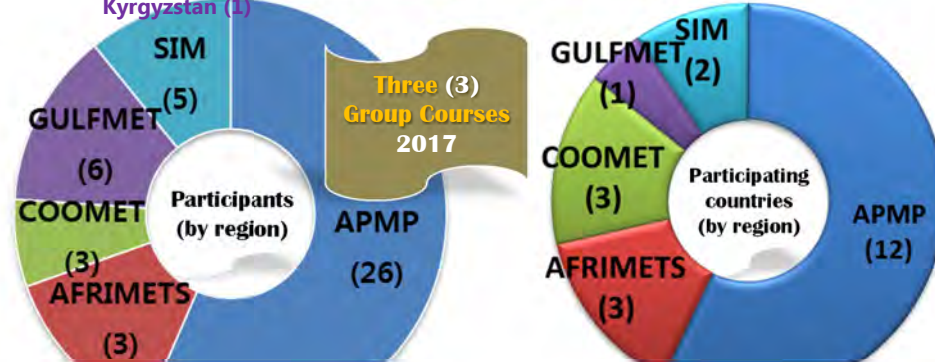
Bangladesh (1)
C. Taipei (1)
China (1)
Hong Kong (1)
Indonesia (4)
Malaysia (2)
Mongolia (1)
Nepal (3)
Pakistan (2)
Philippines (3)
Sri Lanka (2)
Vietnam (5)

Ethiopia (3)
Ghana (2)
Kenya (1)

Georgia (1)
Kazakhstan (1)
Kyrgyzstan (1)

Saudi Arabia (6)
(* Palestine 1)

Bolivia (4)
Colombia (2)



IN 2017 GMA offered training course for foreign customers, It includes three (3) group courses and an individual course. The groups courses accommodated 45 participants coming from 22 countries representing RMOs of AFRIMETS, APMP, COOMET, GULFMET and SIM.

THERE were five (5) new countries who added their names in the list of beneficiaries of the GMA metrology HRD services. They are Bolivia, Georgia, Ghana, Kyrgyzstan, and Palestine.

THE strategic partnership between APMP-KRISS-PTB has

been continued providing financial support for participants from developing economies. The co-funding partnership between PTB and KRISS has been widely expanded so that the eligible beneficiaries of the financial support could encompass all of the regions beyond APMP region. Thanks to the co-funding partnership, 27 people from 16 developing economies could come to study at the three group courses offered by GMA in 2017. GMA and PTB will be working closely together under the partnership in the years to come.

SERVICE FOR FOREIGN CUSTOMERS

GROUP/INDIVIDUAL COURSES 2017



GMA offered three (3) group courses in 2017. It includes three technical workshops, addressing the subjects of Mass and Related Quantities (MRQ), Length and Dimensional Metrology (LDM), and Thermometry and Humidity (TH).

EACH workshop begins with a two-day session of metrology in general (MiG). MiG session is the unique features of GMA's group course, which is followed by intensive laboratory sessions of the technical subjects of each course. MiG presents the very fundamental knowledge

that every people in any metrology laboratories should have, such as NQI, revised SI, CIPM MRA, and uncertainty in measurement.

FOR better performance of learning, participants are requested to dawn up their lab reports in advance, identifying technical and quality issues faced by respective laboratories. GMA takes a look into all reports of participants, and summary of the reports are shared with the lecturers, so that they might adjust lectures and hands-on exercises to help

find solutions to participants as stated in their reports.

THE individual courses of GMA have been developed at the request of its customers. Its programs have accordingly been customized in order to meet the specific needs of the customers, such as getting orientation to be a professional metrologist, building up new calibration and measurement capabilities, conducting collaborative research, etc.

Three (3) group courses receiving 45 foreign participants in 2017;

GMA Courses 2017	Subjects/Modules	Dates	Participants
GMA-GT-2017-01 MRQ	Mass and Related Quantities	Mar 20 - 31, 2017 (2 weeks)	18
GMA-GT-2017-02 LDM	Length and Dimensional Measurement	May 22 – June 2, 2017 (2 week)	16
GMA-GT-2017-03 TH	Thermometry and Humidity	Aug 21 – Sept 1, 2017 (2 weeks)	11
GMA-IT-2017-01 Length	Total Station Calibration	Apr 1-15, 2017 (2 weeks)	2

Intensive laboratory sessions are offered with lectures and hands-on exercises effectively combined.

GMA 2017 PHOTOS



Hands-on practices at mass lab



Opening of MRQ workshop



Korean culture ^^^



Dressed in traditional costumes at the farewell dinner of MRQ



Opening of LDM workshop



Opening of TH workshop



Hands-on practices at length lab

SERVICE FOR LOCAL CUSTOMERS 2017



SERVING customers with measurements of international equivalence is the primary function of national metrology institutes. It is to create values and benefits for the general public by providing confidence in their daily lives. A variety of portfolios are employed by NMIs to deliver their achievements to customers, such as calibration and testing services, supplying certified reference materials, technology transfer and commercialization, and training services.

KRISS began its HRD in metrology service in early 1980's by training programs mainly for the technical staff of calibration and testing laboratories in Korea. As industry

advances, it calls for higher level of measurement capabilities that can be made available by KRISS, the NMI of Korea. GMA's metrology HRD services has been evolved to meet ever growing needs of reliability in measurement on global level that can only be provided by competent metrologists.

GMA's metrology HRD service for its local customers aims to deliver cutting-edge measurement technologies and professional experience such as materials characterization, surface analysis, dosimetry and radioactivity measurement, gas analysis, uncertainty in measurement, etc. Upon request of customers, tailored courses are also offered.

More than 180 people were given 20 tailored individual courses in 2017 where they could find solutions to the measurement problems they were faced on site.

IN an effort to help promising small enterprises to promote their R&D capabilities, **GMA** has been offering tailored training courses in cooperation with KIRD, Korea Institute of HRD in S&T. Newly developed service in 2017 includes metrology trainings in increasing demand that however, are not available in any other organizations in Korea yet. Beginning with three courses in 2017, it is likely to be expanded to organize six courses in 2018.

Courses	Number of courses offered	Number of participants
Regular group courses	11 courses	208 (from 102 organizations)
Tailored individual courses	20 courses	184 (from 66 organizations)



METROLOGY SCHOOL FOR SCIENCE TEACHERS GMA IN KOREA 2017 ~ SUMMER AND WINTER ~

GMA has been hosting Metrology School for Science Teachers over years. Quite different from the previous ones, the metrology school for science teachers has been drastically reformed in 2017 in terms of its contents. Reflecting the voice of customers, GMA has developed the program contents to add a session of experimental practices where teachers do measurement and evaluation by themselves. The experimental projects were developed by the KRISS laboratories in charge covering the two subjects of length and time measurement.

IN addition, the school opens one more



EACH of the rest sessions offered for the three days presented the teachers the seven SI base units one by one: length, mass, electricity and magnetism, and metrology in chemistry and biology. Winter school will present the themes of metrology of time and frequency, thermometry, photometry and

time in winter vacation so that more teachers could enjoy benefits from learning metrology at the metrology school.

WITH a view to providing the participating teachers with a better understanding of “Why Metrology and NMI,” each class was composed of lecture followed by visits to the laboratories in question. The first session began with a couple of lectures delivering them the basic knowledge of measurement and its value to our daily lives, and a lecture on the SI units that are supposed to be officially revised in 2018.

Metrology School intends to share effort for bringing Science, Technology, Engineering, Arts, Mathematics deep into the classrooms of middle and high schools .

colorimetry, along with a couple of lectures on measurement and standards, and the revised SI.

THE Metrology School for Science Teachers intends to bring measurement science deep into the classrooms of middle and high schools.

Summer Metrology School for Science Teachers in Korea

Day 1	<ul style="list-style-type: none"> • Measurement and Standards • Revised SI and Fundamental Constants • Length Metrology (lab visit included)
Day 2	<ul style="list-style-type: none"> • Experiment (Length Laboratory): three projects by groups • Evolving Needs of Metrology in Chemistry and Biology (lab visit included)
Day 3	<ul style="list-style-type: none"> • Quantum Standards for Electricity (lab session included) • Mass and Balance (lab visit included)

[Programs of metrology school for science teachers enriched with experimental project sessions.]

Winter Metrology School for Science Teachers in Korea

Day 1	<ul style="list-style-type: none"> • Measurement and standards • Revised SI and Fundamental Constants • Time and Advanced Industry (lab visit included)
Day 2	<ul style="list-style-type: none"> • Experiment (Time & Frequency Laboratory): by groups
Day 3	<ul style="list-style-type: none"> • Measurement of Temperatures! (lab visit included) • Light and Color (lab visit included)



GMA'S EXPANDED PARTNERSHIP WITH APMP AND PTB

GMA working closely with APMP and PTB through MEDEA Project and beyond (2015-2017)

AS metrology plays an indispensable and underpinning role in the sustainable development of the developing world, GMA has been closely working together with APMP DEC and PTB of Germany by joining resources and efforts with the APMP MEDEA project: Measurement, Enabling Developing Economies in Asia. For the past three years, more than 60 people enjoyed studying with the GMA's service in metrology HRD with

the joint financial support from PTB and KRISS.

IN 2017 the scope of eligible beneficiaries was open wide so as to accept people from all regions beyond APMP. People from AFRIMETS, COOMET, and SIM were among the participants in the GMA courses who benefitted from the expanded partnership with PTB and KRISS. It is anticipated that the strategic partnership will be extended for the years to come.

Year	Number of Beneficiaries		Total
	Group courses	Individual courses	
2015	17 (MiG, FMC, IR)	0	17
2016	15 (MiC, EM)	2 (MiC)	17
2017	27 (MRQ, LDM, TH)	0	27
Total	59	2	61 (*)

KRISS

* Including 52 from 15 APMP member economies

GMA Courses	Member Economy	Institute	Number of Participant	Total
MRQ	Bangladesh	NMC	1	11
	Colombia	INM	1	
	Indonesia	RCC-LIPI	1	
	Kenya	KEBS	1	
	Malaysia	NMIM	1	
	Mongolia	MASM	1	
	Nepal	NBSM	1	
	Pakistan	NPSL	1	
	Philippines	NML-ITDI	1	
	Sri Lanka	MUSSD	1	
LDM	Vietnam	VMI	1	9
	Ghana	GSA	1	
	Indonesia	LIPI	1	
	Kazakhstan	KazInMetr	1	
	Kyrgyzstan	NISM	1	
	Malaysia	NMIM	1	
	Nepal	NBSM	1	
	Philippines	NML-ITDI	1	
	Sri Lanka	MUSSD	1	
	Vietnam	VMI	1	
TH	Georgia	GeoSTM	1	7
	Ghana	GSA	1	
	Indonesia	RCC-LIPI	1	
	Nepal	NBSM	1	
	Palestine	PSI	1	
	Pakistan	NPSL	1	
	Vietnam	VMI	1	
Total	16 countries (9 APMP members)			27

GMA HONORED WITH AN AWARD ON KRISS ANNIVERSARY



GMA was honored with an award of outstanding service in the 42nd anniversary of KRISS in October 2017.

In recognition of the achievement that GMA has had since its operation in 2013, the Academy received an award from KRISS in its anniversary of October 2017. In celebrating its anniversary, KRISS has annually been selecting and giving awards to KRISS people and teams who are regarded to have created outstanding achievement.

Awardees include those who have written excellent papers in renowned science and technology journals, have made technical breakthrough yielding benefits to the society. GMA received an award of excellent services extended to customers both from at home and abroad. Its customer satisfaction in Korea has been

increasing over the past years ever since it was launched. In 2017 GMA has significantly renovated programs for KRISS people. Previously, it was mainly for the QMS lectures open once or twice a year with a few participants. By widening the scope and subjects of the program, which comprise CIPM MRA, Peer Reviews, Revised SI, NQI, Standards and Standardization, CRM, in addition to the QMS. It is certain that such an honor was only possible thanks to kind assistance and friendly partnership offered by all participants and lecturers from the laboratories of KRISS. Next year GMA will look for certification to ISO 9001 for its services.

*GMA pursues to be a most
Friendly and productive partner
in human resources development in metrology*

GMA GROUP COURSES 2018-2020



IN 2018 Global Metrology Academy (GMA) of KRISS is ready to offer a couple of group courses. 2018. The themes of the two workshops are all newly developed in close cooperation with laboratories of KRISS in charge.

THE first one is scheduled to take place for the two weeks of March 26 – April 5, 2018 addressing the key subjects of

Photometry and Radiometry (PR). In addition, we are pleased to be develop a new course of Gas Analysis (GA) in June.

ANNOUNCEMENT and call for applications have already been sent out to be available on the websites of the global and regional metrology communities such as the BIPM/DCMAS, AFRIMETS, APMP, COOMET, GULFMET and SIM.

PLACING its priority on creating better performance of learning and better value for our customers, GMA makes its best to refine its program contents to be quite well balanced with theoretical lectures and hands-on exercises. Your precious comments and advice are greatly appreciated, as GMA will put them all together for improving the quality of the GMA services in every detail.

Year	Courses	Subjects/Modules	Dates	Applications (by)
2018	GMA-GT-2018-01 PR Photometry & Radiometry	- Photometry, Radiometry, Colorimetry - Metrology in General (CIPM MRA:KC-CMC-Traceability, Revised SI, QMS, Uncertainty in Measurement)	Mar 26 – Apr 5, 2018	Jan 25, 2018
	GMA-GT-2018-02 GA Gas Analysis	- Purity Assessment, Testing and Calibration in Gas Metrology - Gravimetric Preparations and Verification of PRMs - Certification of CRMs - Metrology in General	June 18 – 27, 2018	Mar 25, 2018

2019	GMA-GT-2019-01-FMC	Mar 25 – Apr 3, 2019	Fluid flow
	GMA-GT-2019-02-IR	Jun 10 – 20, 2019	Ionizing radiation
2020	GMA-GT-2020-01-AV	Mar 23 – Apr 2, 2020	Acoustics and vibration
	GAM-GT-2020-02-MAC	Jun 15 – 24, 2020	Analytical chemistry

For inquiry regarding the GMA courses, please contact:
Sangwook Seo at swseo@kriiss.re.kr



Sangwook SEO
swseo@kriiss.re.kr

“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (1) ”



There were two colleagues from foreign NMIs who wrote an article for the KRISS Journal. Mr. Ahdrian Camilo C. Gernale from the NML-Phil of ITDI, the Philippines and Dr. Ghufreon Zaid from RCM-LIPI of Indonesia were kind enough to share their experience with studying at KRISS and enjoying time with friends at KRISS and Korea.

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THAN ANY ONE
CAN DO ALONE**

From Ahdrian, NML–Phil/ITDI (Philippines)



Q-1. Please introduce the organization you are working for and your position held along with your responsibility including research fields in charge.

The National Metrology Laboratory (NML) is the national metrology institute of the Philippines tasked by law to be responsible for establishing and maintaining the national measurement standards for physical quantities such as mass, temperature, pressure, voltage, resistance, luminous intensity and time interval and their dissemination to Filipino users. Currently, I hold the position of Science Research Specialist under Mass and Force Section. Also, I am the Lead Developer, Programmer and Designer of the Management Information System (MIS). The MIS is the main framework for the automation and modernization of receiving-releasing of samples and/or equipment, calibration, data entry system and reporting of all laboratories. Machine learning will also be included in the future.



Q-2. Please let us know of the dates and subjects of your study at KRISS under the program of Global Metrology Academy of KRISS.

Group Training Course of Metrology in Mass and Related Quantities - 20 March to 31 March 2017.

Q-3. Could you please tell us of what has brought you to come to the GMA workshop at KRISS?

Primarily, my objective in participating in the GMA Workshop is to enhance the current knowledge, understanding the skills related to the principles of Mass and other related quantities which can greatly affect the improvement and innovative capability of the metrology in the Philippines. Secondly, I am aware the GMA workshops are one of the best metrology training offered by an international training center and known for its premier lecturers and intensive hands-on exercise. Lastly, the opportunity of participating in this course will also give me a better experience in benchmarking our Management Information System.

Mr. Ahdrian exchanging greetings with other participants in the opening of the MRQ workshop in March 2017.

“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (1) ”



From Ahdrian, NML-Phil/TTDI (Philippines)



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Q-4. Please tell us the most memorable time (events) and people you were met during your study with the GMA workshop that you might still have kept deep in mind, along with the reason for your memory.

Though my whole stay at South Korea was memorable, I think I would be having a hard time choosing the most memorable ones but allow me to tell you the people, things and events that really stayed in my heart.

It was my first time in Korea (and definitely won't be the last), the flight took less than 4 hours to arrive at the Incheon International Airport. I wasn't able to

sleep during the flight because of the excitement and inspiration flowing through my veins.

During our orientation and brief walk around the hotel, meeting other participants felt so much like I'm home. The cultural presentation and experience touched my heart so much. Knowing so much about Korea's humble beginnings until becoming one of the world's greatest economy was something worth remembering and pondering.

My co-participants of GMA workshop were very friendly, generous, helpful and spontaneous group. Being with them was all smiles, laughter and I might say the perfect go-around buddies. We ate every

night trying to explore places, tasted traditional Korean food and enjoyed the well-known "soju" alcohol. For me, fell in love with the rich and very sumptuous taste of Korean food- Kimchi is love!

The technical visits at Samsung Innovation Museum and KTC, and including the cultural visit at the Kyeong-bok-gung Palace gave us an opportunity to have a connection with the Korea's wonderful culture and tooling our own life-skills success. I have to say these gave me more reason for "a must" come back to Korea and continue from where I left of.

Q-5. What were the most impressive things about GMA and KRISS (people, culture, R&D capability, and friendship, anything else...)?

Going around walking and studying inside the KRISS campus was just like a dream come true for me. I was impressed with the fact that the campus is beyond describing to be the best- in terms of facilities, development, employees and experts. During our study, the lecturers showed so much knowledge and expertise on the field of metrology. They were smart, cheerful and we (the participants) felt like we have this special connection already.

The time was too short to explore all KRISS

research and development programs, however, the lecturers were all open to answer the participants queries even during lunch breaks. The GMA staff, especially Mr. Sangwook and Ms. Jin-young, did their best for us to learn while enjoying our stay there. The GMA – KRISS Program offered a world-class training methodology and experience. By going through this course, the participants will have an adept capabilities coming back to their country. It's really amazing how I went there without knowing anyone, and yet I left having the best experience, training, knowledge and friendship.



Mr. Ahdrian at hands-on practices in the mass laboratory of KRISS during the MRQ workshop in March 2017.

“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (1) ”



From Ahdrian, NML-Phil/ITDI (Philippines)



Q-6. Advice and comments that you want to give KRISS for the future relations with NML-Phil/ITDI

The relationship of the NML-Phil and KRISS have always been described by such mutual respect and support for development. A deeper cooperation for research and human resource development in diverse area of metrology will further strengthen our relations and capabilities. Having an immersion program for metrology will provide a holistic and progressive approach on

the development of human resource, and it is a good opportunity to see a new perspective and the way how each Institutes can contribute to the betterment of our relations. A collaborative, if not a grant, research and development between the two Institutes will increase the impact in the industry and economy growth.

Q-7. Please tell us your dream as metrologist?

Being young, inspired and full of motivation, I'm totally in love with what I learn and get to do

with metrology. My role in our institution fits with my lifestyle, skills and innovative mind.

Metrology is not very common field, and metrologist is not a lucrative job in the Philippines. However, I see this an opportunity for me to show how important and basic metrology to our lives. In this way, I dream that I can inspire and make an impact to the growing economy of the Philippines and leave a lasting legacy.



Mr. Ahdrian (third from right) with his colleagues at laboratory of NML-Phil, ITDI, Philippines

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“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (2) ”

From Dr. Ghufron Zaid, RCM-LIPI, Indonesia

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Q-1. Please introduce the organization you are working for and your position held along with your responsibility including research fields in charge.

I am working for Research Center for Metrology, Indonesian Institute of Sciences (RCM-LIPI), the National Metrology Institute of Indonesia. Now I am the Head of Mechanical Metrology Division. The division consists of three subdivisions, namely MRQ Subdivision, Length Subdivision and Acoustic and Vibration Subdivision. My responsibilities are to outline technical policy for research, as well as technical policy for the management of national measurement standards (NMS) and technical policy for the dissemination of the NMS within the Division. Starting from January 2017, a new subdivision, the

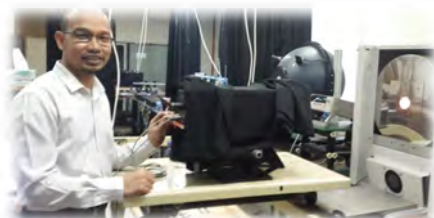
Chemical Metrology, is temporarily added to the Division. The Chemical Metrology is a new subdivision, previously belonging to Research Center for Chemistry LIPI. For the purpose of strengthening the NMI, it has been transferred to RCM-LIPI and temporarily attached to the Mechanical Metrology Division. I am in charge of the development of the chemical metrology which was initiated only in 2007 and now has 14 research staff. I am also in charge of LIPI Competitive Research which now focusing on Clean Water Management in Remote and Outer Islands. It consists of 15 research teams, having different area of research activities including hydrology, water treatment, water resource monitoring (quantity and quality), economic aspect of water availability in remote area, off-

grid electric power etc.

Q-2. Please let us know of the dates and subjects of your study at KRISS under the program of UST-KRISS graduate school of metrology.

I studied and carried research for my PhD in Science of Measurement under the program of UST-KRISS graduate school of metrology starting from February 2007 until December 2010.

My PhD research topic is actually about the establishment of measurement traceability for photovoltaic cell which was in-existence in Korea at that time. It is entirely different from my current job, but it happens when you go into management.



Dr. Ghufron working at his laboratory of Research Center for Metrology (RCM)-LIPI, Indonesia



“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (2) ”

From Dr. Ghufron Zaid, RCM-LIPI, Indonesia

Q-3. Could you please tell us of what has brought you to come to KRISS for your doctoral study in measurement science and technology?

I have been working in national metrology institute since 1999. When I finished my masters degree in instrumentation, I told myself that I should pursue PhD research which is directly related to metrology application. It was difficult at that time to find the topic I was looking for. Not many researches in university related to metrology. Fortunately, I was in charge of recalibration for our standard in my institute which allow me to communicate to other NMIs. And this what makes me aware of the UST-KRISS program. So networking is an important part when you are doing your job, because it could allow you to find better resources to help you do your job.

I decided to apply the UST-KRISS program having learned that KRISS has become one of leading NMIs in Asia as well in the world, equipped with modern equipment as well as highly experience and expert staff doing different areas of research. And more importantly, the person I communicated with at that time was very helpful. He helped me a lot to find suitable supervisor. It was Mr. Sang Wook Seo.



Dr. Ghufron with his family

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CAN DO ALONE**

Q-4. Please tell us the most memorable time (events) and people you were met during your stay in KRISS that you might still have kept in mind, along with the reason for your memory.

I have a good memory of all members of KRISS optic group. All of them. Seung-nam park baksa-nim, my supervisor, obviously comes up first. He asked me not only to study for my research but also to broaden my learning during my stay in KRISS, the wider aspect of metrology in Korea. The rests, Dong Hoon Lee, Park Shongjeong, Kim Seung Kwan, Sang Hyung Lee, Bong Hak Kim, Jae Keun and others, I can not put them in correct order.

He and all of KRISS staff and even other UST students was very supportive when my daughter passed away in 2009. I won't forget them all. Thank you all again...Sorry, I am weeping now...

The first spring festival I attended at tKRISS garden is another moment I won't forget. I had just arrived in February and adjusting to a new life in KRISS. And in April, there was this event. There were some Korean students in the optics group. Sorry, I still remember their faces, but I can only recall one name, Nam Joon. And there were, Bilal from Bangladesh, Ahmad from Egypt and Veejay from Srilanka.

“ WHAT THEY ARE SAYING ABOUT KRISS AND GMA (2) ”

From Dr. Ghufron Zaid, RCM-LIPI, Indonesia

Q-5. What were the most impressive things about KRISS (people, culture, R&D capability, and friendship, anything else...)?

Well, I can not really mention one or two and leave the others. KRISS staff are very helpful. I couldn't complain anything about them. Excellent!

Korean people on the street are very polite. The R & D capability is world class. KRISS has been involved in several global project to show its capability and gaining world recognition as well as makes real contribution to Korea.

Q-6. Could you tell us how your experience with KRISS could be of help for your services at RCM-LIPI? (Benefits/Merits that your experience at KRISS has helped you to better serve for RCM-LIPI, your metrology community or your society)

I may not be the one who would realize the PV cell standard and traceability in my country as I would expect when I finished my PhD research - it will still be realized by my colleagues & we are having cooperation with PTB to realize it.

But I have learnt the wider aspect of metrology in relationship to its stakeholder. The industrial link through the Home Doctor program, the metrology club, to mention a few, are ones which I am keen to adopt, with modification according to the condition in Indonesia. I learnt that expanding your networking is one of the keys to success. I believe this is why KRISS are having international project with several countries.



Dr. Ghufron working with his colleagues on site of clean water project

Q-7. Advice and comments that you want to give KRISS for the future relations with RCM-LIPI

I am optimistic about an even better future relations between RCM-LIPI and KRISS.

I do hope RCM-LIPI staff can keep coming to KRISS for the GMA training as well as for pursuing higher study, Masters or PhD degree. Also, with more PhD staff at RCM-LIPI, I hope we will have more technical and research collaborations.

Q-8. Please tell us your dream as metrologist?

I dream of having a strong national metrology institute, contributing to the global advancement of measurement standard as well as beneficial to our country to support the national industries improving their product qualities and competitiveness in global market. Only real contribution to the society will make people and decision makers realize the importance roles of metrology to the society.

**PARTNERSHIPS
RAISE PARTNERS
UP TO
MORE AND BETTER
THAN ANY ONE
CAN DO ALONE**

GMA AT A GLANCE



Vision

- To be the global center of excellence for metrology HRD

Function

- To develop programs of metrology HRD
- To operate education/training courses in metrology
- To promote ODA in metrology for the developing world

Mission

- To foster competent human resources in metrology

Launched in December 2012, **GMA** has been assigned with a mission of cultivating professional human resources required by customers over wide sectors of metrology community. With its target audience both from local and foreign metrology laboratories, GMA develops and operates education and training programs covering a variety of key subjects in metrology. In pursuit of better performance in delivering quality programs meeting the practical needs of customers, GMA has been making its very best efforts towards a vision to be the global center of excellence for HRD in metrology.

PORTFOLIO OF GMA PROGRAMS



Courses at KRISS

Group, Individual

- **Group courses**
 - Duration: Two-week intensive programs
 - Covering fundamental subjects of metrology
 - Lectures combined with hands-on practice
- **Individual courses**
 - Duration: Two weeks to one year
- Tailored to meet the specific needs of customers

Outreach Services - on site of customers

Comprehensive approach

- **A group of metrologists of KRISS visiting customers on site**
 - Offering on-site technical advice, training and lectures
- Capability evaluation, offering recommendations of action plans
- Advice on strategic planning of national standards system, etc.

Graduate Courses

Master's, Doctoral

- **UST-KRISS Graduate School of Metrology (www.ust.ac.kr)**
 - For master's and doctoral degrees
 - Funded by KRISS

MODULES AVAILABLE



27 modules

- 25 technical modules covering key subjects in metrology
- 2 module concerning MiG (Metrology in general)

Technical
modules

Area	Modules	Area	Modules
AUV	2	PR	3
EM	5	QM	3
L	1	RI	3
MM	2	T	2
MRQ	3	TF	1

Metrology in
General

National standards system, economic impact of metrology,
QMS, Traceability and uncertainty in measurement

OUTREACH SERVICES TO BE PROMOTED

Since it was launched in December 2012, GMA has been offering HRD programs of metrology at the laboratories of KRISS in Korea. As an effort to further widen the horizon of its services and for the sake of better benefits of our customers, GMA has added a new item to its service portfolio. It is the outreach service that is to be offered on site of our customers. Upon request of customers, GMA is ready to offer services on site of customers

abroad. The competitive advantages that customers could enjoy with our outreach services include its wide coverage of services among others. The GMA programs offered at KRISS are primarily focused on addressing technical capability of the customers. Meanwhile, the outreach services could take a more comprehensive approach, ranging from diagnosis to prescriptions, dealing with not only technical but also strategic issues to which the customers expect to

find solutions. Activities of the outreach services therefore consist of fact-finding survey, lectures, training and technical advice. Furthermore, beneficiaries of the outreach service will not merely remain with a few but spread widely over the national metrology community of the customers.

For any inquiry of the outreach service of GMA, please send your inquiry to Mr. Sangwook Seo of GMA at swseo@kriss.re.kr.

Competitive Advantages of Outreach Services of KRISS GMA

Comprehensive Approach

From Diagnosis
To Prescriptions

Diverse Services

Fact-finding Survey
Lectures and advice
Technical Training

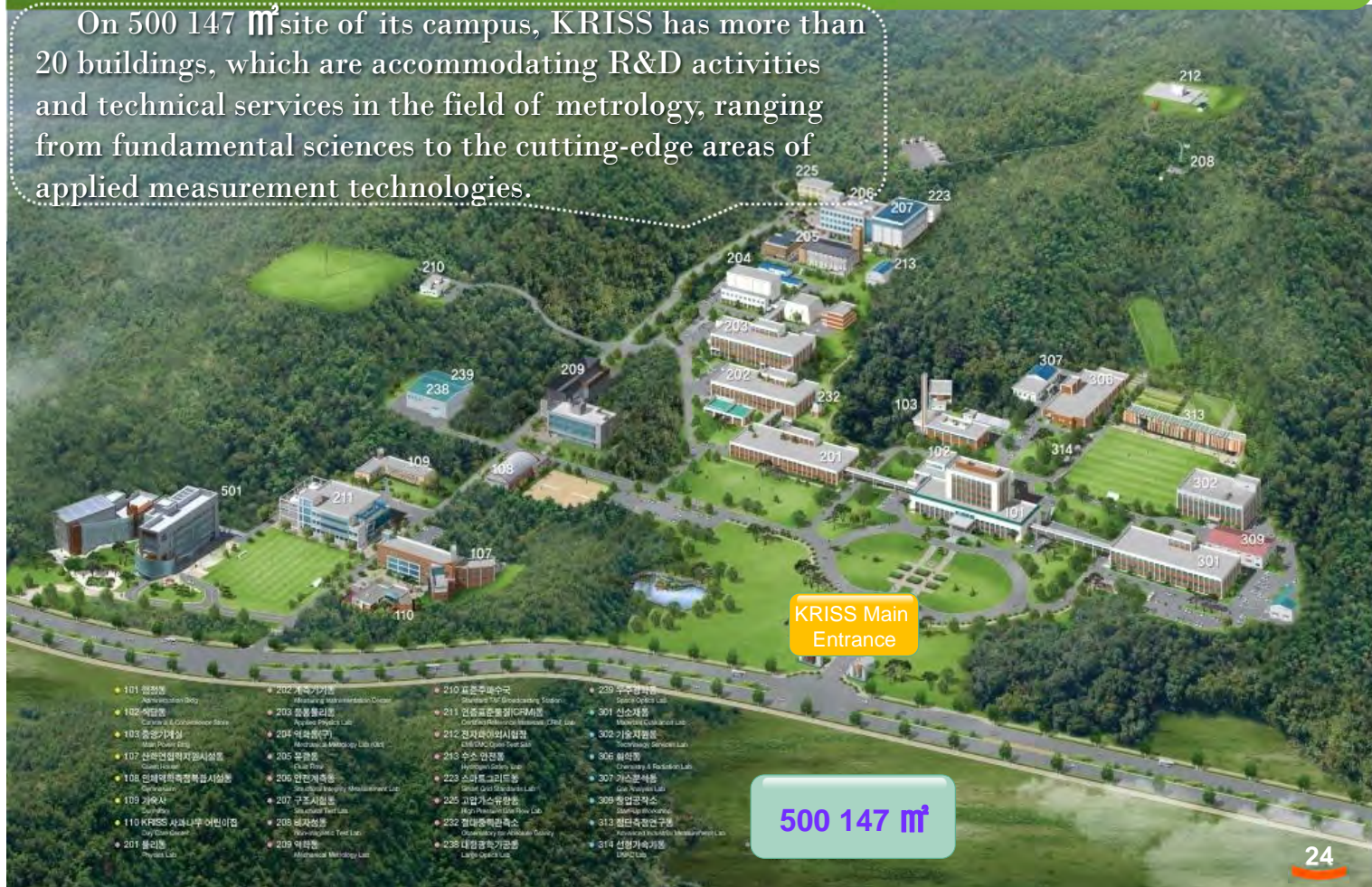
Wide Range of Beneficiaries

Nationwide Community
of Metrology
NMI, Calibration/Testing
Labs, Government, etc.

MAP OF KRISS CAMPUS



On 500 147 m² site of its campus, KRISS has more than 20 buildings, which are accommodating R&D activities and technical services in the field of metrology, ranging from fundamental sciences to the cutting-edge areas of applied measurement technologies.



- 101. 배양실
Reproduction Body
- 102. 이음실
Curve & Connector Stone
- 103. 중앙기대실
Main Power Room
- 107. 산학협업대학정식실용
Campus Hotel
- 108. 인쇄역학특별정밀시험실
Calibration
- 109. 기구사
Tool Factory
- 110. KRISS 사교나루 어원이점
City Club Guest
- 201. 물리실
Physics Lab
- 202. 계측기기술
Measurement Instrumentation Division
- 203. 표준물리실
Applied Physics Lab
- 204. 역학연구
Mechanical Metrology Lab (MML)
- 205. 분광실
Trace Trace
- 206. 안전저축동
Structural Integrity Measurement Lab
- 207. 구조시험실
Structural Test Lab
- 208. 열저장실
Non-destructive Test Lab
- 209. 역학동
Mechanical Metrology Lab
- 210. 표준추진수국
Standard Time Laboratory Station
- 211. 원중량표준연구(CRM)실
Coordinating Metrology Research (CRM) Lab
- 212. 전자역학시험실
EM/CMC Open Test Lab
- 213. 수조-연결동
Hydraulic Control Test
- 223. 소파동 그리드 동
Serial Grid Structure Lab
- 225. 고급가스유량실
High Precision Gas Flow Lab
- 232. 열대중력측정소
Observatory for Absolute Gravity
- 238. 대경량측기공동
Large Optical Lab
- 239. 우주정밀동
Space Optics Lab
- 301. 산학저축
Research & Education Lab
- 302. 기술지원동
Technology Support Lab
- 306. 회의실
Conference & Reception Lab
- 307. 가스분석실
Gas Analysis Lab
- 309. 열입공역소
Heat Treatment
- 313. 원자핵정량연구동
Nuclear Isotopes Measurement Lab
- 314. 선형가속기동
LINAC Lab

KRISS Main Entrance

500 147 m²



*GMA pursues to be a most
Friendly and productive partner
in human resources development in metrology*



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