THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY (NM-AIST)

REPORT OF THE 10TH AMRS CONFERENCE

THEME: "African Materials for African Development"

The Nelson Mandela African Institution of Science and Technology - ARUSHA, TANZANIA

10th – 14thDecember 2019

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THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY (NM-AIST)
and

AFRICAN MATERIALS RESEARCH SOCIETY (AMRS)

NM-AIST, 2019

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1.0 Background, Overview and Objectives of the conference

1.1 AMRS Background

The African Materials Research Society (AMRS) was established in August 2000 via a US-Africa Materials Workshop, which was held in Pretoria, South Africa. Subsequent biennial International Conferences have been held in South Africa (2003), Morocco (2005), Tanzania (2007), Nigeria (2009) Zimbabwe, (2011), Ethiopia (2013), Ghana (2015), Botswana (2017) and the present was hosted by the new president Prof. Hulda Swai in Tanzania, Arusha in 2019. The next one will be hosted by the new president Dr. Samuel Chigome who will announce the conference destination in due time.

1.2 Overview of the conference

The African Materials Research Society (AMRS) and the Nelson Mandela African Institution of Science and Technology (NM-AIST) hosted the 10th International Conference of the African Materials Research Society from 10th – 13th December 2019 in Arusha, Tanzania. The AMRS holds conferences every two years and it involves members of the materials community, including, world leading experts, academicians, industrialists, governments, and other sectors working and having interests in materials sciences research. Invited participants, are expected to represent local and international expertise in the area of material sciences from their diverse sectors.

This conference brought 336 participants from around the world and over 100 students. With the theme: "***African Materials for African Development***", the conference focused on advancements in materials with a close bearing for Africa's growth and well-being. The conference addressed challenges and opportunities for material science and technology in the following specializations: Health; Sustainable Building and Construction; Water and Environmental Mitigation Technologies; Nano-science and Nanotechnology; Mining and Mineral Processing; Agriculture and Environment; Education and Networking in Science and Engineering; Energy; Computational Material Science; and Manufacturing and Structural Materials.

The conference was preceded by a Pre-Conference Workshop from 8th – 9th December 2019. The workshop introduced participants to key material science topics namely:

- Biomaterials: Musculoskeletal Structure, Biomedical Implants, Cell Surface Interactions, Case Studies in Biomedical Devices and Tissue Engineering, and Nano Biomaterials.
- Nanomaterials: Nanomaterials Synthesis. Nanomaterials Characterization, Case Studies in the Applications of Nanomaterials and Devices.
- Materials for energy: Fuel Cells, Perovskite Solar Cells, Light Emitting Devices. Batteries.
- Materials for water: Ceramic Water Purification, The Underlying Materials Science and Engineering Concepts.
- Material Characterization: NMR (liquid and solid), Surface characterization methods, Mass- spectroscopy, Microscopy (TEM, SEM, Auger, EDS etc.), non-destructive material evaluation, spectroscopy and electrochemical methods.

The pre-conference workshop mainly focused on training and empowering students, early career materials researchers, and material technologists.

1.3 Conference aims and objectives

The main objective of the AMRS International Conference Series is to create a platform for science and research communities in Africa and from around the world to foster relationships, build knowledge and promote actions for further understanding and collaborations in fields associated with materials research and technology. The ultimate vision is to see Africa able to fully harness and exploit its rich natural resources greatly endowed by nature.

2.0 The Main conference

2.1 Participants

The conference was attended by 336 participants from 39 nations across the world namely Algeria, Australia, Belgium, Benin, Botswana, Cameroon, Canada, Ethiopia, France, Germany, Ghana, Greece, India, Israel, Italy, Japan, Kenya, Lesotho, Malta, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Paraguay, Poland, Russian Federation, Rwanda, Senegal, Singapore, South Africa, South Korea, Sudan, Sweden, Switzerland, Tanzania, Uganda, United States of America and Zimbabwe. Participation of delegates by continents is presented in Figure 1 where more African countries participated. Number of participants by countries is explained in Annex VI.

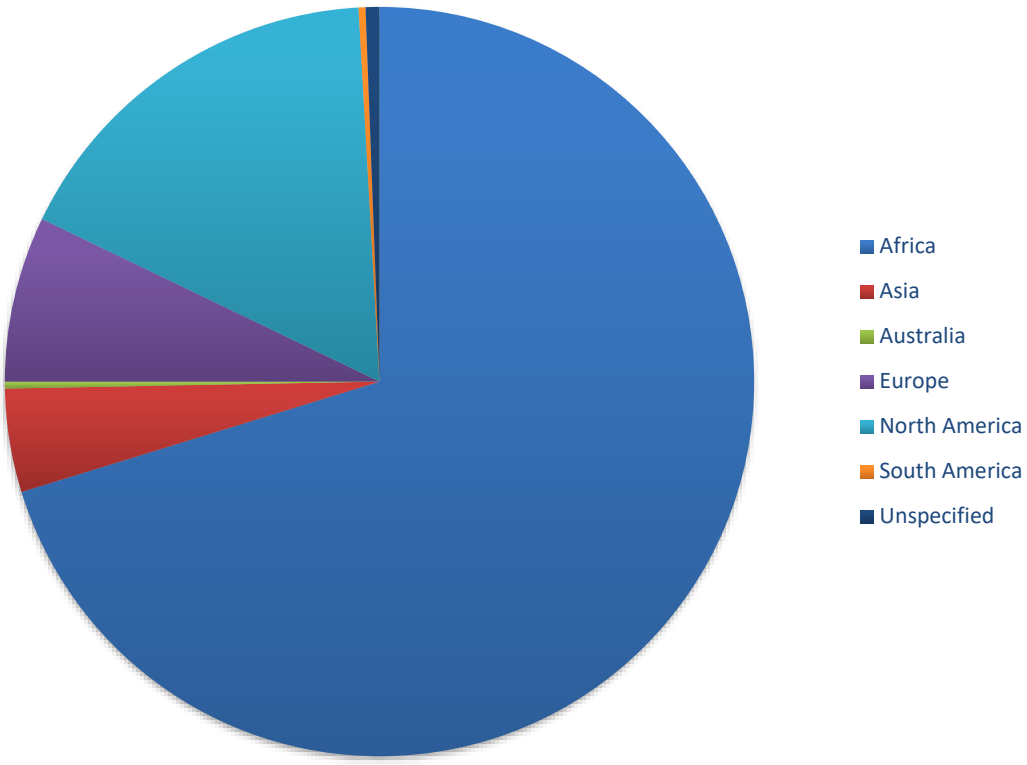

Figure 1: Number of participants by continents

2.2. Presentations

The 10th AMRS conference was composed of 9key note addresses; 58 posters and 273 paper presentations made by eminent researchers, scientists and speakers. These sessions included discussions, reflections, questions and answer sessions. Furthermore, the conference had twenty eight (28) parallel sessions chaired by eminent scientists and researchers in sevenbreakout rooms through-which vibrant discussions, experience and knowledge sharing were widely held. There were alsotwo panel discussions namelythe future of the work and the worker and the future of higher learning institutions in Africa.It is also worth noting that the conference had exhibition sessions throughout the conference where seven (7) exhibitors displayedvarious activities both for materials and for otherservices. A detailed program that highlights all papersand posters presentations, exhibitions and panel discussions is shown in Annex V.



The above pictures show presentations in parallel and plenary sessions as well as exhibitions from The Nelson Mandela African Institution of Science and technology and International exhibitors

2.3 Official Opening of the Conference

The Master Ceremony, Dr. Eliamani Laltaika welcomed the President of AMRS Prof. Hulda Swai to welcome the guest of honor and all the participants to the 10th AMRS conference. In her welcoming speech, she said the conference, among other things, will identify and discuss areas of research priorities that will be used by Universities and Research Institutions. She then welcomed the Vice Chancellor of the NM-AIST to address the audience. The Vice Chancellor presented the background of the institution including the mission and vision. In his speech, he insisted that NM-AIST is a transformative research-intensive university. The speeches offered by Prof. Hulda Swai, the president of AMRS and the NM-AIST vice chancellor are presented in Annex IX and Annex VIII respectively.

The **Guest of Honor was the Deputy Minister of Education, Science and Technology Hon. William Ole Nasha.**The Deputy Minister welcomed all participants to the 10th AMRS conference in Arusha.In his speech, he also challenged the participants to conduct research that address the challenges facing Tanzanian society and Africa in general. The guest of honor emphasized that the Tanzanian's 5th phase Government is focused on building a middle-income economy that is based on industrial economies. It is therefore important for research to focus on the areas of science, technology and innovation to solve the challenges that exist by developing products and services that meet the needs of the current highly competitive world of Science and Technology.

The Deputy Minister also posed a challenge on "Who decides what is to be done, is it for the benefit of foreigners or Tanzanians/Africans?" He said we need to focus on the research that will help solve the challenges of Africans and not foreigners. As part of his concluding remarks, the Guest of honour urged the delegates present in the conference to actively participate and ensure that, the intended noble objectives of the conference are attained and that he was looking forward to the conference report and key recommendations for uptake and administrative undertakings. He invited delegates from outside Tanzania to spare some time to visit attractive and beautiful sceneries such as climbing Mt. Kilimanjaro, visiting Ngorongoro Conservation Area Authority, Manyara, Tarangire and Arusha National parks to witness the beauty of Tanzania. He finally declared the **10th African Material Research Society Conference** with a theme on***"African Materials for African Development"***officially opens**.** *For more details, please find the speechannexed to this report (Annex VII).*

Futhermore Deputy Permanent Secretary of the Ministry of Education, Science and Technology, Prof. James Mdoe addressed the delegates giving the votes of thanks to the hosts, participants and organizers. He challenged members of the Association of African Materials Research Society (AMRS) to come up with solutions on how best we can utilize the resources available in Africa for Africa's development.

Hon. William Ole Nasha, Deputy Minister of Education, Science and Technology (L), Prof. James Mdoe The Deputy Permanent Secretary of the Ministry of Education, Science and Technology (R) addressing the delegates during the opening session of the Conference

3.0 Presentation sessions: Key note Adresses and Parallel sessions Presentations

3.1 Key Note Addresses

3.1.1 Key Note Address I: Prof. John A. Rogers, Northwestern University, USA

He presented "Soft electronics for the human body". His discussion was based on three categories; (1) background, areas of opportunity, (2) "epidermal" electronic sensors and (3) microfluidic lab on the skin systems. The presentation focused on the application of advanced electronic materials fitted on the human skin to collect various data as follows:

- Thermal: Thermography, Thermal Transport, Hydration
- Electrical: Bio-potential (ECG, EMG, EEG), Hydration
- Fluidic: Sweat (loss and chemistry), blood flow
- Mechanical: Strain, motion, modulus, pressure
- Optical: Vein mapping, etc.
- Mechano-acoustic: Cardiac auscultation, etc.

The presenter also pointed out that lack of a precision, intimate skin interface frustrates reliable collection of clinical data. He insisted that this technology has been successfully applied in neonatal intensive care in the US and they are now planning to open manufacturing points in Africa.They have started with Kenya and Zambia. With this technology, it is easy to take care of a patient as compared to traditional methods with many wires in the skin interface. This project is funded by Bill & Melinda Gates Foundation and Save the Children.

3.1.2 Key Note Address II:Prof. Nelson Torto, Executive Director, African Academy of Sciences

His presentation was on "Transforming lives through research excellence". He presented the coverage, mandate, vision and mission of African Academy of Sciences (AAS). He also presented the available funds for the researchers to apply, one of them was the DELTAS Africa, which is going to an end and is being funded by the UK Aid. The other one is Grand Challenges Africa with the following priority areas, (1) maternal, neonatal, child health, (2) Anti-microbial resistance, (3) Drug discovery and (4) water, hygiene and sanitation, just to mention few. He also presented the vision, mission and the strategic plan approach of Coalition for Africa Research and Innovation (CARI). The strategic plan approach includes resource mobilization, systematic collaboration and strategic advocacy. He concluded his presentation by insisting the researchers to take advantage of various opportunities available at AAS.

3.1.3 Key Note Address III: Dr. Askwar Hilonga, Nelson Mandela African Institution of Science and Technology, Arusha-Tanzania

His presentation was based on solving one of the societal problems in Africa (water security) which is in line with the motto of the institution "Academia for Society and Industry". He is an inventor of the "Nanofilter" which has helped a significant number of people with water crisis in Tanzania and the neighboring countries. He presented the side effects of heavy metals and fluoride to human health and importance of his invention. He noted that, in Tanzania, over 70% of the populations are living without safe water and this is the reason of his invention. In his presentation, he mostly presented success stories of the invented filter on individuals, institutions and schools. He also highlighted the awards received through this invention such as the recent award from WHO.

3.1.4 Key Note Address IV: Prof. Winston Soboyejo, Worcester Polytechnic Institute, USA

His presentation was about "US/Africa collaborations in materials Research and Education". He presented the background of US/Africa collaborations in materials. He said the initial efforts to establish this collaboration started in the 1990s. The first US/Africa workshop was held at Farm Inn in Pretoria, South Africa and the subsequent workshops in San Diego, Puerto Rico in the US and Dakar, Senegal. Through this program the idea of Nelson Mandela African Institution of Science and Technology (NM-AIST) was established. One of the first AISTs to be established was the African University of Science and Technology (AUST) in Abuja, Nigeria, which started in 2007. The presenter was one of the founders. He also highlighted areas of research that are being done at AUST such as

Healthy (cancer) specifically nanotechnology approach to early breast cancer detection and treatment, water (ceramic water filters), energy (solar cells, LEDs, batteries and super capacitors) and housing (eco-materials). In summary, the significant outcome of this collaboration with the US, African governments and other development partners includes Systems-Based Interdisciplinary Materials Research and Education in US/Africa Materials Institute (USAMI), establishment of AMRS, NM-AIST, Pan Africa Materials Institute (PAMI), African Centers of Excellence (ACEs), PASET etc. He then concluded that sustainable solutions must empower people to use science and technology to address their own problems.

3.1.5 Key Note Address V: Prof. Soo Wohn Lee from Sun Moon University, Activities of the International Union of Materials Research Societies (IUMRS).

Prof. Soo Wohn presented background of IUMRS, success stories and challenges. He also highlighted the areas that IUMRS is interested to work with AMRS in the near future. He welcomed discussion on the possibility of IUMRS sponsoring the AMRS conference. He also challenged African participants to think about hosting IUMRS conferences one day because it has never been hosted in Africa.

3.1.6 Key Note Address VI: Prof. Paul Weiss - UCLA, USA

Prof Paul Weiss's discussion was based on adding chemical dimension to lithograph at all scales: enabling studies in chemical signaling and cellular therapies. He presented how to enable cellular therapies while taking into consideration safety, efficiency, and cost effectiveness of gene modification. He also discussed issues regarding global opportunities in nanotechnology such as nanotechnology for intracellular delivery.

3.1.7 Key Note Address VII: Prof. Kenneth Ozoeman, University of Witwatersrand, South Africa

Prof Kenneth Ozoeman discussed manganese based electrode materials for energy storage applications. His discussion was based on the potential of using microwave irradiation to tune the physico-chemistry of the materials to improve energy capacity. He also reported basic facts about microwave irradiation.

3.1.8 Key Note Address VIII: Prof. Shelley Claridge, Purdue University - Standing, Lying, and Sitting: Phospholipid Striped Phases as Templates for Nanomaterials at Interfaces

Shelley, presented about broad array of problems in modern materials chemistry that relate to creating interfaces with two distinct, well-structured chemical environments at near-molecular scales. For instance, positioning nm-wide metal and semiconductor features with a pitch of 5-7 nm in a structured matrix represents a central requirement for next-generation electronic devices. She found that assembling striped phases from diyne phospholipids creates interfaces with very different properties than simple diynoic acids or diyne amines. Her study showed the relationship between structure and function at striped phospholipid interfaces, and useful material properties that emerge from the unusual surface chemistry; these include assembly of inorganic nanocrystals and assembly of functional organic molecules.

3.1.9 Key Note Address IX: Prof. Mmantsae Diale, University of Pretoria - Photo electrochemistry for Solar-Water Splitting

Prof. Diale's talk was around the concern that, while the power conversion efficiencies of perovskite solar cells have exceeded 24.2% in less than a decade of extensive research, the material still suffer from instability due to moisture and high temperatures, hindering scalability and Commercialisation. He presented synthesis of mixed cation-anion perovskite of the form CsFAMAPb(IBr)3 and fabricated solar cell. The perovskite was a 3D hybrid organic-inorganic material, which was the treated further with PEAI to produce 2D material. XRD results indicated the formation of cubic perovskite with Pm-3m space group and absorbance in the region of 700-900 nm. He concluded that evaluation of the solar cell on the 3D material yielded efficiency of up to 15%, approximated lifetime of 24 ns at a bandgap of 1.62 eV.

3.2 Panel Discussions

3.2.1 Future of work and the worker

The discussion expounded about Circular Economy as useful in the future development of African countries with respect to massive population growth. The session explained also the emergence of the fourth industrial revolution and the future of work offer unique opportunities for Africa. Workers think of losing their jobs due to innovations on digital work operations. Seventy percent (70%) of the African populations mostly youths under the age of 30 years need to update their knowledge to suit with these technological advancements. The circular economy will be the solution to these challenges in the future whereby waste materials should be recycled and become energy resources. Africa has many resources (useful minerals in production of raw materials for food industry, shelter, transportation, clothing, health facilities, computer, and other digital devices) that are not well utilized in solving Africa's

problems including poverty. Therefore, researchers need to think on ways of adding value to ideas and digital wealth, recover, re-use and add value of waste materials for sustainable circular economy in Africa.

3.2.2 Higher Education in Africa

The pannelists for the session were Dr. Winston Tumps Ireeta-Makerere, University, Dr. Kevin Jones - University of Florida and Dr. George Amolo-Technical University of Kenya. The panel discussion was on higher education in Africa. Main points from university of Makerere were that, research outputs in materials sciences is low despite the initiatives that are in place. However research on solar cooking methods, Energy storage such as, Solar concentrators, Bio processing of solid wastes, Renewable energy, Food wastage processing into energy and looking for solutions on water scarcity, water quality are main topics of interest that Uganda through the university is looking forward to undertake. Prof. Jones presented on the impact of the material research to the society. Main points were increasing social awareness of engineers and having multidimensional teams and facilitate circular economy. This would be achieved through designing teaching materials that are more Africa centric rather than Eurocentric and encourage talents and social entrepreneurship.

Some of the ways forward towards enhancing higher education that solves social problems were such as:

- Understanding problems clearly.
- Avoid situations where students want scores and so memorizing and passing, not connecting to the environment.
- Interaction and working to invent things from the classes.
- Establishing learning goals in courses that are being offered.
- Having projects that help students apply what they have learned.
- Sufficient time to think about the real problem of learning systems.
- Ensure that people we are teaching are doers, getting things done.
- Have a system that has the constant evolution.
- Training relevant individuals and find the direction of where Africa should go.
- We need a complete overhaul of the education system, get strategies for changing curricular.
- Have ministries andn governments involved.
- We need proper mentorships to younger generations and undergraduates to be involved in conferences for them to learn.
- Emphasize extra-curricular activities.

- Go to local governments, woks on projects and help local government understand what they are doing.

Prof. Amalo explained about applying experience from conventional materials science and technology. The main concern was that most of research we were engaged were more driven by collaborators and that there is still less commitments from government where there is no research culture. Hence, there is a need to shift and research on the relevant. Solutions to such challenges highlighted were to first invest in local institution, having students studying in home countries and get co supervision, lab attachments and collaborations from abroad. Some funding agencies would help such as TWAS, ICTP, IUCEA, DAAD and PASET.

3.3 Parallel Sessions Presentations

Parallel sessions were conducted under seven (7) main themes as presented in table 1. Prominent scientist, experts in respective themes, chaired the themes. Table 2 shows the detailed plan of parallel sessions, indicating days of presentations, themes and the number of presentations per theme. Likewise, figure 1 highlights the number of presentation per theme, showing that the theme known as Sustainable Manufacturing and Construction had more presentation while Materials for Agriculture and the Environment received minimum presentations.

3.3.1 Session themes and chairpersons

Table 1: List of themes and respective chairpersons

Chairpersons	Theme
Alejandro Sosnik	Materials For Health
Esther Obonyo	Sustainable Manufacturing and Construction
Cheruiyot Lagat Silah	Water and Environmental Mitigation Technologies
Fiorenzo Vetrone	Nanoscience/ Nanotechnology
Mmanthse Dialle	Materials For Energy A
Kevin Jones	Materials For Energy B - JUAMI
David Perry	Computational Materials Science
Stephen Ojwach	Materials For Health
Rostand Moutou Pitti	Sustainable Manufacturing and Construction
Patrick Sharrock	Materials for Agriculture and the Environment
Jun Lou	Nanoscience/ Nanotechnology A
Asare Nkansah	Facilities and Instrumentaion
Nchola Manyala	Materials For Energy
Anita Etale	Water & Environmental Mitigation Technologies
Mervin Meyer	Materials For Health

Patrick Mensah	Mining and Mineral Processing/Sustainable Manufacturing and Construction
Force Thema	Materials for Agriculture and the Environment
Margaret-Anne Wampamba	Education/Networking In Materials Science & Engineering
Ange Nzihou	Materials for Energy A
Adewale Adeloye	Materials For Energy B
Nicola Seriani	Computational Materials Science
Jonathan Dessi-Olive	Sustainable Manufacturing and Construction
Veronica Augustyn	Education and Networking in Materials Science and Engineering
Giovanni Fanchini	Nanoscience and Nanotechnology
Mohamed Chaker	Materials for Energy
Dickson Andala	Computational Materials Science
Benjamin Hsiao	Water and Environmental Mitigation Technologies

3.3.2 Number of delegates presentation in the specific themes

Table 2. List of themes, days of presentations and number of presenters in each theme

Day	Theme	Number of presentations
Day 1	Computational Materials Science	10
Day 2	Computational Materials Science	0
Day 3	Computational Materials Science	16
Day 4	Computational Materials Science	3
	Total: Computational Materials Science	**29**
Day 1	Facilities and Instrumentation	0
Day 2	Facilities and Instrumentation	15
Day 3	Facilities and Instrumentation	0
Day 4	Facilities and Instrumentation	0
	Total: Facilities and Instrumentation	**15**
Day 1	Materials for Agriculture and the Environment	0
Day 2	Materials for Agriculture and the Environment	6
Day 3	Materials for Agriculture and the Environment	0
	Total: Materials for Agriculture and the Environment	**6**
Day 1	Materials For Energy A	10
Day 2	Materials For Energy A	14
Day 3	Materials For Energy A	16
Day 4	Materials For Energy A	1
	Total: Materials For Energy A	**41**
Day 1	Materials For Energy B	11
Day 2	Materials For Energy B	0
Day 3	Materials For Energy B	16
Day 4	Materials For Energy B	0
	Total: Materials For Energy B	**27**
Day 2	Materials For Health	12
Day 3	Materials For Health	13
Day 4	Materials For Health	0
Day 1	Materials For Health	9
	Total: Materials For Health	**34**
Day 1	Nanoscience and Nanotechnology	11
Day 2	Nanoscience and Nanotechnology	11
Day 3	Nanoscience and Nanotechnology	12
Day 4	Nanoscience and Nanotechnology	4
	Total: Nanoscience and Nanotechnology	**38**

Day 2	Sustainable Manufacturing and Construction	14
Day 3	Sustainable Manufacturing and Construction	18
Day 4	Sustainable Manufacturing and Construction	5
Day 1	Sustainable Manufacturing and Construction	13
	Total: Sustainable Manufacturing and Construction	**50**
Day 3	Water and Environmental Mitigation Technologies	12
Day 4	Water and Environmental Mitigation Technologies	2
Day 1	Water and Environmental Mitigation Technologies	7
Day 2	Water and Environmental Mitigation Technologies	12
	Total: Water and Environmental Mitigation Technologies	**33**
	Overall number of presentations	**273**

3.3.3 Summary of presentations by themes

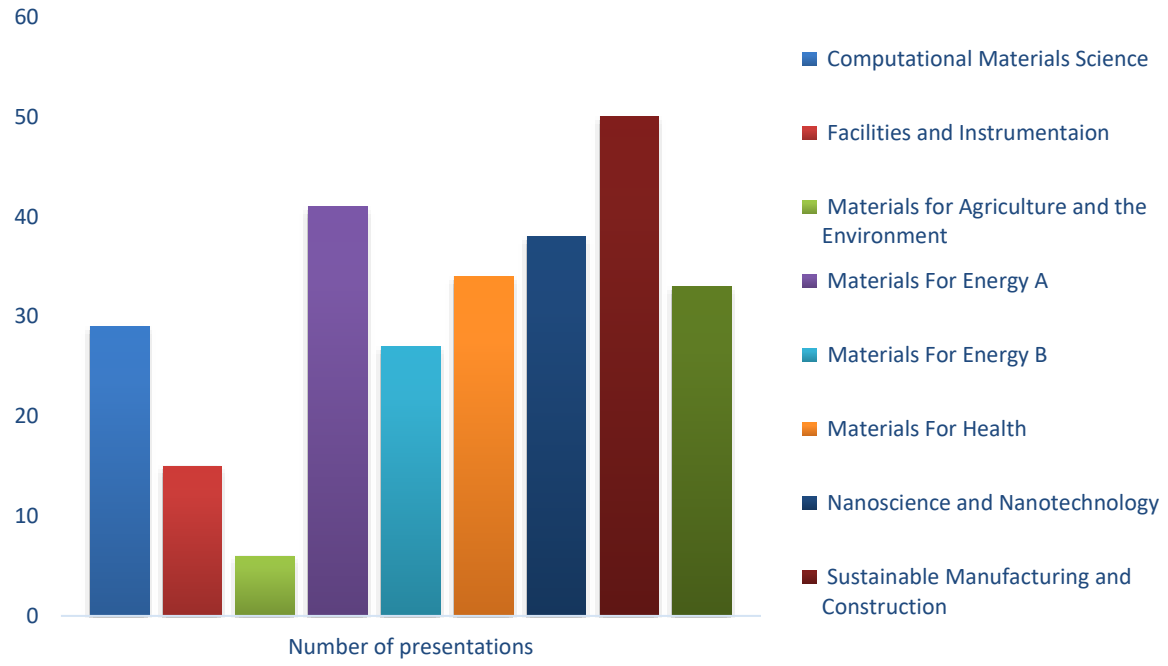

Figure 1. Summary of Presentations by themes

4.0 Discussion about the future of AMRS

The discussion about future of AMRS started with a presentation from the chairperson of the scientific committee Prof. Verdiana Masanja. The presentation highlighted analysis of the attendance of delegates by countries showing high attendance from Africa. From the analysis, it was seen important that Africans drive AMRS agenda. Other opinions on the future of AMRS were along encouraging participation of students, who represent younger generation into key convening such as conferences to encourage broader learning and networking.

5.0 Closing session

The 10th AMRS Conference with a theme titled, "African Materials for African development" was officially closed by the Deputy Vice Chancellor Planning, Finance and Administration, of the Nelson Mandela African Institution of Science and Technology, Prof. Charles Lugomela. The Depute Vice Chancellor recognised and thanked the president for hosting the conference at the Nelson Mandela African Institution of Science and Technology, and that it was an Honour for her and for the institution. He thanked all scientists, researchers and those who communicated various research findings to the conference participants through specific thematic areas and case studies for their contribution to knowledge in the area of material sciences, highlighting that Materials sciences is also one of important agenda of the institution.

The Deputy Vice Chancellor also thanked the organizing committee for making the conference a success and the conference moderators for steering the deliberations of the conference. On behalf of AMRS, the Guest of honour thanked the sponsors of the conference which included, the Tanzania Commission for Science and Technology (COSTECH), Ministry of Education, Science and Technology (MoEST), Centre for Research, Agricultural Advancement, Teaching Excellence and Sustainability (CREATES), National Science Foundation (NSF), Worcester Polytechnic Institute (WPI), Materials Research Society (MRS), Community and Rural Development Bank (CRDB), Tanzania National Parks (TANAPA), Tanzania Breweries Limited (TBL), Inter University Council for East Africa (IUCEA), Departments of Science and Technology, Republic of South Africa (DST), RUTGERS University, International Centre for Theoretical Physics (ICTP), Ngorongoro Conservation Area Authority (NCAA), Innovatoon Solutions (IMP), Northwestern University, Botswana Institute for Technology Research and Innovation (BITRI) and The Nelson Mandela African Institution of Science and Technology (NM-AIST).

The Deputy Vice Chancellor provided that, the conference has deep-dived into seven conference sub-themes. He ascertained that, it is his understanding that, the discussions during the conference were fruitful and have yielded positive results, enhanced the delegate's understanding and fostered knowledge exchanges that are worth for the materials research advancements. He added that, the papers shared during the conference are an important contribution to the improvements in the materials values in Africa.

This was followed by the Awards Ceremony presided by the The Deputy Vice Chancellor, AMRS outgoing president, Prof. Hulda Swai, AMRS incoming president, Dr. Samuel Chigome, and the Chairperson of the Scientific Committee Prof. Verdiana Masanja. This was followed by a vote of thanks by the newly elected AMRS president Dr. Samwel Chigome. Finally a group photo session that was followed by lunch and adjournment of the conference.

List of Annexes

Annex I: List of participants for the Pre conference workshop

LIST OF PRECONFERENCE PARTICIPART				
Name	**Gender**	**Organization**	**Email Address**	**Country**
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Annex II: List of Pre conference Facilitators

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Computational Physics and Biology	Japan Advanced Institute of Science and Technology (JAIST), Nomi, Ishikawa	Prof. Ryo Maezono	rmaezono@mac.com	Japan
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	(Nelson Mandela African Institution of Science and Technology (NMAIST), Arusha, Tanzania	Daniel M Shadrack	dmssjut@gmail.com	Tanzania
Nano-biosensors for the early diagnostics of diseases	Elettra Sincrotrone Trieste, Trieste, Italy	Prof. Loredana Casalis	Loredana.casalis@elettra.eu	Italy

Building Materials at the Human Scale Workshop	Engineering Design and Architectural Engineering; Material Research Institute, Penn State University, State College, PA, 16802 USA.	Dr Esther Obonyo	eao4@psu.edu	USA
	Engineering Design and Architectural Engineering; Material Research Institute, Penn State University, State College, PA, 16802 USA.	Prof Clive Randall	car4@psu.edu	USA
Workshop on Electrochemical Impedance Spectroscopy	AMETEK Scientific Instruments	Mr. Luca Pini	luca.pini@ametek.com	German

Annex III: Pre - conference Program

Sunday 8th December	**Monday 9th December**
Crystallography	Crystallography
Electrospinning	Electrospinning
Life Cycle Assessment	Life Cycle Assessment
Impact of Materials on the Society I	Impact of Materials on the Society II
Electrochemical Energy Technologies I	Electrochemical Energy Technologies II
Computational Biology and Physics	Computational Physics and Biology
Nanoscale Biosensors	Building Materials at the Human Scale
	Electrochemical Impedance Spectroscopy

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Annex V. Program for the Main conference

DAY ONE							
TUESDAY 10TH DECEMBER 2019							
OFFICIAL OPENING NM-AIST CONFERENCE HALL							
	Chair: Prof. Emmanuel Luoga, Vice Chancellor, NM-AIST						
	Rapporteur: Dr. Revocatus Machunda						
08:00 - 08:30	Arrival and registration; set-up posters in Amphitheatre						
08:30 - 08:45	Welcome address by **Prof. Hulda Swai, NM-AISTand AMRS President**						
08:45 - 08:55	Welcome address by **Prof. Emmanuel Luoga, Vice Chancellor, NM-AIST**						
08:55 - 09:05	Welcome address by **The Honorable Mrisho Gambo, Arusha Regional Commissioner**						
09:05 - 09:25	Opening Speech by Guest of honor - **The Honorable William Ole Nasha, Deputy Minister of Science, Education and Technology**						
09:25 - 09:35	Vote of thanks - **Prof. Anthony Mshandete, Deputy Vice Chancellor for Research and Innovation, NM-AIST**						
PLENARY PRESETATIONS 1 NM-AIST CONFERENCE HALL							
	Chair: Prof. Verdiana Masanja, NM-AIST						
	Rapporteur: Dr. Revocatus Machunda						
09:35 - 10.00	Address: **Prof. James Mdoe, Deputy Permanent Secretary, Ministry of Education, Science, Technology, and Vocational Training**						
10:00 - 10:45	Keynote Address: **Prof. John A. Rogers, Northwestern University, USA**						
10:45 - 11:15	**Group Photo & HEALTH BREAK at Exhibition Hall**						
11:15-11:45	**s**						
11:45-12:15	**Askwar Hilonga, Nelson Mandela Institution of Science and Technology**						
12:15-12:45	**Winston Soboyejo, Worcester Polytechnic Institute, USA** - US/Africa Collaborations in Materials Research and Education						
12:45-14:00	**LUNCH BREAK**						
BREAKAWAY PARALLEL SESSIONS 1							
SESSION	**Materials For Health**	**Sustainable Manufacturing and Construction**	**Water and Environmental Mitigation Technologies**	**Nanoscience/ Nanotechnology**	**Materials For Energy A**	**Materials For Energy B - JUAMI**	**Computational Materials Science**
	Chair: Alejandro Sosnik	**Chair: Esther Obonyo**	**Chair: Cheruiyot Lagat Silah**	**Chair: Fiorenzo Vetrone**	**Chair: Mmanthse Dialle**	**Chair: Kevin Jones**	**Chair: David Perry**

	A201	Conference Hall	A202	B201	D201	D202	B202
14:00-14:30	**Gang Bao, Rice University -** Nanomaterials for Health Applications	**Rostand Moutou Pitti, Université Clermont Auvergne, IRT -** Identification of crack front in wooden material by X-ray microtomography	**Tunde Ojumu, Cape Peninsula Univ. of Tech. -** South African coal fly ash – an abundant resource for materials development	**Giovanni Fanchini, Univ. of Western Ontario -** Organic flash memory devices from radical polymers and carbon nanomaterials	**Kofi Adu, Penn State Univ. -** Binderless Carbon Nanotube Flexible Membranes: Architecture, Device and Energy Applications	**Simon Billinge, Columbia Univ. and Brookhaven National Lab -** Characterizing structure when your material is disordered or nanostructured: yes you can	**David Perry, Univ. of Akron -** Toward the rational design of organic solar photovoltaics: Application of molecular structure methods to donor polymers
14:30-15:00		**Samuel Ibekwe, Southern Univ., Baton Rouge -** Self-Closure of Fractured Surfaces of a Composite Material during the Healing Process	**Habauka Kwaambwa, Namibia Univ. of Science and Tech. -** New Insights and Improved Applications of Moringa Seed Proteins in Water Treatment and Colloidal Materials Development	**Pierre Mubiayi, Univ. of Witwatersrand -** Nanocrystalline materials for photovoltaic applications	**Veronica Augustyn, North Carolina State Univ. -** Tuning Electrochemical Energy Storage Kinetics in Oxides via Structural Water	**Sossina Haile, Northwestern Univ. -** JUAMI Mini-Symposium: Influence of Zr-doping on the Surface Chemistry and Reactivity of Ceria	**Nelson Dzade, Cardiff Univ. -** High Photoresponse of Marcasite–Pyrite Heterojunction and Its Origin: Insights from First-Principles DFT Calculation

15:00-15:15	**Joey Chifamba, Univ. of Zimbabwe -** Development of an Albinistic actinic damage retarding treatment incorporating Zinc Oxide and Titanium dioxide nanomaterials	**Tahiru Azeko, Tamale Technical University -** Reprocessing Polyethylene and Phosphogypsum Wastes into Composite Materials for Sustainable Building Applications	**Ebenezer Annan, Univ. of Ghana -** Local Adsorbents for Fluoride Removal from Ground-drinking Water	**Winny Maboya, Vaal Univ. of Tech. -** One-step synthesis of carbon nanotubes with secondary growth of carbon nanofibers: effect of chlorine, synthesis time and temperature	**Moses Kigozi, AUST -** Replacing doping with oxide layers in semiconductors: A review	**Matthias Agne, Northwestern Univ. - JUAMI:** Strategies to engineer thermal transport through microstructure	**George Manyali, Kaimosi Friends University College -** High bulk modulus but low Vicker's hardness: A DFT study of mechanical properties of hcp Rhenium
15:15-15:30	**Maria Chinyerem Onyekanne, AUST -** Mechanical and Thermal Properties of Superparamagnetic Magnetite - Polycaprolactone Nanocomposites for Localized Treatment and Ablation of Breast Tumors	**Balakrishnan Subramanian, Addis Ababa Science and Technology Institute -** Preparation and Characterization of Ethiopian Natural Sisal Fibre Reinforced Polypropylene Composites	**Noor Gulamussen, Eduardo Mondlane Univ. -** Softening during ceramic micro filtration for application on water reclamation for cooling	**Michael Spencer, North Carolina State Univ. - JUAMI:** Nanomanufacturing Transition Metal Oxide/CNT Foam Composite Electrodes via Electrodeposition	**Ncholu Manyala, Univ. of Pretoria -** Bimetallic Phosphates/Graphene Foam as Enhanced Electrode for Hybrid Supercapacitor	**Timothy Tibesigwa, Makere Univ. - JUAMI:** Life Cycle Assessment of Biodiesel Production from Jatropha Oil, Castor Oil and Croton Oil in Uganda	**Eric Abavare, KNUST** - The stability of 3C-SiC(111) on Si(111) interface: first-principals calculations
15:30-15:45	**HEALTH BREAK/POSTER SESSION**						
SESSION	**Materials for Health**	**Sustainable Manufacturing and Construction**	**Water and Environmental Mitigation Technologies**	**Nanoscience/ Nanotechnology**	**Materials For Energy A**	**Education and Networking in Materials Science and Engineering - JUAMI**	**Computational Materials Science**
	Chair: Joey Chifamba	**Chair: Samuel Ibekwe**	**Chair: Habauka Kwaambwa**	**Chair: Richard Moutloali**	**Chair: Kofi Adu**	**Chair: Sossina Haile**	**Chair: Nelson Dzade**

	A201	Conference Hall	A202	B201	D201	D202	B202
15:45-16:00	**Laura Fabris, Rutgers Univ. -** Monitoring Communicable and Non-Communicable Diseases with SERS Probes	**Joseph Agboola, Federal Univ. Tech., Minna -** Effects of Cooling Rate During Casting on the Corrosion Resistance of 6XXX Aluminum Alloy	**Anita Etale, Univ. of Witwatersrand -** Mercury removal from mine drainage contaminated water using thin film nanocomposite membranes	**Gunnar Westin, Uppsala Univ. -** Complex nano-structured sponges through solution processing	**Clive Randall, Penn State Univ. -** Cold Sintering: Enabling a New Manufacturing Path to All Solid State Batteries	**Veronica Augustyn, North Carolina State Univ. - JUAMI -** Building the SciBridge Project via Hands-on Materials Science and Engineering Experiment Kits	Ryo Maezono, JAIST - Computational Approach to Material Design and Materials Informatics
16:00-16:15		**Jennifer Panashe, Ashesi Univ. -** Recycling of Plastic Waste Materials: Mechanical Properties and Implications for Road Construction					
16:15-16:30	**Dimitri Alexandrov, Ural Federal University -** Evolution of crystals in supersaturated solutions with biomedical applications	**Abel Olorunnisola, Univ. of Ibadan -** Evaluation of Cellulose Pulp-Cement Composite Ceiling Boards Produced with	**Usisipho Feleni, Univ. of South Africa -** Electro-oxidation of 17α-Ethinyl Estradiol Using Smart	**Christian Nijhuis, Nat. Univ. of Singapore -** Functional Molecular Electronics: Diodes, Memory, and Plasmon Sources	**Kent Griffith, Northwestern Univ. -** Oxide Materials and Mechanisms to Enable Safe and Energy-dense Fast Charging Batteries	**Michael Spencer, North Carolina State Univ**. - JUAMI: SciBridge: Preparing the Next- Generation of Scientists through	

		a Locally Developed Roller Press	Nanomaterials in Water			Renewable Energy Kits	
16:30-16:45		**Esther Anosike-Francis, AUST** - Natural fibre reinforced building materials : A review			**Francis Dejene, Univ. of the Free State -** Characterization of titanium dioxide anatase phase synthesized using tetra isopropyl orthotitanate (TIP) and tetra-n-buty orthotitanate (TNB) by wet chemical method.	**Jeremy Hitt, Univ. of Pennsylvania - JUAMI**: A Low-cost, Open Source Potentiostat for Teaching Electrochemistry	**Gloria Murila, Masinde Muliro University Of Science And Technology -** Elastic Layer Modulus for Janus Transitional Metal Dichalgonides
16:45-17:00	**Oladiran Abubakre, Federal Univ. of Tech., Minna -** Development and characterization of carbon nanotube reinforced natural rubber composite for prosthetic foot application	**Sun Hwi Bang, Penn State Univ.** - Sustainable cold-sintered composite bricks with locally-accessible materials		**Fabian Ezema, Univ. of Nigeria, Nsukka** - Irradiation-Induced Effects of 8.0 MeV Carbon Ion (C++) on Nanostructured MnO2-NiO-ZnO/GO	**Emmanuel Iwuoha, Univ. of the Western Cape -** Nanomaterials for Amperometric Sensing, Signalling and Energy Sustainability	**Jill Wenderott, Northwestern Univ. - JUAMI -** Design and creation of professional development workshops that support women in STEM in Tanzania	**Musa Mjankwi , NM-AIST -** Unsteady MHD flow of Nanofluid with Variable Properties over a Permeable Horizontal Stretching Sheet under Thermal radiation and Chemical Reaction

17:00-17:15	**Ntabeleng Hlapisi, Univ. of Zululand** - Encapsulation of Porphyrins with Gold Nanoparticles for the potential treatment of Cancer and Bacterial Infections.	**DK Osseo-asare, Penn State Univ. -** Cuboctahedral Bamboo-Steel-Resin Composite Construction System for Mobile Architecture		**Miron Kagan, V.a. Kotelnikov Institute Of Radio Electronics Of Russian Ac. Sci.** - Field Ionization of Boron Acceptrs in CVD-Diamond due to Poole-Frenkel' Effect	**Mmantse Diale, Univ. of Pretoria** - Mixed cation-anion 3D perovskites for solar cells	**Danielle Butts, UCLA - JUAMI** Mini Symposium: Increasing girls' participation in higher education through women's health	**Keishu Uchimura, JAIST** - Ab initio evaluation of thermal conductivity for polymer crystals towards a QSPR
17:15-17:30	**Theresa Ezenwafor, AUST -** Processing of Magnetite Nanoparticles for Triple Negative Breast Cancer Detection	**Mike Otieno, Univ. Witwatersrand -** Utilization of kimberlite tailings as aggregates in concrete – strength and selected durability properties		**Aleksandr Kisliuk, NUST MISiS** - Magnetoelectric Properties of Laminates Based on Y+140°-cut Bidomain Lithium Niobate Crystals		**Brian Iezzi, Univ. of Michigan, Ann Arbor - JUAMI Minisymposium :** The Open Computing Facility (OCF) and Life Cycle Assessment	**Daniel Shadrack, NM-AIST** - A Computational Study of the Role of Solvents and Conformational Fluctuation in Drug Interactions
17:30-17:45		**Emmanuel Arthur, KNUST** - Material Selection for Water Pipe by Multi-Objective Decision-Making Method: The		**Martin Thuo, Iowa State Univ., Ames** - Functional Materials through Surface and Interface Engineering			

		Case of Alternative Materials for PVC Pipes.					
18:00	**POSTER SESSION in the Amphitheatre**						
DAY TWO							
WEDNESDAY 11TH DECEMBER 2019							
08:00 - 08:30	Registration						
PLENARY PRESETATIONS 2 NM-AIST CONFERENCE HALL							
	Plenary Session Moderator:						
08:30 - 09:00	**Soo Wohn Lee, Sun Moon University** - Using microstructure design of Sialon Ceramics for multi-functional properties						
09:00 - 09:30	**Paul Weiss, UCLA** - Global Opportunities in Nanotechnology						
09:30 - 10:00	**Kenneth Ozoemena, Univ. of Witwatersrand** - Manganese-Based Next-Generation Electrochemical Energy Storage Systems						
10:00 - 10:30	**HEALTH BREAK**						
BREAKAWAY PARALLEL SESSIONS 2							
SESSION	**Materials For Health**	**Sustainable Manufacturing and Construction**	**Materials for Agriculture and the Environment**	**Nanoscience/ Nanotechnology A**	**Facilities and Instrumentaion**	**Materials For Energy**	**Water & Environmental Mitigation Technologies**
	Chair: Stephen Ojwach	**Chair: Rostand Moutou Pitti**	**Chair: Patrick Sharrock**	**Chair: Jun Lou**	**Chair: Asare Nkansah**	**Chair: Nchola Manyala**	**Chair: Anita Etale**
	A201	**D202**	**Conference Hall**	**B201**	**B202**	**D201**	**A202**
10:30 - 11:00	**Alejandro Sosnik, Technion-Israel Institute of Technology -** The Potential of Amphiphilic Nanobiomaterials in Drug Delivery and Targeting.	**Nima Rahbar, MIT** - Bioinspired Design of Next Generation Structural and Thermal Materials	**Patrick Sharrock, Paul Sabatier Univ.** - Engineering phosphates from recycled animal bones	**Fiorenzo Vetrone, Institut National de la Recherche Scientifique** - Upconversion Nanoparticles	**Greg Boebinger, Florida State Univ.** - U.S. National High Magnetic Field Laboratory (MagLab): Energy, Nanoscience, and Medicine	**Ange Nzihou, IMT Mines Albi -** Biomass and waste valorisation in materials for thermal energy storage (TES) and applications	**Wondimagegne Mengistu, Ethiopian Biotechnology Institute -** Zeolites for the Purification of Water (Removal of Hardness and Heavy Metal

							Specifically Cr and Pb
11:00 - 11:30	**Joey Chifamba, Univ. of Zimbabwe** - Advances in materials nano functionalization for cancer and CVDs early diagnosis, targeted and triggered drug delivery	**Said Kenai, Univ. of Blida 1** - Performance of Stabilized Earth with Wheat Straw and Slag	**Force Thema, Botswana Univ. of Agriculture and Natural Resources** - Bio economy and advanced Agriculture: How establishment of robust bio nanotechnology platform can make it a reality.	**Joelle Margot, Université de Montréal** - Plasmas : A Unique Tool for the Synthesis and Processing of Thin Films and Nanomaterials	**Samuel Chigome, BITRI** - Electrospinning for Analytical Device Fabrication	**Mohamed Chaker, INRS Canada** -Plasma Deposition of Oxide Materials for Photonics and Energy	
11:30 - 11:45	**Yiporo Danyuo, Ashesi Univ.** - Drug Release and Laser Application of Nanocomposite Hydrogels on Cancer Cell Viability	**Ifeyinwa Obianyo, AUST** - Strength and Morphology of Stabilized Lateritic Soil for Sustainable Building Applications	**Peter Echassa, Kenyatta Univ.** - An Efficacious Supplementary Fertilizer Formulation from Agricultural Farm Biomass	**Cecil King'ondu, BIUST** - Gas Phase C-N Coupling over Alpha Manganese Oxide Nanomaterials: A Route to Large-Scale Green Synthesis of Imines	**Tessema Guebre, National Science Foundation**	**Abdulhakeem Bello, AUST** - High Voltage Hybrid Supercapacitors in Aqueous Electrolyte	**Temesgen Girma Kebede, Univ. of South Africa** - Removal of pharmaceutical drugs from wastewater using nanofibers
11:45 - 12:00	**Wubshet Girma, Wollo Univ.** - Heteroatom-doped Carbon Quantum Dots: Microwave-assisted Synthesis	**Emeso Ojo, AUST** - Influence of Fibres on Strength and Resistance Curve Behaviour of Extruded Alkali	**Joshua Idassi, Empowering Africa Consulting Group** - Precision Sustainable	**Hailemariam Gebru, Technology and Innovation Institute of Ethiopia** -	**Eric Garfunkel, Rutgers Univ.** - New Tools for Surface, Interface and Nanostructure	**Chibueze Amanchukwu, Univ. of Chicago** - Controlling Lithium-ion Solvation for Improved	

	and its Biomedical Applications	Activated Natural Clays	Agriculture for Long Term Sustainability of Agriculture and the Environment	Catechol End-Functionalized Polysarcosine for In-situ Synthesis and Stabilization of Silver Nanoparticles	Characterizatio n	Lithium Metal Deposition	
12:00 - 12:15	**Stella Dozie-Nwachukwu, Sheda Science and Technology Institute -** Prodigiosin induced apoptosis and the cytoskeletal changes on breast cancer cell line MDA-MB-231.	**Philbert Nshimiyimana, Institut 2ie & Univ. Liège -** Effect of production and curing conditions on performances of compressed earth block stabilized with calcium carbide residue: Kaolinite vs quartz-materials	**Patrice Okoye, Nnamdi Azikiwe University Awka -** Establishing the Feasibility of Substituting Synthetic Preservatives with Natural Phytochemicals in the Food and Allied Industries: Orange Juice Preservation.	**Miron Kagan, V.a. Kotelnikov Institute Of Radio Electronics Of Russian Ac. Sci. -** Electrical Domains in Short-Period GaAs/AlAs and InAs/AlSb Superlattices	**Alain Gibaud, IMMM, CNRS UMR 6283 , Le Mans Université -** From incoherent to coherent scattering at synchrotron beamlines : the power of 3D tomography	**Fabian Ezema, Univ. of Nigeria, Nsukka -** Synthesis and Characterization of GO/Mn3O4 Nanocomposite Film Electrode Materials for Supercapacitor Applications	**Sean Perry, CSIR -** AMD treatment using modified sisal/chitosan nanocomposit e as an adsorbent
12:15 - 12:30	**Obinna Ofoegbu, Univ. of Agriculture -** Fabrication of Chitosan-based Molecularly Imprinted filters With Binding Sites for Nicotine-Phenylalanine Amide Blend, for Sequestration of	**Mike Otieno, Univ. of Witwatersrand -** Curing of slag concretes at low temperatures: effect on strength and durability properties		**Alexander Temirov, NUST MISiS -** Silicon-Carbon Films Synthesis by High-Frequency Deposition	**Loredana Casalis, Elettra Sincrotrone Triesete -** Nanoscale surface biofunctionaliz ation strategies for high sensitivity liquid biopsy	**Delvina Tarimo, Univ. of Pretoria -** Sulphur-doped reduced graphene oxide material with improved electrochemical performance for supercapacitor applications	**Dickson Andala, Multimedia Univ. -** Mixed Metal Oxide-Biopolymer Nanocomposit es for Anion and Heavy Metal Water Remediation

	Carcinogens from Cigarette Smoke.						
12:30 - 14:00	**LUNCH BREAK**						
BREAKAWAY PARALLEL SESSIONS 3							
SESSION	**Materials For Health**	**Sustainable Manufacturing and Construction**	**COACh Workshop**	**Nanoscience/ Nanotechnology A**	**Nanoscience/ Nanotechnology B**	**Materials for Energy**	**Water & Environmental Mitigation Technologies**
	Chair: Laura Fabris	**Chair: Nima Rahbar**		**Chair: Cosmas Muiva**	**Chair: Pierre Mubiayi**	**Chair: Johannes Awudza**	**Chair: Wondimagegne Mengistu**
	A201	**D202**	**Conference Hall**	**B201**	**B202**	**D201**	**A202**
14:00 – 14:30	**Naomi Matsuura, Univ. of Toronto -** Acoustically activated biomaterials for personalized medicine	**DK Osseo-Asare, Penn State Univ.** - Peer-to-Peer (P2P) Interclass Open Design and Innovation Network for Upcycling E-waste	**COACh Workshop: Prof. Geri Richmond, University of Oregon, USA**	**Jun Lou, Rice Univ. -** The Emergence of Multifunctional Two-Dimensional Materials	**Gen Tatara, Riken Cems -** Recent developments in nanomagnitism and spintronics	**Benjamin Agyei-Tuffour, Univ. of Ghana -** Organic and Perovskite Solar Cells: The Influence of Pressure, Substrate and Morphology on interfaces and performance	**Qilin Li, Rice Univ. -** Multifunctional nanocomposite coatings for desalination and water purification

14:30 – 14:45	**Michinao Hashimoto, Singapore Univ. of Tech. and Design** - Additive Manufacturing for Fabrication of Microfluidic Devices	**Maina Maringa, Central. Univ. of Tech., Bloemfontein** - Ameliorating the Effects of High Temperature on Polymers and in Particular Polypropylene in Laser Sinter Additive Manufacturing		**Rashidah Akoba, Ithemba Labs & Univ. of South Africa** - Preparation and characterization of Nanostructured Black Moly Coatings as selective solar absorbers by wet chemical etching	**Anna Krzykawska, Jagiellonian Univ.** - All in One: N-Heterocyclic Carbenes for the Self-Assembly of Monolayers of Superior Quality and Stability	**Adebayo Fashina, AUST/Gollis University** - Exploring the possibility of perovskite solar cells dominating the solar technology market by 2030.	**Hlobsile Kgomo, Univ. of South Africa** - Removal of selected antibiotics from water using silk fibroin-based adsorbents derived from Argema mimosae silkworm cocoons
14:45-15:00		**Amos Muiruri, Central Univ. of Tech., Bloemfontein** - Application of Phenomenological Modelling in the Development of Database for Additively Manufactured Ti6Al4V (ELI): A Review		**Maram Ali Ahmed Musa, Universiti Putra Malaysia** - Synthesis of Nanocomposite Magnetite/Titania Nanocomposite for photocatalytic and Magnetic application	**Krysztof Jankowski, Jacob of Paradies Univ.** - Effect of growth carbon structure as a wire, using in situ HV AC arc discharge.	**Julius Mwabora, Univ. of Nairobi** -Dye-Sensitized Solar Cells (DSSCs): Theory, Technology and Current Status	**Innocent Nkurikiyimfura, Univ. of Rwanda** - Wastewater treatment using starch-functionalized magnetite nanoparticles.

15:00 – 15:15	**Killian Onwudiwe, AUST -** Strain-Displacement Analysis for the Viscoelastic Parameters of Breast Cancer cells Using MATLAB	**Tido Tiwa Stanislas, AUST -** Impact of hornification treatment in the physico-chemical and mechanical properties of raffia fibre and okra fibres		**Honita Ramphul, Univ. of Mauritius -** Investigation of sugarcane bagasse derived cellulose-based nanocomposite scaffolds for tissue engineering applications	**Piotr Cyganik, Jagiellonian Univ. -** Molecule-substrate interface analysis by SIMS	**Tumaini Mkwizu, Univ. of Witwatersrand -** Mixed Metal Electroceramic Energy Materials: Doping Strategies in Tuning Solid Phase Structure and Electrolytic Effects	**Kanayo Oguzie, Federal University Of Technology, Owerri -** Electrochemical Degradation of Dye Contaminated Water
15:15 – 15:30	**Mervin Meyer, Univ. of the Western Cape -** The antimicrobial and immune modulatory effects of bio-inspired nanoparticles produced from indigenous flora of South Africa	**Julio Diarte, Penn State Univ. -** Tapping into Urban Recycling for Low-cost Materials. Designing Acoustic Panels with Waste Cardboard		**Michael Musembi, Univ. of the Free State -** Citrate–nitrate auto-combustion synthesis of zinc zirconate $ZnZrO_3$ nanocomposite	**Bathusile Masina, CSIR -** Effect of laser wavelength in PLD in the orientation and thermochromic properties of VO_2 (M1) on a glass substrate	**Benjamin Ombwayo, Masinde Muliro Univ. of Science And Tech. -** Device Simulation of Sb_2S_3 Solar Cells by SCAPS-1D software	**Mary Simiyu, Univ. of Nairobi -** Design of Low-cost water Purification System based on Nano-technology
15:30 – 16:00	**HEALTH BREAK**						
15:45 – 16:00	**Nikiwe Mhlanga, Mintek -** Application of Ag and Au mercaptobenzoic labelled Surface enhanced Raman Spectroscopy probes for detection of Plasmodium falciparum	**Kabiru Mustapha, Kwara State Univ. -** Mechanical properties of Calcium carbonate/Eggshell particle filled polypropylene Composites		**Giday Welegergs, Univ. of South Africa -** Synthesis and optimization of copper oxide (CuO) nanocoatings on copper substrate	**Cosmas Muiva, BIUST -** Low Cost Synthesis of CuO Nanostructures: Challenges and	**Joseph Asare, Univ. of Ghana -** PEDOT/NiO Composite Hole Transport Layer for Perovskite Solar Cells	**Augustine Appiah, Univ. of Ghana -** Local Adsorbents for Mercury and Arsenic Removal from Contaminated Water in the Mining

				as selective solar absorbers	Opportunities		Communities in Ghana
16:00 - 16:15	**Stephen Ojwach, Univ. of KwaZulu Natal -** Palladium(II) complexes of N^N^N 2,6-bis(benzoazole) ligands: Structural, kinetics of ligand substitution reactions, DNA binding and anti-cancer activity studies	**Monnamme Tlotleng, CSIR** - LENS manufactured γ-TNB turbine blade using Laser "in situ" alloying approach		**Ramakwalah Chokwe, Univ. of South Africa -** Preparation and characterization of electrospun nanofiber from Mondia whitei seed extract	**Monika Szwed, Jagiellonian Univ. -** Preparation of Chemically Inert Carbon Nanomembranes by Electron Irradiation Process	**Johannes Awudza, KNUST -** Development of Nanomaterials for Solar Cell Applications: Options and Challenges	**Gunda Chembea, Taita Taveta Univ. -** Redefining the water utilities in Kenya; A case study of TAVEVO
16:15 - 16:30		**Ines Ngassam, Univ. of Cape Town** - Potential for agro-waste materials to be used for infrastructure in materials in Africa		**Ibrahima Ngom, Univ. of South Africa -** Biosynthesis of Nickel Oxide Nanoparticles Using Flowers, Seeds, and Leaves Extract of Moringa Oleifera: Structural, Optical, and Morphological Properties	**Tom Oder, Youngstown State Univ. -** Optical and Microstructural Properties of Sputter-Deposited Gallium Oxide Films	**David Dodoo-Arhin, Univ. of Ghana** - Inkjet-Printed Graphene Electrodes for Dye-Sensitized Solar Cells	**Vusumzi Pakade, Vaal Univ. of Tech.** - Designer Adsorbents: Toward Total Chromium Removal
	NM-AIST Conference Hall						

16:30-18:30	**THE FUTURE OF WORK AND THE WORKER** **Panelists:** **Diran Apelian, Metal Processing Institute, Worcester Polytechnic Institute** **Martin Burt, Fundacion Paraguaya and Worcester Polytechnic Institute** **Sajitha Bashir, World Bank Group** **Ange Nzihou, IMT Mines Albi-Carmaux**						
16:30	**AMRS AFRICAN DINNER AND GALA**						
DAY THREE							
THURSDAY 12TH OF DECEMBER 2019							
08:00 - 08:30	Registration						
PLENARY PRESETATIONS 3 NM-AIST CONFERENCE HALL							
	Plenary session chair						
08:30 - 09:15	**Federico Rosei, INRS-EMT, Univ. du Quebec, Canada -** Fabricating, processing and characterizing inorganic, organic and biocompatible nanomaterials						
09:00 - 09:30	**Mmantsae Diale, Univ. of Pretoria** - Photoelectrochemistry for Solar-Water Splitting						
09:30 - 10:00	**Shelley Claridge, Purdue University** - Standing, Lying, and Sitting: Phospholipid Striped Phases as Templates for Nanomaterials at Interfaces						
10:00 - 10:30	**HEALTH BREAK**						
BREAKAWAY PARALLEL SESSIONS 4							
SESSION	**Materials For Health**	**Sustainable Manufacturing and Construction**	**Water and Environmental Mitigation Technologies**	**Nanoscience/ Nanotechnology**	**Materials for Energy A**	**Materials For Energy B**	**Computational Materials Science**
	Chair: Naomi Matsuura	**Chair: David Dodoo-Arhin**	**Chair: Askwar Hilonga**	**Chair: Joelle Margot**	**Chair: Balla Diop Ngom**	**Chair: Benjamin Agyei-Tuffour**	**Chair: George Manyali**
	A201	**B201**	**A202**	**E201**	**D201**	**D202**	**B202**

10:30 - 11:00	**Fulvio Ratto, Istituto di Fisica Applicata -** Hybrid devices exploiting the photothermal and photoacoustic features of plasmonic systems	**Patrick Mensah, Southern Univ. -** Study of Thermo-Mechanical Properties of Selective Laser Melting Processed Materials: Aluminum, 316L Stainless Steel and Titanium Alloys	**Tom Lindstrom, KTH and SUNY Stony Brook -** The World of Nanocellulosic Applications (talk delivered by Benjamin Hsaio)	**Giovanni Fanchini, Univ. Western Ontario -** Graphene and two-dimensional (2D) materials for water purification and nanofiltration with in-line sensing capabilities	**Francesca Iacopi, Univ. of Technology, Sydney -** Engineering graphene on silicon for electrochemical applications	**Jennifer Rupp, MIT -** Solid State Ceramic Battery Electrolyte and Low Temperature Cell Processing	**Nicola Seriani, ICTP -** Ab-initio simulations of water oxidation at a hematite surface
11:00 - 11:15	**Abram Madiehe, Univ. of the Western Cape -** Peptide-functionalized gold nanoparticles for enhanced targeted drug delivery and efficacy	**Eubert Mahofa, Harare Institute of Tech. -** Synthesis of bio-lignin based adhesives	**Cheruiyot Lagat Silah, Jaramogi Oginga Odinga Univ. of Science and Tech. -** Leaching of herbicide metribuzin under field conditions in different types of tropical soils around Lake Victoria basin	**Richard Moutloali, Univ. of Johannesburg -** Photodegradation Of Organic Dyes Using Cobalt-Based Metal Organic Framework (ZIF-67) Catalysts Supported On Graphene Oxide: An Experimental and Theoretical Report	**Kandis Abdul-Aziz, Univ. of California, Riverside -** lucidating Structure-Property Relationships for the Rational Design of Nanoparticles on Lanthanide Perovskites	**Floyd Lionel Mabiala, iTHEMBA Labs/Univ. of the Western Cape -** Pb-Sn binary perovskite solar cells by chemical vapor deposition	**Paul Barasa, Mmust -** Dynamical and Mechanical stability of FeO2 at elevated pressures
11:15- 11:30		**Cecilia China, NM-AIST -** Stabilization of hides/skin to get leather by using combination of vegetable tannins from local plants and aluminium sulphate				**Lineo Mxakaza, Univ. of Witwatersrand -** Preparation of Cu2ZnSnS4 /N-MWCNTs nanocompos	**Job Wafula, Kibabii Univ. -** Fracture toughness and Vickers hardness of α-TiZr: A shape memory alloy

						ite as potential Pt free counter electrode material in dye sensitized solar cells	
11:30 - 11:45		**Joshua Asante, Univ. of Ghana -** Fabrication and Characterisation of Particle/Cellulose fibre Reinforced Polymer Biocomposites for Packaging Applications	**Nura Shanono, Bayero Univ.** - Assessing the Impact of Human Behaviour on Water Resource Systems Performance: A Conceptual Framework	**Abera Ambaye, Univ. of South Africa** - Ultra-sensitivity of Cu-MOF/N-doped graphene oxide composite based screen-printed electrodes for electrochemical detection of Pb (II)	**Adewale Adeloye, Umaru Musa Yar'adua Univ. -** Effects of extended pi-conjugation bonds on the photophysical and electrochemical properties of Ru(II) polypyridyl complexes as dye-sensitized solar cells (DSSCs)materials	**Hezekiah Buay Sawa, Univ. of Dar Es Salaam -** Effects of Annealing conditions on the properties of copper Zinc Tin Selenide (CZTSe) absorber layer for thin film solar cells	**Kenji Oqmhula, JAIST** - Ab-initio Evaluation of Binding Energy in Cyclodextrin Inclusion Complex Systems
11:45 - 12:00	**Andrei Turutin, Nat. Univ. of Sci. and Tech. MISIS -** Suppression of acoustic noise in magnetoelectric sensors based on bidomain lithium niobate	**Cecilia Wandiga, CSTI - Nairobi** - (to be delivered by Esther Obonyo) Regional Growth Opportunities: Using ICT and Circular Bioeconomy Practices to Link Agriwaste as an	**Hossein Miraji, Univ. of Dodoma** - Society Engagement in Low-Cost Percussion Water-Well Drilling Technology for	**Nandipha Botha, Univ. of the Western Cape -** Effects of reaction temperature and cadmium source on the optical, morphological characterization and cytotoxicity	**Raesibe Ledwaba, Univ. of Limpopo -** Multiscale Modelling of Spatio-Temporal Dynamics in Li- and Mn-Rich Cathode Materials	**Stephen Otieno, Maseno Univ.** - Hydrothermal Crystallization of Zeolites from Clay through	**Genki Iman Prayago, JAIST** - Ground state determination of LiVX2 system using Diffusion Monte Carlo

	for biomedical applications	Industrial Raw Material Input	Rehabilitation of Africa Economy: Moving from Theory to Practice	studies of CdSe/ZnSe		Meta-kaolinization and Fused-kaolization for Bio-diesel Synthesis	
12:00 - 12:15	**David Obada, Ahmadu Bello Univ. -** Direct conversion assisted by compaction and the gradient of mechanical properties of kaolin reinforced hydroxyapatite	**David Dodoo-Arhin, Univ. of Ghana -** Plastic Fuel Conversion and Characterisation: A Waste Valorization Potential for Ghana	**Tatenda Madzokere, Midlands State Univ. -** Filtration properties and Anti-biofoluing characteristics of Electrospun Nano Silver/Polysufone – Nanofibrous Membrane for Water Purification	**Sixberth Mlowe, Univ. Dar es Salaam -** Structural Influence of Single Source Precursor on the Morphology of Lead and Iron Sulfide Thin Films	**Ilya Kubasov, NUST MISiS -** Low-frequency vibration sensor with a sub-nm sensitivity using a bidomain lithium niobate crystal	**Ugochukwu Madukasi, Federal College Of Education, Eha-amufu -** Potentials of Biomass for Improved Energy Generation. A Step in Steering West Africa Towards Renewable Energy Use	**Kennedy Gitari, Masinde Muliro Univ. of Science and Tech. -** Band Structure and Optical Absorption in Copper Oxides

12:15 - 12:30	**Isabelle Niyonshuti, Univ. of Arkansas -** Synthesis and Characterization of Poly Ethylene Glycol (PEG)-Based Injectable Anionic Hydrogels for Protein Delivery in Wound Healing Applications	**Maina Maringa, Central Univ. of Tech., Bloemfontein -** The combined effect of mercerisation, silane treatment and acid hydrolysis on the mechanical properties of sisal fibre/epoxy resin composites	**Usisipho Feleni, Univ. of South Africa -** Electro-oxidation of 17α-Ethinyl Estradiol using Smart Nanomaterials in Water	**Ipe Mavunkal, BITRI -** Effect of Relative Humidity on Electrospun Nanofibers	**Itani Madiba, Univ. of South Africa/ iThemba LABS -** Synthesis, modification and radiation of vanadium oxide based thin films for opto-electronic applications	**Celine Omondi, Masinde Muliro Univ. of Science and Tech. -** Effects of the substrate on the electronic properties of CH3NH3 PbI3 films	**James Sifuna, Technical Univ. of Kenya/Univ. of Canatabria -** Construction of a second-principles model for WSe2
12:30 - 14:00	**LUNCH BREAK**						
BREAKAWAY PARALLEL SESSIONS 5							
SESSION	**Materials For Health**	**Mining and Mineral Processing/Sustainable Manufacturing and Construction**	**Materials for Agriculture and the Environment**	**Education/Networking In Materials Science & Engineering**	**Materials for Energy A**	**Materials For Energy B**	**Computational Materials Science**
	Chair: Mervin Meyer	**Chair: Patrick Mensah**	**Chair: Force Thema**	**Chair: Margaret-Anne Wampamba**	**Chair: Ange Nzihou**	**Chair: Adewale Adeloye**	**Chair: Nicola Seriani**
	A201	**B201**	**A202**	**Conference Hall**	**D201**	**D202**	**B202**
14:00 – 14:15	**David Obada, Ahmadu Bello Univ. -** Facile synthesis and fracture toughness evaluation of catfish bones	**George Kato, Univ. of Dar Es Salaam -** Petrography of the Maruku Sands in Kagera, Tanzania	**Alois Ngonyani, Government Chemist Laboratory Authority, Dar Es Salaam -** Mixed Iron	**PANEL ON HIGHER EDUCATION IN AFRICA: <u>Winston Tumps Ireeta, Makerere Univ. -</u>** Capacity Building in Materials Science	**Clara Santato, Polytechnique Montreal -** Towards a circular vision for electronics	**Tom Oder, National Science Foundation (US) -** Optimization of Ti and Mo contacts for	**Nicola Marzari, EPFL -** Novel Two-dimensional Materials from High-throughput Computation

	derived hydroxyapatite.		Oxide Nanoparticle-Based Colorimetric Assay for the Detection of Selected Organophosphate Pesticides	and Solar Energy in Africa; **Kevin Jones, Univ. of Florida**- The Impact of Materials on Society; **George Amolo, Technical Univ. of Kenya**- Applying Experiences from conventional materials science and technology to current applications in the local scenes.		SiC Schottky Barrier Diodes	al Exfoliation
14:15-14:30		**Kojo Konadu, Kyushu Univ. -** Characterization of biotreated natural organic carbon by spectroscopic and thermogravimetric techniques: application to gold extraction from carbonaceous earth materials	**Aderonke Omole, Ahmadu Bello Univ. -** Investigation of Prospective of Ethanolic Annona senegalensi Extract for Preventing Fungal Pathogen Induction for Enhanced Seed Sprouting				

14:30 – 14:45	**Reuben Pfukwa, Stellenbosch Univ. -** Pyrrolidone-based Polymers: Synthesis, Self-assembly and Biomedical Applications	**Abraham Ebunu, AUST -** Barite as an Industrial mineral in Nigeria: Occurrence, Utilization, Challenges and Future	**Martin Egblewogbe, Univ. of Ghana -** Room Temperature Gas Sensing Using ZnO2		**Balla Diop Ngom, Univ. Cheikh Anta Diop -** Novel Green Biosynthesis of Vanadium Pentoxide Using Water Extraction of White Hibiscus Sabdariffa Leaves as Electrode Material for Supercapacitor Applications	**Ginena Shombe, Univ. of Zululand -** Direct solvent-free synthesis of bare α-NiS, β-NiS and α-β-NiS composite for high-performance supercapacitors and overall water splitting activity	**Ismaila Dabo, Penn State Univ. -** Computational Screening of Photocatalytic Materials for Solar-to-Hydrogen Conversion
14:45-15:00		**Takalani Madzhivandila, Univ. of Johannesburg -** Utilization of South African spent foundry sand in brick manufacturing	**Muvhango Rasalanavho, Univ. of Kwazulu-Natal -** Mineral and nutritional contents of five species of wild growing mushrooms from South Africa		**Brian Owuor, Univ. of Nairobi -** Effect of TiO2 Blocking Layer on Photovoltaic Characteristics of TiO2/Nb2O5 Dye Sensitized Solar Cells	**Amal Azuha, Shibaura Inst. of Tech. -** Quaternary Quasicrystal Alloys for Hydrogen Storage Technology	
15:00 – 15:15	**Pamhidzai Dzomba, Bindura Univ. -** Formulation of Food-based Alternatives	**Farai Banganayi, Univ. of Johannesburg -** Optimisation of an Environmentally Friendly Foundry Inorganic binder Core	**Stephen Majoni, BIUST -** Assessing the effects of precursor material	**Kwadwo Osseo-Assare, Penn State Univ.-** Sika ano yɛnam sen sekan. Money is sharper than the sword: On	**Vianney Andrew Yiga, Makerere Univ. -** Thermogravimetric analysis of agricultural residue carbonized briquettes for domestic	**Munashe Chikweche, Harare Inst. of Tech. -** Quaternary Quasicrystal Alloys for	**Cliffton Masedi, Univ. of Limpopo -** Beyond Li-ion: Computation

	Remedies for Type 2 Diabetes	Making Process for the Replacement of an Organic Binder.	carbon content on the heavy metal adsorption activity of synthesized zeolites	teaching and learning materials engineering with African proverbs	and industrial applications	Hydrogen Storage Technology	al Modelling Studies on Stability of Li-S-Se System
15:15 – 15:30	**Willie du Preez, Central Univ. of Technology, Free State** - Production of Certified Customised Titanium Medical Implants through Additive Manufacturing	**Godfrey Mwendenusu, Univ. of Dar Es Salaam** - An Approach to Mineral Prospectivity Through Integrated Studies. Applicability to Kikombo, Dodoma, Tanzania.	**Edina Meela, Univ. of Dar Es Salaam** - Comparison of tomato shelf life using partial deacetylated chitin nanofibers and chitosan as a coating films		**Kwena Modibane, Univ. of Limpopo** - Electrocatalytic properties of metal organic framework composites for hydrogen technology	**Andrew Eloka-Eboka, Univ. of KwaZulu-Natal** - Biodiesel Production in Selected Feedstocks: the impact of hybridization to prominent properties and transesterification processes	**Vitalis Anye, AUST** - Finite Element Modeling of Nanoindentation of CH3NH3PbI3 thin films for Solar Cell and Light Emitting Device Applications
15:30 - 16:00	**HEALTH BREAK**						
16:00 - 16:15	**Nowsheen Goonoo, Univ. of Mauritius** - Seaweed derived polysaccharide-based nanofibrous scaffolds for bone repair: Enhanced in vitro	**Stanford Mudono, NUST** - A study on the effect of different parameteris on CYANEX 272 viscosity system during cobalt-nickel separation		**Elizabeth Dickey, North Carolina State Univ.** - Integrating Programming and Data Sciences into the Materials Science Curriculum	**Francis Wanjala, Univ. of Nairobi** - Solar Thermal Conversion Efficiency of Textured and Untextured Aluminum Substrate Coated with TiO2-Bound	**Stephen Nyandoro, Univ. of Dar Es Salaam** - Castor Oil Bio-diesel Production Employing Castor oil Templated Heterogeneou	**Musa Mjankwi, NM-AIST** - MHD flow of Nanofluid over a Vertical Stretching Sheet in the Presence of Heat source or Sink and

	multicellular response and reduced in vivo foreign body response					s Acid Catalysts	Chemical Reaction
16:15 - 16:30	**Obinna Ofoegbu, Univ. of Agriculture -** Deracination of Chitosan from locally sourced Millipede (Eurymerodesmus spp.) and Establishment of its spectroscopic and Physico-chemical properties.	**Said Kenai, University Blida1 -** Performance of Repair of Mortar with Natural Fibers		**Shola Odusanya, AUST -** Materials Science and Engineering education, research and outreach at the Pan African Materials Institute	**Blessing Rikhotso, Univ. of Limpopo -** Simulations Synthesis of Na0.22TiO2 Nanosphere at Varied Temperatures:Beyond Li-ion Batteries	**Matthias Ugwu, Federal College of Education Eha-amufu -** Effects of Palm Kernel (Elaeis guineensis) Cake on Sub-Bituminous Coal Briquette for Energy Generation.	**Shola Kolawole, AUST -** Modeling Studies of Stress Corrosion cracking in a low carbon steel
16:30 - 16:45	**Pamhidzai Dzomba, Bindura Univ. -** Formulation of an anti-alopecia cream from dicerocaryum senecioides flavonoids	**Arnold Chakona, Harare Institute of Tech. -** Production of concrete roof tile using fly ash in partial replacement of cement		**Margaret-Anne Wampamba -** How to get Funded and the Importance of International Collaborations	**Godwin Kalu-Uka, AUST -** Benchmarking the potentials of insect biomass both as a renewable energy resource and a high-value carbon resource.	**Mesfin Ibido, Dilla Univ. -** Determinants of rural household effective demand for biogas technology in southern Ethiopia	**Hasani Chauke, Univ. of Limpopo -** Molecular dynamics study of Fe50-xMxAl50 ternary alloy (M=Ag, Pt, Pd)

16:45 - 17:00	**Shingirayi Zengeni, Univ. of Zimbabwe -** Enhanced effectiveness of Pt. angolensis-based nano-emulsified system for topical delivery against skin carcinomas	**Odette Ngasoh Fayen,AUST** - Mechanical Performance of a Novel Epoxy Nanocomposite for Coating Applications			**Adeniyi Ogunlaja, Nelson Mandela Univ. -** Electrochemical oxidation of dibenzothiophene and 4,6-dimethyldibenzothiophene on a silver-doped polyaniline/carbon electrode	**Emmanuel Iwuoha, Univ. of the Western Cape** - Nanomaterials for Amperometric Sensing, Signalling and Energy Sustainability	**Adewumi Popoola, Federal Univ. of Tech. - Akure -** The properties of NbRhGe as high temperature thermoelectric material
17:00 - 17:15		**Farai Banganayi, Univ. of Johannesburg -** Influence od Re-hydration and Activation on Cation Exchange Capacity and Swelling Index of Foundry Sodium Bentonite from Different Deposits			**Genene Tessema Mola, Univ. of Kwazulu-Natal** - Metal surface plasmon resonance as a mechanism to improve the performance of thin film organic solar cells.		
DAY 4							
FRIDAY 13TH OF DECEMBER 2019							
BREAKAWAY PARALLEL SESSIONS							
SESSION	**PANEL: African Mining and Minerals Beneficiation Strategy: Challenges and Opportunities**	**Sustainable Manufacturing and Construction**	**Education and Networking in Materials Science and Engineering**	**Nanoscience and Nanotechnology**	**Materials for Energy**	**Computational Materials Science**	**Water and Environmental Mitigation Technologies**

		Chair: Jonathan Dessi-Olive	Chair: Veronica Augustyn	Chair: Giovanni Fanchini	Chair: Mohamed Chaker	Chair: Dickson Andala	Chair: Benjamin Hsiao
	Conference Hall	**A201**	**A202**	**B201**	**B202**	**D201**	**D202**
08:30-09:00	**PRESENTATION and DISCUSSION: Beneficiating South Africa's Mineral Resources for Industrial Development -** Silethelwe Chikosha, Dept. of Science and Innovation, Republic of South Africa	**Esther Obonyo, Penn State Univ.** - Drawing Down Building Material Matters at the Human Scale Sympossium	**Ines Ngassam, Univ. of Cape Town** - Shaping and driving the African research agenda – a case for African researchers to be more proactive	**Hao Gong, National University of Singapore -** Realization and properties of optically transparent and electronically conducting semiconductors	**Sarath Witanachchi, Univ. of South Florida** - Energy harvesting with Solar and Thermoelectric materials: A novel hybrid concept	**Giuseppe Pellicane, Univ. of KwaZulu-Natal** - Colloidal interactions in molecular simulations of globular protein solutions	**Benjamin Hsiao, Center for Integrated Electric Energy Systems, Stony Brook -** Sustainable water purification using biomass nanofibers
09:00-09:15		**Edward Rwegasila, Univ. of Dar Es Salaam -** Nanostructured cellulose fibrils from banana rachis prepared through nitro-oxidation: structure and mechanical properties	**Mainak Ghosh, Jadavpur Univ. -** Establishing a generic process framework for design and analysis of materials based on visual perception: Study through two cases	**Ngesa Ezekiel Mushi, Univ. of Dar Es Salaam -** Chitin nanofibrils for materials of high mechanical performance		**Kennedy Khaemba, Masinde Muliro Univ. of Science and Tech. -** Weyl Chirality in Topological Semimetal Tantalum Phosphide	**Mpitloane Hato, Univ. of Limpopo** - Facile synthesis of polymer hydrogel nanocomposites as adsorbents with improved performance towards removal of organic pollutants from wastewater

09:15-09:30		**Jonathan Dessi-Olive, Kansas State Univ. -** Design and Construction of the Ekialo Kiona Radio Pavilion, Mfangano Island, Kenya	**Teiji Kimball, PHIRST Labs -** Owning Our Future - Closing the Technology Void Through Collaborative Applied Project-Based Learning and Robotic 3D Community-Based Laboratory Networks	**Amos Kiyumbi, Univ. of Dar Es Salaam -** Nanoparticle Synthesis, Characterization And Functionalization		**Samuel Atarah, Univ. of Ghana -** Electronic and structural properties of Nihonium	
09:30-09:45		**Marzieh Kadivar, Univ. of Sao Paulo -** (to be delivered by Holmer Savastano) From minimally processed materials to fibers for composite reinforcement – applicability of bamboo in the constructed environment		**Pendo Bigambo, Univ. of Dar Es Salaam -** Potential Use of Cotton Fabric Waste through Nanotechnology	**Stanford Mudono, NUST -** Investigation on the potential production of diesel from waste tire.		
09:45-10:00		**Bathusile Masina, CSIR -** Microstructure and mechanical properties of direct laser deposited IN718 specimens			**Wycliffe Isoe, Masinde Muliro Univ. -** Optical Modeling of TCO Based FTO/TiO2 Multilayer Thin Films for Silicon Solar Cell Application		
10:00-10:30	**HEALTH BREAK**						
10:15-11:45	Discussion on the future of the African MRS						
11:45-12:00	Closing Session - President of the African MRS, Senior Administrators from NM-AIST, Representatives from Tanzania						

12:00-13:00	**LUNCH**
13:00-15:00	African MRS Board meeting

2019 African Materials Research Society Conference NM-AIST
POSTER PRESENTATIONS
Tuesday, December 10 (18:00 – 19:00)
Thursday, December 12 (17:00 – 18:30)

First name	Last name	Poster title
George	Achieng'	Preparation and characterization of fish scales biochar and application in the removal of anionic indigo carmine dye from aqueous solution
Mahmood	Akbari	Electrical tunability of surface tension of Vertical Graphene Nanosheets:
Moussa	Bakayoko	Synthesis and Characterization of Zinc Oxide Nanoparticles in Powders and in Thin Films using Corn Husk extract via green chemistry
Numfor	Bih	The Effect of Natural Fibre Reinforcement on Compressive Strength of Clay and Fly Ash Geopolymer
Romang	Bosigo	Effects of Ce doping on the morphological, structural, optical and electrical properties of CuO nanomaterials prepared by hydrothermal synthesis.
Maureen	Chijioke-okere	Synthesis, characterization and photocatalytic evaluation of PES/ZnO-CeO2 films in the removal of paracetamol in aqueous solution
Admire	Dube	Differential Protein Corona Composition And Binding Kinetics Of Human Serum To PLGA And PCL Nanoparticles
Phindani	Dube	Effect of annealing on the morphology and structure of CuSbS2 nanocrystalline thin films
Heba	Elfaig	Preparation and characterization of chitosan/silver nanocomposite and its application on Nile water as antibacterial material
Andrew C.	Eloka-Eboka	Effect of pith/fibre separation, binders and hybridization on bagasse briquettes energy density
Adama	FALL	Transformation of Nickel (II) Acetate Tetrahydrate to Nickel Oxide Nanoparticles Synthesized Using Peel of Citrus Sinensis by Green Synthesis Process
Tlotlo	Gabasiane	A Review: Recovery of Iron & Copper from smelter slag

HENOK	GEBRETINSAE	Biosynthesis of Ni2O3 nanocomposite as selective solar absorbers for low temperature applications
Ruth	Gontse	Determination of minteral content in sugarbeans, lentils and groundnuts sold by the roadside
Noor	Gulamussen	Evaluation of Potentialities for Use of Fine Coal Waste as Alternative fine Aggregate in the Production of Building Blocks
Lukman	Ismaila	Blood bank management system for both rural and urban areas (a case study of Nigeria)
Jin-Seung	Jung	Synthesis and Applications of Fe3O4@TiO2-M(M=Ag,Au) for Photocatalytic Activity
Rujeko Viola	Kahiya	Development of a cytotoxic anti-keloid treatment incorporating Eurphobia ingens
Sandrine	Kamdoum Noukelag	Investigation of structural and optical properties of biosynthesized Zincite (ZnO) nanoparticles by using Rosmarinus officinalis (Rosemary) leaves extract.
Lemme P	Kebaabetswe	Synthesis of Lanthanum Oxide (La2O3)and Silver Doped Lanthanum Oxide (AgLa2O3) Nanoparticles and their toxic effects on bacteria and HeLa cells
Grace	Kinunda	Chitosan coated activated carbon for softening hard water
Amos	Kiyumbi	Plasmonic Resonator in Gold Crystalline Particles: Fabrication and Optical Properties
Raesibe	Ledwaba	Multiscale Modelling of Spatio-Temporal Dynamics in Li- and Mn-Rich Cathode Materials
Ntumba	Lobo	Effect of TiO2 + Nb2O2 + TiH2 Catalysts on Hydrogen Storage Properties of Magnesium Hydride
Boitumelo M	Mabakachaba	Mg and C ion implantation on reactive pulsed laser deposited VO2 THIN FILM
Khomotso	Maenetja	DFT study of SnO2 surfaces for the discovery of catalysts in Li-air batteries
Nyemaga	Malima	Synthesis and characterization of nanostructured Ni1-xCoxFe2O4 ($0 \leq x \leq 1$) solid solutions via solventless thermolysis of molecular precursors
George	Manyali	High bulk modulus but low Vicker's hardness: A DFT study of mechanical properties of hcp Rhenium
Darius	Martin	Development of aptamer-nanoparticles conjugates for the diagnosis of Ebola
Nobanathi	Maxakato	Pt-Sn nanoparticles supported on Carbon Nanodots as efficient anode catalysts for direct alcohol fuel cells
David	Mbaga	Graphite resource potential of Tanzania and its implications towards attaining a Global Green community
Lydia	Mensah	Gel Formation Influence of Aqueous PEO-PPO-PEO F127 Micelles with Added Antibiotics
John	Mmbaga	Synthesis and characterization of zeolite- cellulose acetate nanocomposites for water treatment
Hamza	Mohamed	Expeditious synthesis of monoclinic Clinobisvanite phase BiVO4 nanorods using fruit extracts of Hyphaene thebaica as bio-reductant revealing enhanced biological properties
Hee	Moon	Removal of rhodamine-B from wastewater using Mongolian anthracite-based activated carbons: Adsorption equilibrium and kinetics
William	Motswainyana	Antibacterial evaluation of Cu and CuO nanoparticles based PSF/PVP composites

Rostand	Moutou Pitti	Design and manufacture of adobe bricks made from clay and sawdust of Gabonese origin
Adama	Mramba	Investigation on the Green Production Of The Industrial Fine Chemicals from the Lignocellulosic Biomass
Kgomotso	Mtshatsheni	Grafting of pine-magnetite composite with acrylic acid for removal of methylene blue dye
Reneta	Nafu	Blended sand and plastic paste: a prospect for corrugated roofing sheet production
Blasius	Ngayakamo	Evaluation of Kalalani Vermiculite for Production of High Strength Porcelain Insulators
Uba	Nwankwo	Anomaly Dc Resistivity of Nickelates Single Layer and Heterostructures Thin Films
Chukwudalu Clare	Nwazojie	Effect of carbonization temperature on the mechanical properties and micro-structure of bone-epoxy composite
Leah	Nyangasi	Synthesis and characterization of Pd nanoparticles supported on electrospunTiO2 nanofiber
Justine	Nyarige	Effects of L-arginine concentration on hematite nanostructures synthesized by spray pyrolysis and chemical bath deposition.
Oluwafemi	Obisesan	NANOPARTICLES: An Alternative to the Treatment and Management of HIV-1/HSV-2 Co-infection
Martin	Onani	Synthesis and Characterisation of Cadmium-free CuInS/ZnS nanocrystals in combination with a [FeFe]–H2ase mimic for visible light-driven H2 production in water
James	Owuor	Effect of polymer blend on release of a hydrophobic drug loaded into PLGA microparticles for Intraarticular delivery.
Resego	Phiri	Influence of deposition parameters on the residual stresses of WC-Wo sputtered thin films
Resego	Phiri	Effect of Heat Treatment Hardening on the Dry Sliding Wear Behaviour of Mild Steel
Bellah	Pule	Electrospun Hydrogel for Biomaterial applications
Esnaider	Rodriguez Suarez	Coal ash obtained from coal tailings for remediation of the Acid Mine Drainage formed in the Benga Mine, Tete, Mozambique
Sheel	Sanghvi	JUAMI Minisymposium: A modular, open-source tube furnance
Dineo	Sebuso	Green synthesis of graphene from waste biomass: corn husk
Besabakhe	Skhosane	Effect of niobium (Nb) on mechanical properties of laser coated Nitinol (NiTi) used for surface modification of TC4 alloy
Imani	Sospeter	Quantum Chemical Study of Structure, Vibrational Spectra and Thermodynamic Properties of Ionic Clusters Existing in Vapours over Strontium Dichloride
Fikre	Urgessa	Polymer translocation through a nanopore under a pulling force:- A 3D Langevin dynamics simulation study
Thokozani	Xaba	Decomposition of Bis(N-benzyl-salicydenaminato)zinc(II) Complex for the Synthesis of ZnO Nanoparticles to Fabricate ZnO-Chitosan Nanocomposite for Removal of Iron(II)Ions from Wastewater

Annex VI. List of Registration by country

Country	Number of participants	Continent
Algeria	1	Africa
Benin	1	Africa
Botswana	21	Africa
Cameroon	2	Africa
Ethiopia	3	Africa
Ghana	13	Africa
Kenya	28	Africa
Lesotho	1	Africa
Mauritius	2	Africa
Morocco	1	Africa
Mozambique	1	Africa
Namibia	1	Africa
Nigeria	29	Africa
Rwanda	2	Africa
Senegal	1	Africa
South Africa	89	Africa
Sudan	2	Africa
Tanzania	28	Africa
Uganda	6	Africa
Zimbabwe	4	Africa
India	1	Asia
Israel	2	Asia
Japan	7	Asia
Singapore	3	Asia
South Korea	2	Asia
Australia	1	Australia
Belgium	1	Europe
France	4	Europe
Germany	2	Europe
Greece	1	Europe
Italy	3	Europe
Poland	4	Europe
Russian Federation	5	Europe
Sweden	1	Europe
Switzerland	2	Europe
Malta	1	Europe
Canada	6	North America
United States of America	51	North America
Paraguay	1	South America
Unspecified	2	Unspecified

Annex VII. Speech for the Guest of Honor. Hon. William Ole Nasha, Deputy Minister for Ministry of Education, and Science and Technology

10TH INTERNATIONAL CONFERENCE OF THE AFRICAN MATERIALS RESEARCH SOCIETY (AMRS2019), 10-13 DECEMBER 2019, ARUSHA, TANZANIA

OPENING ADDRESS BY HON. WILLIAM OLE NASHA

DEPUTY MINISTER FOR EDUCATION, SCIENCE AND TECHNOLOGY, UNITED REPUBLIC OF TANZANIA,

DELIVERED ON 10TH DECEMBER 2019 AT THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY, ARUSHA, TANZANIA

Hon. Mrisho Gambo, the Arusha Regional Commissioner

Hon. Jerry Muro, the Arumeru District Commissioner

Professor Dr. James Mdoe, Deputy Permanent Secretary, Ministry of Education, and Science and Technology

Professor Dr. Emmanuel Luoga, Vice Chancellor, Nelson Mandela African Institution of Science and Technology

Professor Dr. Anthony Mshandete, Deputy Vice Chancellor Academics, Research and Innovation, Nelson Mandela African Institution of Science and Technology

Professor Dr. Charles Lugomela, Deputy Vice Chancellor Planning and Finance, Nelson Mandela African Institution of Science and Technology

Professor Dr. Hulda Swai, President of the African Materials Research Society and Chair of the Organising Committee

Members of the Organising Committee

Members of the Scientific Committee

Members of the Materials Research Society

Members of the African Materials Research Society

Invited presenters and attendees,

Eminent Scientists

Ladies and gentlemen

Protocol observed

I am indeed honoured to be invited to officiate the opening ceremony of the 10th International Conference of the African Materials Research Society which is being held in Tanzania for the second time, after 12 years. I bring greetings from the Minister for Education, Science and Technology, the Hon. Professor Joyce Ndalichako (MP) who would have loved to be with you but she is not able to be here due to the celebrations of the 58th Anniversary of the independence of Tanganyika (now known as Tanzania mainland). I am grateful that you decided to hold the conference in the United Republic of Tanzania bringing a few hundreds of eminent scientist to our country to interact with our own in pursuit of solutions of challenges facing the social economic development of our beloved continent.

Ladies and gentlemen, the AMRS President, Professor Hulda Swai has just informed us that the African Materials Research Society (AMRS) was established nearly twenty years ago in 2000, and that among its objectives is to ensure that materials research contributes significantly to the various national strategies for social equity and poverty alleviation in a constructive and sustainable manner and to work closely with governments and state structures to develop appropriate policy and support for materials research and development. I congratulate the past AMRS leadership, and its current President Professor Hulda Shaidi Swai together with your team, for keeping the Society alive. I propose that country level branches of AMRS be formed so that its objective of research that contributes significantly to the various national strategies can be realized in realistic terms, well poised for local ownership and sustainability.

Dear Conference Chairperson, have just been informed further that ARMS has a tradition of organising an international conference bi-annually since 2002. The conference brings together on the same platform world leading members of the materials community including experts, academicians, industrialists, and government officials to share advancements of created materials and materials for new needed products. The ultimate goal is to see an Africa that is able to fully harness and exploit its rich natural resources greatly endowed by nature. Let me congratulate you, the society leaders and your sponsors for keeping up this tradition through which the objective of sharing advancements of created materials and future materials is a stimulus to the postgraduate students, as well as old and early career materials scientist and engineers to engage in new discoveries, innovations and inventions for mitigating the continent's challenges in an accelerated manner.

Curiously, since this is the 10th conference, one would like to hear more on the achievements of the Society in terms of the extent to which the materials research through the influence of AMRS and its past nine conferences has permeated the development agenda of the African countries. It is high time now, to move from reporting the number of PhD graduates, the number of articles in highly rated journals and the citation indices to reporting the number of patents, copyrights and the number or proportion of the population of a given African country whose economic status and wellbeing have been impacted by these researches.

Let me at this juncture, ladies and gentlemen, digress a bit and reiterate the continent's development agenda strategic frameworks which are guiding our path to social economic growth and wellbeing. To address its development challenges, Tanzania is guided by the processes enshrined in the global, regional, and national strategic development frameworks, respectively, the global 2015-2030 Sustainable Development Goals (SDGs), the 2013 – 2063 Africa Agenda (aka Africa Agenda 2063), and the Tanzania 2000 – 2025 Vision (aka Tanzania Vision 2025).

Since AMRS is a continental Society, let me highlight some aspirations and expected outcomes of the Africa Agenda 2063 that could be accelerated through the materials research, discoveries, innovations, and inventions. The first aspiration of the Africa Agenda 2063, is to see a prosperous Africa, in 50 years as of 2013, that is based on inclusive growth and sustainable development. The role of AMRS through improved manufacturing, agricultural and other types of production and businesses, transportation, climate change mitigation, etc. is vital in achieving the following Africa Agenda 2063 outcomes:

- Real per-capita incomes would be a third more than 2013 levels.
- Incidence of hunger, especially amongst Women and Youth will only be 20% of 2023 levels.
- Job opportunities will be available to at least one in four persons looking for work.
- At least one out of every three children will be having access to kindergarten education with every child of secondary school age in school and seven out of ten of its graduates without access to tertiary education enrolled in TVET programmes.
- Malnutrition, maternal, child and neo-natal deaths as at 2013 would be reduced by half; access to anti-retroviral will be automatic and proportion of deaths attributable to HIV/AIDs and malaria would have been halved.

- Nine out of ten persons will have access to safe drinking water and sanitation; electricity supply and internet connectivity will be up by 50% and cities will be recycling at least 50% of the waste they generate.

- GDP will be growing at 7% and at least a third of the outputs will be generated by national firms.

- Labour intensive manufacturing, underpinned by value addition to commodities and doubling of the total agricultural factor productivity will be attained by 2023

- The beginnings of value addition blue economy – fisheries, eco-friendly coastal tourism, marine bio-technology products and port operations- will emerge.

- Creative arts businesses will be contributing twice as much in real terms their 2013 contribution to GDP.

- ICT penetration and contribution to real GDP in absolute terms would be double of 2013 levels.

- Regional industrialisation hubs linked to the global value chains and commodity exchanges will be in place by 2023.

- At least 17% of terrestrial and inland water and 10% of coastal and marine areas would have been preserved and 30% of farmers, fisher folks and pastoralist will be practicing climate resilient production systems.

Dear members of AMRS, it gives me great pleasure to learn that this is the second AMRS conference to be held in Tanzania, spanning 12 years apart, since 2007 when the other one was held. It is my belief that in your discussions, you will find time to reflection on the impact (if any) the 2007 conference has had on the country's priority areas that have been designed to enable the country to attain the Africa Agenda 2063 outcomes. I hope that this conference will go out of its way, and focus on turning the journal publications and laboratory results into availability of materials with the appropriate properties and performance characteristics to mitigate today's major challenges for creation of next generation technologies. Tanzania, like many other African countries badly need creation of materials and material systems with properties and performance superior to those of today to mitigate challenges such as accessible clean water, economical solar energy, future energy technologies, restoring and improving the urban infrastructure, virtual classrooms, health and healthcare, telemedicine, advanced

manufacturing, renewable and sustainable energy, materials efficiency, biotechnology, transport, communications and information technology among others.

Dear Vice Chancellor, I am gratified to learn that our Dr. Askwar Hilonga through this Institution, NM-AIST, innovated a nano-filter material for cleaning water from harmful germs as well as harmful minerals to human bones and teeth. Diarrhoea and disease resulting from water contaminated with germs are among the infections causing the highest mortality and morbidity among children and adults in Tanzania also causing a significant financial burden on the health budget. In some parts of Tanzania and other African countries the amount of fluoride in water is very high causing fluorosis that affects teeth and bones. For centuries, people living in such areas have been suffering from dental effects and skeletal effects to the extent that a large proportion of people in those communities have highest degree physical disabilities. Hilonga's nano-filter not only has it given him journal papers for his academic promotion, numerous international awards and visibility of NM-AIST, but its impact on Tanzanian communities in Arusha and neighbouring regions is now quite vivid. The filter has also permeated neighbouring countries such Kenyan and Zambia. I am very much excited to listen to his Keynote address this morning. We at the Ministry will strive to ensure the innovation is accessible to as many Tanzanians as possible, while we urge investors to support its massive production.

Ladies and gentlemen, I would have loved to listen to the talk and partake in the discussion by the two distinguished Professors Diran Apelian and Ange Nzihou on the development and adoption of circular economy approaches as one of the platforms that can attend to the sustainable development challenges of our continent. As inferred from their abstracts, the main principal of the circular economy is to attain zero waste, to produce value from waste and to transform by-products, waste materials, useless, or unwanted products into new materials or products of better quality and environmental value. This is the opposite of the existing practice of high production of industrial wastes, electronic waste, mining waste, and non-recovery of critical, precious and other materials from extractive wastes and landfills. Additionally, the little recycling of waste materials that is currently taking place in our African countries, it is the type where the recycled material is of lower quality and functionality than the original material.

Let me borrow from the abstracts of the two distinguished professor. Being one of the richest continent in minerals and other natural materials resources, the circular economy poses vital opportunities for African nations to create value by being mindful of the downstream operations that are integral for resource recovery and reuse from a material science and engineering perspective. The professors

purport that transition to the circular economy however, poses a deep transformation that requires deep understanding of its positive and negative implications on the environment, economy and society (including human health), and the design of well-targeted transitional policy measures. We in the ministry, are hopeful that the AMRS will work hand in hand with the industry, the government and other sectors in ensuring African nations will adopt the circular economy approaches and the transition will be fast with optimal positives and minimal or zero negatives.

Dear Conference Organisers, I will be delighted to get the proceedings of the conference especially the resolutions reached at the end of this event, and recommendations to the government so that we take the necessary steps to ensure the growth of the AMRS. I sincerely hope that the Tanzanian branch of the AMRS will be created soon, please keep me updated on this. As it can be observed by everyone, the female participation is very low, and I believe most of these we see here have other roles of offering services as ushers and the like. I will be equally delighted if an Organisation of Tanzania Women Materials Scientists and Engineers will be formed to be a catalyst for increased female participation in the Society.

The Hon. RC of Arusha Region and DC of Arumeru District, the top management of NM-AIST, the leadership and members of the MRS and AMRS, Conference participants, ladies and gentlemen, I DECLEARE THE 10TH INTERNATIONAL CONFERENCE OF THE AFRICAN MATERIALS RESEARCH SOCIETY OFFICALLY OPENED.

THANK YOU FOR YOUR ATTENTION

Annex VIII: Speech from the Vice Chancellor of the Nelson Mandela African Institution of Science and Technology

10TH INTERNATIONAL CONFERENCE OF THE AFRICAN MATERIALS RESEARCH SOCIETY (AMRS2019), 10-13 DECEMBER 2019, ARUSHA, TANZANIA

WELCOME NOTE BY PROFESSOR EMMANUEL JOACHIM LUOGA,

VICE-CHANCELLOR OF THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY AND FORMER VICE PRESIDENT OF THE UNITED REPUBLIC OF TANZANIA

DELIVERED ON 10TH DECEMBER 2019 AT THE NELSON MANDELA AFRICAN INSTITUTION OF SCIENCE AND TECHNOLOGY, ARUSHA, TANZANIA

Hon. William Ole Nasha, Deputy Minister for Education, Science and Technology

Hon. Mrisho Gambo, the Arusha Regional Commissioner

Hon. Jerry Muro, the Arumeru District Commissioner

Professor Dr. James Mdoe, Deputy Permanent Secretary, Ministry of Education, and Science and Technology

Professor Dr. Anthony Mshandete, Deputy Vice Chancellor Academics, Research and Innovation, Nelson Mandela African Institution of Science and Technology

Professor Dr. Charles Lugomela, Deputy Vice Chancellor Planning and Finance, Nelson Mandela African Institution of Science and Technology

Professor Dr. Hulda Swai, President of the African Materials Research Society and Chair of the Organising Committee

Members of the Organising Committee

Members of the Scientific Committee

Members of the Materials Research Society

Members of the African Materials Research Society

Invited presenters and attendees,

Eminent Scientists

Ladies and gentlemen

Protocol observed

You are all warmly welcome to the Nelson Mandela African Institution of Science and Technology (NMAIST) in Arusha, Tanzania. We the entire NM-AIST Community are delighted to have you with us to participate and share in the 10th International Conference of the African Materials Research Society. Thank you for coming. That many of you have travelled long distances to be here serves as a reminder to us all just how important the initiatives of the AMRS and particularly its conferences are.

Beloved participants, and dear Guest of Honour, let me start by sharing with you a brief about NM-AIST.

HERE SHOW THE NM-AIST POWERPOINT

Dear participants, as can be inferred from the NMAIST presentation, it goes without saying that the University is committed to the advancement of material science and engineering on one hand, as imbued in its establishment as a research intensive one to catalyse the development of a Science, Engineering, Technology, and Innovation (SETI) and on the other hand, the aim of NMAIST is to harness the abundant resources of nature available in SSA thereby contribute to the economic and social transformation of the continent. Definitely the role played by materials science and engineering in this endeavour is vital.

Dear participants and guests, this AMRS Conference has come at the most opportune time at our University, which is catering for 14 (fourteen) Eastern African countries as per the African Union demarcation, and the conference theme augurs well with the University objects. In deed the impact of this conference by the mere fact that it is hosted by the NMAIST is quite enormous.

Seeing you all here gives me great pleasure that deliberations of this particular conference will be a big impetus to the advancement of our continent through innovative materials!

Thank you all and have a most fruitful conference.

Annex IX: Speech from the President of the African Material Research Society, Professor. Hulda Swai

THE 10TH INTERNATIONAL CONFERENCE AFRICAN MATERIALS RESEARCH SOCIETY (AMRS2019)

SPEECH DELIVERED TO THE 10TH INTERNATIONAL CONFERENCE OF THE AFRICAN MATERIALS RESEARCH SOCIETY (AMRS2019)

BY PROF. HULDA SHAIDI SWAI, THE PRESIDENT OF THE AFRICAN MATERIALS RESEARCH SOCIETY (AMRS)

NM-AIST, ARUSHA,

DECEMBER 10TH, 2019

- Hon. Samia Suluhu Hassan – Vice President of the United Republic of Tanzania
- Hon. Joyce Ndalichako - Minister of Education, Science and Technology
- Prof. Professor James Mdoe - Deputy Permanent Secretary - Ministry of Education, Science and Technology
- Hon. Mohamed Gharib Bilal – Chancellor of the Nelson Mandela African Institution of Science and Technology (NM-AIST)
- Prof. Emannuel Luoga – Vice Chancellor of the Nelson Mandela African Institution of Science and Technology (NM-AIST)
- NM-AIST Council and Management
- Distinguished speakers and presenters ;
- Organizing Committee Members;
- Distinguished Participants, Media present, Ladies and Gentlemen,

Hon. Vice President Distinguished Participants, Ladies and Gentlemen,On behalf of the AMRS Board of Directors and all members of the African Materials Research Society, I would like to take this opportunity to thank you for accepting our invitation. We understand that you have a very busy schedule but we are happy that you have managed to be here with us today.

Hon. Vice President, In front of you are 250 research Scientists and technologists of Materials Research Science from around the World who will be here for the coming three days to learn and discuss new technological advancements in areas of Materials Science.

Hon. Vice President, within this audience we have about 100 young scientists from around the world who have attended the AMRS *Pre-conference workshop from 8th to 9th December 2019 and will also attend the main AMRS 2019 conference*. The aim of the AMRS 2019 Pre-conference *workshop* is to train and empower Masters and PhD students and early career Materials Researchers and technologists to be aware of the new developments and challenges facing the Materials Research but above all these young scientists are the future pioneers of Science of the African continent and of the World.

Hon. Vice President, together with us we have exhibitors who will be showcasing their Products and services one of them being *IMP Scientific and Precision (Pty) Ltd* from the Republic of South Africa.

Hon. Vice President, I would like to inform you that, as part of making sure that this conference is conducted with success, the Ministry of Education Science and Technology has contributed $25,000.00 while the Council of the Nelson Mandela African Institution of Science and Technology has allowed us to use its facilities free of charge. On behalf of the AMRS Board and the entire members of the AMRS we take this opportunity to acknowledge this unique support from your government.

Hon. Vice President, This year's Conference theme is *"African Materials for African Development"*. As we mark the 10th Anniversary of our Society, we thought it is important for this conference to focus on issues, which will indeed transform Africa and its people. This conference will discuss ten focus areas which are Materials for Health, Sustainable Buildings & Construction; Water & Environmental Mitigation Technologies; Nanoscience & Nanotechnology; Mining & Mineral Processing; Agriculture & Environment; Education & Networking; Science & Engineering; Energy; Computational Sciences; and Manufacturing & Structural Materials.

The ultimate vision of the AMRS is to see Africa able to fully harness and exploit its rich natural resources to respond the 4thAfrica industrial revolution strategy.

Hon. Vice President, before I conclude my speech, kindly allow me to convey my sincere gratitude to your government and to our supporters for the financial and moral support we have received from them. Apart from the Ministry of Science and Technology and the Nelson Mandela African Institution of Science and Technology we have also received financial support from Tanzania Commission for Science and Technology, the Ngorongoro Conservation Area Authority, Tanzania National Parks,

CREATES, CRDB Bank, Inter University Council of East Africa, JUAMI, North-western University, Rutgers, American Materials Research Society, National Science Foundation, Department of Science and Technology of the Republic of South Africa, Worcester Polytechnic Institute and Botswana Institute for Technology Research and Innovation (BITRI).

I thank you for your attention and I wish you all a nice stay in Arusha