



GOODWILL MESSAGES

Prof. S. S. Taiwo, Provost, College of Health Sciences, LAUTECH, Osogbo.

Application of nanotechnology in medicine (Nanomedicine) has immense impact on global economy. This ranges from applications of nanomaterials and biological devices, to nanoelectronic biosensors and possible applications of molecular nanotechnology such as biological machines. Nanotechnology has provided the possibility of delivering drugs including antibiotics to specific cells using nanoparticles, which maximizes bioavailability, enhances selectivity thereby preventing bystander tissue damage, and potential to decrease antibiotic resistance or circumvent multidrug resistance mechanisms. Greater application potentials exist in oncology especially for cancer imaging and in the use of nanoparticles for detection of gene sequences in a dimension of lab-on-a-chip technology, blood purification, tissue engineering and the theoretical use of nanorobots introduced into the body to repair or detect damages and infections. It is highly commendable that Prof. A. Lateef has assembled a group of scholars to pioneer the LAUTECH Nanotechnology Research Group (*NANO*⁺). I have personally reviewed twelve of the research publications of this group and identified great potentials for collaborations especially in area of bench to bedside translation. This will first require experimental studies on suitable animal model before progressing to ethically-sound phase 1 and 2 human clinical trials. I believe this maiden workshop will consider this. I wish you good success.

Prof. L.A. Sunmonu, Dean, Postgraduate School, LAUTECH, Ogbomosho.

It is with great pleasure that I am here to join hands with LAUTECH Nanotechnology Research Group on this timely and laudable workshop aimed at increasing awareness and discussing the importance of nanotechnology. I consider this workshop as relevant and timely. LAUTECH is renowned for its pride heritage of commitment to research and learning, which today's event is intended to demonstrate. As productivity improving technology initiatives spread across the globe, intensive research is required to deepen our shared understanding of the potentials and practice of nanotechnology. Many benefits of nanotechnology depend on the fact that it is possible to tailor the structures of materials at extremely small scales to achieve specific properties, thus greatly extending the materials science toolkit. Using nanotechnology, materials can effectively be made stronger, lighter, more durable, more reactive, more sieve-like, or better electrical conductors, among many other traits. Many everyday commercial products are currently on the market and in daily use that rely on nanoscale materials and processes. I applaud the publications on nanotechnology by *NANO*⁺. I appreciate your positive attitude and your ability to motivate people to contribute to a good cause in academic environment. I am personally impressed with the way the group leader kept its members motivated and focused, even in the face of several obstacles. Thank you for giving this University your best. May you enjoy this type of success in all your endeavours. I urge the participants to engage in the discussions with sincerity and enthusiasm and to have a good time while doing so. I have high hope for this workshop, therefore prepare yourself to be challenged, excited and inspired. Thank you.

Prof. O. Olorode, Formerly of Department of Botany, Obafemi Awolowo University, Ile-Ife.

As I thought of Nanotechnology, what came to my mind were two important books about the desirability of small things: Arundathi Roy's "The God of Small Things", and E. F. Schumacher's "Small is Beautiful". Nanotechnology is about both big and small; and the prospects and problems of both. I hope its prospects will reduce the problems of our people and that its problems will be kept constantly in view. I therefore congratulate *NANO*⁺, for its advances in this area, and wish participants at the workshop fruitful deliberations.

Prof. A. Egunyomi (MIBiol, FLS), Department of Botany, University of Ibadan.

It is an unimpeachable fact that science and technology constitute the engine room for driving sustainable and economic development of a nation. The initiative, drive and focus of the LAUTECH Nanotechnology Research Group (*NANO*⁺) has resulted in relatively high research productivity, thereby publishing many papers in international journals of repute. A cursory look at the list of papers by the group and members shows that they have contributed immensely to knowledge aimed at improving the lot of poverty stricken people of Nigeria and in particular of Oyo and Osun states – the joint owners of LAUTECH. This is highly commendable. Surprisingly and regrettably too, what do members of the *NANO*⁺ in LAUTECH have in return for their patriotic efforts? Based on media reports, your members (and other staffs) have not received salaries for 9 months; you are vilified and incessantly open to vitriolic unguarded utterances which are perniciously destructive. Despite the acts of omission and commission killing LAUTECH gradually, you have remained undeterred. You have chosen the path of patriotism and honour and continue to spread the gospel of nanotechnology by organizing the first workshop. I urge you to continue the good work already started as posterity will judge you and those whose acts are inimical to the progress of LAUTECH. Congratulations!

Prof. J.K. Oloke (NPOM), Pioneer Director of Academic Planning Unit; Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

I am very pleased that the Nanotechnology Research Group can finally take-off in LAUTECH with the formation of *NANO*⁺, headed by Prof. A. Lateef. With the kind of achievement the group has witnessed within the few months of its take-off, there is no doubt that better days are ahead of the group. I therefore recommend that many more scientists within and outside LAUTECH should join the Nanotechnology Research Group. I wish members of the group and other participants very exciting deliberations.

Prof. R.O. Rom Kalilu (PhD, JP, PMNYAS, MISEA, MACS, MIAAA, fsna), Deputy Vice-Chancellor, LAUTECH (2006-2008); Department of Fine and Applied Arts, LAUTECH, Ogbomoso.

NANOTECHNOLOGY AND THE PRESISTENCE OF LAUTECH: A GOODWILL MESSAGE

Nanotechnology is currently one of the momentous defining factors for the future of the world. Its importance is in the almost limitless possibilities it offers for creation of many new materials and devices for diverse applications across sundry platforms and various disciplines. The significance of the LAUTECH Nanotechnology Research Group (*NANO*⁺) can be properly appreciated against the backgrounds of the several trillions in monetary values annually committed to nanotechnology research by industrialized and advanced economies. That this Group and this workshop is happening in Ladoko Akintola University of Technology, inspite of the crippling challenges facing the University for over a year, is reflective of the perseverance, commitment and ingenuity of the academics of this University. Ten, including the leader of the group (Prof. A. Lateef) of the 11-man Research Group are LAUTECH products, with the eleventh not being an alumnus of this University but started his academic career here. This is very significant. It is indeed: a justification for the vision for the University by the founding fathers; a reward of support by the owner states; a reflection of the accomplishments of those of us who variously mentored members of the Group; and a ray of hope for the survival of the University. I therefore felicitate with the leader and members of the LAUTECH Nanotechnology Research Group, the Department of Pure and Applied Biology, the Faculty of Pure and Applied Sciences, and the entire University community on this milestone.

Prof. O.O. Fawole, Department of Pure and Applied Biology, LAUTECH, Ogbomoso; Rector, The Polytechnic, Ibadan.

It is an honour well appreciated when called upon to give a goodwill message on workshop on synthesis, characterization and application of nanoparticles. Nanotechnology is an emerging area of technology that its applications in different fields of human endeavor will be of benefit if properly annexed especially in this part of the world. Though very few people are always willing to adapt to new technology apart from glaring existing finance hindrance being experienced in recent time, nevertheless, the workshop will serve as an eye opener to this emerging multidisciplinary field. Its applications in hydrobiology and fisheries will be of benefit, through reported antimicrobial activities as fish infections that often lead to yield reduction will be eliminated thus increasing the income of farmers and makes protein more available for human consumption. The diverse discipline of the members is a great asset as reflected in quantum of publications within about three years of inauguration of the group. This workshop will provide opportunity for researchers to know more about nanotechnology and to collaborate with your group. I wish you a successful workshop outing. Long live *NANO*⁺!!! Long live LAUTECH!!!

Prof. J.B.I. Aderiye, Department of Microbiology, Ekiti State University, Ado-Ekiti.

The theme for this workshop is Nanotechnology: Key to sustainable development and national integration. I believe this is timely, given that the world is now a 'global village' with challenges which are more sophisticated and complex, and thus demands for adjustments to make intervention imperative. It is gladdening to note that despite the present harsh economic condition in Nigeria and the closure of the hosting institution to academic work, nanotechnologists have gathered together to ruminate on the synthesis, characterization and applications of nanotechnology to agriculture, life and physical sciences, environmental sciences, engineering and medicine, and therefore commend the organizers (*NANO*⁺) for their steadfastness and commitment to research. I am particularly in the known of the activities of the group, having examined a few theses of students of Prof. A. Lateef at both undergraduate and postgraduate levels on the subject matter of nanobiotechnology, which I have found to be inspiring adventure to advance the course of knowledge. I send my warmest greetings to all the speakers and participants at this workshop taking place at Ladoke Akintola University of Technology, Ogbomoso, 21st-24th August, 2017.

Prof. T.A. Adebayo, Immediate Past Deputy Vice-Chancellor; Department of Crop and Environmental Protection, LAUTECH, Ogbomoso.

It is a great honour for me to deliver a goodwill message on the nanotechnology workshop organized by LAUTECH Nanotechnology Research Group (*NANO*⁺) at this material time in the life of the University. Nanotechnology as an emerging multidisciplinary field of study deals with the creation, manipulation and applications of materials at nanoscale level. Its diverse applications has brought down the wall of barriers across disciplines, notably with the in-road made by biotechnologists, biomedical scientists and life scientists in the sub-fields of nanobiotechnology and nanomedicine. Nanotechnology also has a lot of applications in agriculture; plant nutrition, post-harvest preservation, disease and pest control amongst others. It is therefore heart-warming that our University is setting the pace of innovative research in nanotechnology, through some dedicated young scholars, who have formed a formidable research group, *NANO*⁺. I am particularly pleased that the energetic leader of the group, Prof. A. Lateef, is a thorough-bred product of LAUTECH, having obtained all his degrees from the University, and the achievements made so far within a space of about three years are highly commendable. I am optimistic that participants at this workshop would become new converts of nanotechnology through the inspiring

lectures to be delivered. As I wish you successful deliberations, I congratulate *NANO*⁺ and indeed LAUTECH for this epoch-making event. Thank you.

Prof. A.A. Olajire, Former Director of Academic Planning Unit; Department of Pure and Applied Chemistry, LAUTECH, Ogbomoso.

I am very pleased for the opportunity given to me to deliver the goodwill message on the maiden workshop on the synthesis, characterization and applications of nanoparticles organized by *NANO*⁺. I see nanotechnology as a vital part of that future, with its amazing breadth of potential applications ranging from health to ICT, agriculture, energy and defence. The nano market is growing fast and presence of nanotechnology has become a reality in our daily life. The nano concept consists of the huge development, at nanoscale, of non-conventional particles which are manufactured for specific properties and applications. At present, nanotechnology remains difficult to circumvent with the trend of incorporating some nanoparticles already being produced into nanoproducts for many years. The main challenge concerns how to consider specifically the safety of those products that contain nanomaterials. Because of their new properties, new hazards could appear. It is therefore imperative to identify these products, to make all the hazards data available and to assess public, workers', and environmental exposure, in order to perform a complete risk assessment, so as to comply with the REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) regulation for chemical products before these nanoproducts are put on the market. I sincerely wish you a very productive workshop, one that will support the safe, integrated, and responsible development of nanotechnologies. More specifically, it is my hope that you will not only be able to advance our thinking through the lively exchange of information and the significant brainstorming that should take place, but also to develop consensus positions on some of the grey areas, including risk evaluation that characterize the different fields of applications of nanoscience and nanotechnologies. I wish you the very best in your deliberations.

Prof. A. A. Odunsi, President, World's Poultry Science Association, Nigeria Branch (WPSA-NB); Convener, Animal Biosciences Group, Department of Animal Nutrition and Biotechnology and immediate past Dean, Faculty of Agricultural Sciences, LAUTECH, Ogbomoso.

This is to felicitate with the Head and members of the Nanotechnology Research Group (*NANO*⁺), LAUTECH Ogbomoso on the occasion of her maiden workshop with the theme Nanotechnology: Key to Sustainable Development and National Integration. Nigeria is a country of nearly 180 million people with an agrarian economy. The agriculture sector including poultry has a potential for not only meeting the food requirement but also as an engine for sustainable economic growth. For this purpose, any input of modern technologies including nanobiotechnology is absolutely essential. With nanotechnology, it is possible to control the assembly of atoms and molecules to fabricate intelligent probes for poultry disease diagnostic and treatment while drugs can be injected in living systems to improve their bioavailability and targeted delivery. It is also possible to breakdown cellulosic and fibrous feed materials using enzymatic principles. Potential future benefits of nanotechnology products include application and effectiveness of agrochemicals, while nanosized micellar systems could be developed to provide delivery systems for vitamins, minerals or phytochemicals useful in animal feeding systems. The goal of the WPSA-NB is to promote education, research and industrial relations in the entire poultry value chain system. We are ready to partner with *NANO*⁺ group to expand and ensure quality applications of their research outputs. Congratulations.

Prof. E.T. Otunola, Department of Food Science and Engineering, LAUTECH, Ogbomoso.

It is certainly a thing of great joy to note that a group of very dedicated academicians of this great institution could form such a formidable team to organize this kind of workshop, especially amidst the prevailing situation. For all the time, energy and resources deployed to the organization of the workshop, the *NANO*⁺ research group is greatly acknowledged and appreciated. The numerous achievements of the group since inception are also commendable. The workshop, a unique and unrivaled platform for the training of scientists in nanotechnology, especially in this part of the world, is a welcome development, even as participants get exposed to this emerging discipline so early. Consequent upon the diverse nature of the application of nanotechnology, diverse professionals from various backgrounds are being brought together for this workshop. It is designed to advance and widen scientific knowledge in this important discipline. It is on this premise that I wish to congratulate the *NANO*⁺ group and all others involved in the organization of the workshop. I also sincerely wish the workshop a resounding success, and all participants a memorable stay in Ogbomoso, especially on LAUTECH campus.

Prof. S.O. Jekayinfa, Immediate Past Director of Academic Planning Unit; Department of Agricultural Engineering, LAUTECH, Ogbomoso.

At the opening of the maiden workshop on the synthesis, characterization and applications of nanoparticles organized by the Nanotechnology Research Group (*NANO*⁺), it gives me great pleasure to send you a very sincere message of support and good wishes. I send you this message as an individual who is a friend of the organizers and probably of the participants of your workshop. It is heartening to note that the group has recorded a few great achievements, since its formation in September 2014 and that her research endeavours have been multi-disciplinary in nature and have yielded good results. From my little experience, I know that nothing is more important in the present world than the striving for the common good which finds expression in the honest collaboration among individuals, peoples and nations. This, you have successfully done as a research group. Research in nanotechnology is probably the most multi-disciplinary research field in this generation, bringing together biologists, engineers, agriculturists, physicists, mathematicians, medical scientists, life science researchers, and so on. I therefore sincerely congratulate the organizers of this workshop for their laudable attempt to bring these professionals together for a discourse on nanotechnology. Wishing you all a very fruitful and rewarding workshop.

Prof. M.O. Liasu, Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

Nanotechnology, Nanoparticles and Biological systems: The universe consists of matter and space. The various components of the universe are in constant dynamic flux of interacting forms of matter within the various domain of space (different spatial dimensions). The currency of material existence is energy. Energy is a form of intangible expression of matter. An understanding of the mechanism of the existence of matter, both living and non-living depends solely on the interface of mass and energy, tangible and intangible matter, nature and super nature, corporeal and ethereal, physical and metaphysical. The different spatial dimensions can be categorized on the basis of scale of size: e.g. intergalactic, interstellar, interplanetary, intercontinental, international, national, community, interspecific, internal systems (of both living and non living matter) and within species, internal physiology level; within non-living, crystal level to colloidal particle level. It continues to molecular and to atomic level. Importantly, at each of these spatial dimensional levels, the tangible forms of matter interface with the intangible. While the tangible form of matter is physically restricted in its mobility, the intangible is capable of traversing the dimensional units of space travelling as waves i.e. electromagnetic waves/ radiation at the speed of light serving as connection between tangible matters at the different spatial dimensions. At the same time, they

interface with particulate tangible matter within each dimension of space. Albert Szent Gyorgyi (1893-1986), the Hungarian born American medical biochemist and molecular biologist and a Nobel prize winner in 1937 reflected about his career while he was seeking the scientific basis for life he had to travel down the hierarchy of space and life existence from ecosystems- community- species population- individual organisms- systems- organs- body-tissues - cells- organelles- macromolecules- simple organic molecules/compounds- inorganic molecules-elements- atoms- protons/neutrons/electrons- radiations. He concluded that while trying to find out what constituted living essence he ended with non-living, non-tangible radiation. The elusive point of transition from living to non-living hierarchical level appears to at the nano space level. Particles at the nanospace level i.e. whose sizes lie within 1-100 nanometre (10^{-9} m) range are called Nanoparticles. They are at the interface between the tangible and the intangible forms of matter in both living and non-living systems.

Nanotechnology, the creation and use of materials and devices at extremely small scale (nanoscale) is a new study area to exploit the advantages of the ability of nanomaterials to maximally interface with the intangible components of matter thus bringing about almost perfect efficiency in physical and biological processes. Physical breakthroughs include pollution free emissions via catalytic converters in automobile operations, hard disc configuration in computers etc. Nanotechnology can be applied to biological systems to increase the efficiency of intermediary metabolism far beyond anything achievable by enzyme catalyzed systems. Nutrients availability from systems as well as nutrients absorption by plant roots can be enhanced. Inorganic nutrient relations at the soil-plant roots interface and bioremediation of polluted environment can be more effectively achieved. All catalytic reactions within living systems that were based on probability in a random system can be turned to actual certainty in a nanoparticles-based system with the probability of positive interaction between substrate molecules to yield products approaching hundred percent. The initiators and leaders of nanotechnology predictably had been the USA, JAPAN, CHINA and lately, GERMANY. The tools for research are special high resolution electron microscopes. However, physical manifestation of nanoparticles activity can be observed as new colour development. In Africa, very little attempt has been made to dabble into the high-tech field of nanotechnology. It is therefore heartwarming that in this era of poor funding of academic and research activities, a group of scientists from Ladoke Akintola University of Technology Ogbomoso coordinated by Prof. A. Lateef and colleagues from the Department of Pure and Applied Biology has taken the initiative to dabble into research in this promising new technology. All we can wish the group is more success as we admonish the various sponsoring agencies both local and international to grant maximum financial, material and logistic support to this bold initiative. Long live Nanotechnology Research Group, long live LAUTECH.

Prof. A. A. Adesokan, Immediate Past Provost, College of Health Sciences, Department of Biochemistry, LAUTECH, Ogbomoso.

I am highly honoured to write this goodwill message. Let me congratulate the organizers of the scientific workshop on Nanotechnology for their efforts in establishing the Nanotechnology Research Group in LAUTECH (*NANO*⁺) and for the relentless and dogged determination in organizing this workshop despite the prevailing situation of the University campus. I will urge our colleagues far and near, to seize this unique opportunity of the workshop within our domain, to turn out in large numbers and attend the workshop, as it will enrich and update their research knowledge in this new research technique. I wish the organizers and attendees alike, a very impactful and hitch-free workshop.

Prof. B.I.O. Ade-Omowaye, Immediate Past Director, LAUTECH Research and Consultancy Services (LAURESCON) Unit; Department of Food Science and Engineering, LAUTECH, Ogbomoso.

It is a singular pleasure and a privilege to send a message of support and best wishes to the organizers and participants of the workshop with the theme ‘Nanotechnology: Key to Sustainable Development and National Integration’ in LAUTECH. The theme of this workshop is aptly chosen, and also challenging. It is coming at a time where there is a dare need for realistic measures to meet the sustainable development goals in the country. It is very challenging because of the unimagined adverse effect of the current economic recession on education sector in Nigeria. This is why this workshop aimed at promoting research and training in nanotechnology in our Universities for sustainable national development and integration is most welcome. With the identification of nanotechnology as a technological panacea to solving human problems such as climate change, food security, health care, environmental pollution, inter alia; multiplication of research activities in the field should be encouraged especially in the developing economy as ours. The excellent initiative of the Nanotechnology Research Group (*NANO*⁺) under the visionary leadership of Prof. A. Lateef is highly commendable with the anticipated knowledge and skill that the workshop will impact on the participants and invariably the community. May the deliberation at the workshop inspire creative and innovative concepts able to lead us further in our realization of the SDGs in Nigeria and beyond.

Prof. M.K. Akinloye (FNIP), Department of Pure and Applied Physics, LAUTECH, Ogbomoso.

It is a singular pleasure and a privilege to send warm greetings and best wishes to the organizers and participants of this maiden workshop of the LAUTECH Nanotechnology Research Group (*NANO*⁺). I sincerely congratulate the group for being able to launch out through this workshop which will no doubt be beneficial to all attendees. The theme of the workshop is quite relevant to current technological developments worldwide. I therefore send my good wishes to all participants and hope you all go back home better informed in the field of nanotechnology and ready to made positive impact with the knowledge acquired. It is also pertinent to note and salute the courage and tenacity of the group that in spite of the huge challenge posed by the situation in the University, the process of holding the workshop could not be disturbed. This attests to the fact that in LAUTECH, academics is key and a lifestyle and cannot be compromised.

Prof. A.A. Bakare, Department of Zoology, & Director, Special Duties, Office of the Vice-Chancellor, University of Ibadan.

I heartily congratulate the Nanotechnology Research Group (*NANO*⁺) of Ladoke Akintola University of Technology, Ogbomoso and the entire University management for the insight to organize a workshop of this kind on **the synthesis, characterization and application of nanoparticles**. This workshop on nanotechnology is a timely one in the era of scientific development in Nigeria, Africa and the world at large. The Nanotechnology industry is a revolutionizing industry with great promises and benefits. Its evolution has enhanced agricultural, biomedical engineering productions and a good number of consumer products. This advancement is capable of contributing immensely to sustainable development of Nigeria especially in the areas of health, agriculture and environment. The vision and achievements of the *NANO*⁺ so far to advance the development of nanotechnology in Nigeria is highly commendable. I therefore congratulate and urge all participants at this workshop to make the best use of the immense wealth of knowledge and networking opportunities that this workshop offers to improve/add value to their scientific research and development of the nation’s economy. Once again, I congratulate the Nanotechnology Research Group (*NANO*⁺) of LAUTECH.

Prof. A.A. Raheem, Department Civil Engineering, LAUTECH, Ogbomoso.

I feel honoured to be invited to give goodwill message on the occasion of the maiden workshop of the Nanotechnology Research Group (*NANO*⁺) in LAUTECH, Ogbomoso, with the Theme: The Synthesis, Characterization and Application of Nanoparticles. I commend the head of the group – Prof. A. Lateef and other dedicated young scholars in the group, for their relentless efforts in conducting meaningful research that has continuously put LAUTECH in the forefront as far as Nanotechnology Research in Nigeria is concerned. This is despite the unfavourable conditions on campus in particular and in the country at large. I enjoin you never to relent in your efforts or allow the set back the University is presently witnessing to deter you from achieving your vision of transforming LAUTECH to a Centre of Excellence in Nanoscience and Nanotechnology in Nigeria. I also implore you not to allow your research findings to end in your shelves or in pages of Journal Publications, but to pursue practical applications of your results within the immediate and extended communities. Let’s turn our research findings into tangible things the common man can see and enjoy. This is one the ways by which you can contribute you own quota to the growth of the University and the development of the country. May the Almighty Allah continue to guide, protect and preserve you in all your research efforts and others. Congratulations.

Prof. A.O. Awodugba, Department of Pure and Applied Physics, LAUTECH, Ogbomoso.

Nanotechnology is facilitating major breakthroughs in different application sectors- Nanomedicine- Magnetic nanoparticles (MNPs) with many applications in biomedicine, diagnostic tracers and therapeutic agents in cancer therapy; as carriers in cell separation from biological liquids, bionanosensors for the diagnostic of infectious diseases (like Dengue and Zika fevers) to development of nanogels for biomedical applications based on marine resources (organic, inorganic or hybrid nanomaterials); robotics, biocatalysis, agriculture, green chemistry- pharmaceuticals, fragrances, cosmetics, biodegradable plastics, polymers; Physics- Photovoltaic applications, semiconductors, magnetic seals in the damping of audio speakers; in the remediation of environment and so on. Therefore, Nanotechnology, a major scientific phenomenon, is torching practically all facets of human needs just like the invention of electricity some centuries ago. Either we like it or not, it is fast becoming the in-thing as the world tends to confront the emerging challenges of the 21st century, and also because of the quest for more efficient miniaturized appliances. But more than that, nanotechnology will create new opportunities that we cannot now see. We are only seeing the peripheral of the subject and therefore, it becomes imperative for us in Africa, to develop the killer instinct approach that will engender the participation and contribution of Africa in this global phenomenon called Nanotechnology, more so that, this geo-entity called African is more challenged now than before. On this note, I wish the entire group of *NANO*⁺ robust research activities that will confront headlong the challenges of the 21st century and beyond.

Prof. O.O. Oyegoke, Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

The study of biology as a branch of natural science is never static since the study of nature which it entails is not static. Consequently, the different aspects or sub-disciplines of the subject are dependent on the level, the type of organism being studied, and the methodology applied in studying the organism. A big quantum in the study of biology was made in the 1930s when electron microscope was developed; this opened the gates for studying the fine or ultra-structures of living cells and their functional components. The development of electron microscope in the form of Scanning Tunneling Microscope precociously birthed Nanotechnology. Nanotechnology on the other hand studies matters at nanoscales (1-100 nanometers) which gives greater advantages since matters in all its forms in scientific fields can now be investigated (design, synthesis and manipulation) to even the atomic and molecular levels and the inherent properties of materials taken advantage of. Thus, nanotechnology cuts across all

other scientific fields such as biology, chemistry, physics, engineering, materials science, agriculture etc. The Department of Pure and Applied Biology, being one of the pioneering Departments of Ladoke Akintola University of Technology, Ogbomoso had earlier lived to its research objectives by its bold and positive venture into Biotechnology, an important discipline of biological science. That, this department is making another inroad into Nanotechnology is more or less a confirmation of Feynman’s observation of 1959 that “*There is plenty room at the bottom*”. In moving from macro, to micro, to electrons, and now to nanoscale; and perhaps we can go further to tinnier scales who knows. The boldness to inquire and explore in this novel and challenging direction is where I doff my hat for this group. It is only those who are able to envisage the future that can benefit from its gains; fortunately, the future is here. Congratulations to these noble visioners (*NANO*⁺ group), as I wish you successful deliberations at the workshop.

Prof. A.T.J. Ogunkunle, Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

It is an honour of great dimension for me to be associated with the achievements and aspirations of Nanotechnology Research Group (*NANO*⁺) in Ladoke Akintola University of Technology (LAUTECH), Ogbomoso; and to be invited to be part of its success story on this occasion of its maiden workshop. This workshop with the theme “Nanotechnology: Key to sustainable development and national integration” is historic, being the first of its kind happening in LAUTECH. It is also timely, being on the same page with our current national policies which emphasize environmental management for sustainable development and national integration. All over the world, Nanotechnology is not only an emerging field of research; it is also an important tool in many other fields such as agriculture, life, physical and environmental sciences, and in engineering and medicine. It is gratifying to note an array of achievements credited to your group within only three years of its existence. This, coupled with the rich academic and technical profiles of the members of the group, and the network of competent partners within and outside Nigeria, have made me to come to the conclusion that the future of Nanoscience in Nigeria is bright, and our sustainable development is guaranteed. I therefore wish to congratulate the Head and members of your highly esteemed group, and the organizing committee of this unique and solemn occasion.

Prof. B.A. Akinwande, Director, Quality Assurance Unit; Department of Food Science and Engineering, LAUTECH, Ogbomoso.

It is an honour for me to extend my warmest greetings to all participants, most importantly to the organizers of this maiden workshop on ‘nanotechnology’, which is a global cross-cutting theme. I was a one-man standing ovation when I heard of another landslide achievement of our great Ladoke Akintola University of Technology (LAUTECH), Ogbomoso through the efforts of the group to organize this workshop. The outstanding achievements of LAUTECH *NANO*⁺ group are highly commendable which includes launching of website, collaboration with other scientists in both national and international institutions, publications on nanotechnology in outstanding global journals and training of students in this field. These achievements with the hosting of this maiden workshop will further enhance institutional visibility. This will go a long way in proving the relevance of LAUTECH to the academic world and thereby boost the institutional ranking at national and global levels. This great University shall continue to move from glory to glory. Congratulations to *NANO*⁺.

Prof. O.M. Olabemiwo, Department of Pure and Chemistry, LAUTECH, Ogbomoso.

I congratulate Prof. A. Lateef and the entire members of LAUTECH Nanotechnology Research Group (*NANO*⁺) on this occasion of your maiden workshop. I also welcome all the participants who have come from far and near to attend this workshop. This workshop is probably the first of its kind in the field of nanotechnology being held in Nigeria. Nanoparticle technology is one of the indispensable ingredients needed not only for industrial development but more importantly to achieve most of the United Nation Millennium Development Goals. Hence, the appropriateness of this workshop is timely, in a period like this, when our country is undergoing economic recession due mainly to over dependence on the crude oil at the expense of industrial development. Within short period of three years, your research group has made a remarkable contribution to nanoparticle development and applications using locally available materials as attested by the quality and quantity of international journal articles that have emanated from your research. It is not an overstatement to say that *NANO*⁺ has opened a new chapter in the history of scientific research in LAUTECH in particular and the entire tertiary institution in Nigeria in general. No doubt, the quest for increased local content input as panacea for industrial and economic development in Nigeria is being adequately addressed by your research group. I therefore, wish you a very successful deliberation during this workshop. I am very optimistic that deliberations during the workshop will produce stimulants for academics in Nigeria to start looking inward to making use of local resources and meager facilities we have to proffer solutions to our technological and economic problems in Nigeria.

Prof. O.A. Olowe, Department of Medical Microbiology and Parasitology, College of Health Sciences, LAUTECH, Osogbo.

Congratulations on this laudable LAUTECH NANO-TECH 2017 workshop. The excellent effort gathered into planning this conference by the research group is overwhelming despite all odds facing the institution. It is indeed a great achievement launching the image of this institution continuously. We are proud to call you our own. You have been a great example to many research scientists. Your research activities over the years have opened doors of opportunities to other research groups within and outside the University. We are so proud that your research efforts and tireless output have paid off. Once again Congratulations.

Prof. T.I. Olabiyi, Department of Crop and Environmental Protection, LAUTECH, Ogbomoso.

"Materials with 100 nm particle size, or less than, in at least one dimension" are generally referred to as **NANOMATERIALS**. By and large, the application of biotechnology has increased the use of nanomaterials in various scientific fields of study. On a good note, nanotechnology has its use in Agricultural sciences, Pure and Applied Sciences, Medicine, Pesticide Sciences, Pharmacy, Food industry, Biotechnology, Environmental waste management, etc. My goodwill message however, focused on "Use of nanotechnology in Agricultural Production and Crop Protection". Suffice to say, nanotechnology has played important roles in plant germination and growth, plant protection, detection of plant pathogenic organisms, plant nematology, Agronomy, nano-fertilizer production, and pesticide residue detection and degradation. However, eco-toxicity, carry-over effect of nanoparticles in food items and phytotoxicity of nanomaterials on plant leaf are great concerns in Agriculture. Study of toxico-kinetics and toxico-dynamics of nanoparticles, as it relates to agriculture, should not be undermined. Therefore, application of nanomaterials can be under controlled environments, such as greenhouse and screen house. I wish the Nanotechnology Research Group (*NANO*⁺), a very fruitful workshop. Thank you.

Dr. M.O. Olatinwo, Department of Mathematics, Obafemi Awolowo University, Ile-Ife.

Thanks for informing me on your Nanotechnology Workshop coming up in August 2017 and for which goodwill message has been requested from me. I wish all the members of *NANO*⁺ a very successful workshop. Nanoscience and nanotechnology are the study and application of extremely small things and can be used across all the other science fields, such as Chemistry, Biology, Physics, Materials Science, and Engineering. The ideas and concepts behind nanoscience and nanotechnology commenced with a talk entitled "There's Plenty of Room at the Bottom," delivered by physicist Richard Feynman at an American Physical Society meeting at the California Institute of Technology (CalTech) on December 29, 1959, long before the term nanotechnology was used. In his talk, Feynman described a process in which scientists would be able to manipulate and control individual atoms and molecules. Over a decade later, in his explorations of ultra precision machining, Professor Norio Taniguchi coined the term nanotechnology. It wasn't until 1981, with the development of the scanning tunneling microscope that could "see" individual atoms that modern nanotechnology began. The challenge for the modern experts in this field is to consider how an undergraduate curriculum devoid of shabby politics can be drawn for Nigerian Universities. It will be more interesting if Mathematics can be incorporated into such curriculum for empirical formulation of physical problems. I will also like to serve your Society/Group in this regard whenever you are ready. Once again, I wish all the members of *NANO*⁺ a very successful workshop. Thanks.

Dr. S.O. Kareem, Department of Microbiology, Federal University of Agriculture, Abeokuta.

Nanotechnology is considered as a new technology of the 21st century because of its driving force in the manufacturing of novel functional materials that can have huge beneficial impacts on solving some of the critical challenges of the society. It plays significant roles in energy production and storage, water treatment, efficient computer system, metallurgical engineering and better health care system. Nanotechnology has a great potential in alleviating many challenges facing tropical countries like Nigeria. This workshop organized by crop of erudite scientists is an avenue to intimate many budding scientists with the prospects of nanoscience. It is indeed a timely event at the point the world is searching for alternative sources to address various global scientific and technological challenges. It is equally important to implore government to support this scientific workshop and employ the technology for national development. I therefore congratulate the organizers (*NANO*⁺) of this training workshop for their commitment to research and development.

Dr. M.A. Adabanija, Department of Earth Sciences, LAUTECH, Ogbomoso.

I congratulate the entire members of Nanotechnology Research Group (*NANO*⁺), Ladoke Akintola University of Technology Ogbomoso, Nigeria on the occasion of your pace-setting maiden workshop on Synthesis, Characterization and Applications of Nanoparticles holding on August 21-24, 2017. The vision and dream conceived and pioneered by the exemplary team leader, Prof. A. Lateef has manifested into fruition, grown in leaps and bounds and spread like wild-fire across all borders. I am proud to be associated and identified with the team, as I wish the group a resounding success in deliberations at the workshop. Congratulations.

Dr. S.O. Ojoawo, Department of Civil Engineering, LAUTECH, Ogbomoso.

As a collaborator and a happy beneficiary, it gladdens my heart to felicitate with the Head, Prof. A. Lateef, and entire membership of the great Nanotechnology Research Group (*NANO*⁺) on this maiden workshop on the synthesis, characterization and applications of nanoparticles. The study and application of extremely small things across all the fields of science and engineering, encapsulated as nanoscience and nanotechnology have gained very wide acceptability among researchers. In recent times, tangible findings translating to human comforts have

evolved from deliberate transformation of materials on nanoscale and taking advantage of their enhanced properties such as higher strength, lighter weight, maneuver ease, higher interaction, increased control of spectra, better sorption and greater chemical reactivity, among others. Thanks to nano, the science of simplification. *NANO*⁺ has been known as a body of highly focused, disciplined and goal-oriented intellectuals handling nanotechnology and related research works with impressive dexterity around here. As such, one would not hesitate in appealing to relevant funding agencies (both internationally and locally) to release substantive grants to this altruistic set of emulative researchers, of whom we are all proud. Kindly permit me to heartily wish all the participants at this maiden nanotechnology workshop a fulfilling experience, and may our society be better therefrom. More powers to our dear *NANO*⁺ Group!

Dr. O.S. Bello, Department of Pure and Applied Chemistry, LAUTECH, Ogbomoso.

The beginning of greater things starts as a seed. Passion, willingness to learn and tenacity is the key to rising above average and mediocrity. As you keep pushing and pressing on, the refinery of life will bring out the GOLD within you. *NANO*⁺ group has put passion in the seed sown over two years ago, they have nourished it well, and its predominance now determines all currents towards itself, making the whole life its tributary. Keep soaring high.

Dr. O.O. Ogunleye, Department of Chemical Engineering, LAUTECH, Ogbomoso.

Despotic forces dubbed scientific revolution and developments native of the Western world, while epidemics and vices are from the blacks. But science has neither creed nor race; its language is inquisitiveness and its principle is creativity. These two factors unshackle erudite scholars from intellectual imperialism whose kind we are revelling here today. I whole heartedly salute the irrepressible spirit and commitments of the *NANO*⁺ group in achieving this feat despite so many daunting challenges. This is a delightful moment and a clear education to those who are ignorant of the workings of science and its deliverables that researches are going on at LAUTECH despite all odds. I wish the *NANO*⁺ group more landmark achievements and all the participants at the workshop wonderful sessions.

Dr. T.A. Adedosu, Department of Pure and Applied Chemistry, LAUTECH, Ogbomoso.

Nanotechnology is a multidisciplinary field that cut across all disciplines and one of the emerging technology areas where Nigeria is lacking in expertise. Big Congratulations to LAUTECH Nanotechnology Research Group (*NANO*⁺) under the leadership of our amiable Prof. A. Lateef for organizing workshop on “Synthesis, Characterization and Applications of Nanoparticles”. This workshop is coming at the right time when our country (Nigeria) is focusing on Non-Oil resources for her economic sustainability. *NANO*⁺ has again re-affirmed LAUTECH, Ogbomoso as a major player in the country’s economic sustainability and national integration through her cutting-edge and environmentally world class researches despite all odds. I am using this medium to wish *NANO*⁺ a successful and knowledge-imparting programme. Thanks and God bless.

Dr. A.A. Adedeji, Carnegie Fellow, Assistant Professor, Department of Biosystems and Agricultural Engineering, University of Kentucky, USA.

What can I say, that I am enthralled with the ground-breaking research being led by the LAUTECH Nanotechnology Research Group (*NANO*⁺) is an understatement. *NANO*⁺ has created an oasis in the midst of the desert. They have broken the ground that seems impossible; they are conducting research and applying state-of-art knowledge in nanotechnology to address real problems. All in the midst of challenging environment that scientist

often find themselves in Nigeria and are discouraged. I salute the vision and effort of every member, and I encourage you not to stop reaching into the “*space*” for more. *NANO*⁺ vision, implementation, and achievement is another pace-setting effort that sets LAUTECH apart among its peers. *NANO*⁺ is fulfilling the dreams of the founding fathers of LAUTECH, to train graduates with sound academic knowledge and unmatched ability to apply such knowledge. *NANO*⁺ exemplified what Nigeria can and should be today – that we can be our own solution. Fundamental and Applied Science, Engineering and Innovation are the solutions to emancipation from our current economic quagmire, not petroleum. I urge every stakeholder who is responsible for funding LAUTECH, not to let *NANO*⁺ be lost to another institution. I earnestly request for support from LAUTECH Alumni bodies from around the world for *NANO*⁺. This group holds the key to advancement in medicine, agriculture, vaccines, food, and bioprocessing, etc. in Nigeria, and they more than deserve our support. I congratulate everybody involved in your maiden workshop, and I wish you success.

Dr. D.O. Araromi, Department of Chemical Engineering, LAUTECH, Ogbomoso.

I accept with a sense of honour and appreciation your invitation to me to celebrate with you on the occasion of your maiden workshop with theme “Nanotechnology: key to sustainable development and National Integration”. I congratulate Nanotechnology Research Group (*NANO*⁺) for this laudable effort. With this effort, there is no doubt your group has projected the image of LAUTECH among Universities and it is hope that LAUTECH will bounce back to cling her position not only as one of the best Universities in Nigeria but the World all over. I encourage you to be inspired by tremendous achievement you have made within the shortest period you commence and to chart new course that will bode well for the future development of the group. Your choice of the theme is apt and apropos to current economic challenge in the country which calls for immediate improvement in growth performance and diversification. It is believed that the outcomes of the workshop will help to improve efficiencies in health, manufacturing and energy sectors and overall accelerated progress in economic sector. I congratulate you once again and urge that the effort be sustained and improved upon.

Dr. T.O. Salawudeen, Department of Chemical Engineering, LAUTECH, Ogbomoso.

The quality of material is built in the nano-size of its component matter.

I write to congratulate you LAUTECH Nanotechnology Research Group (*NANO*⁺) on the maiden workshop on nanotechnology. The need to appreciate this becomes imperative considering your great achievement within the short period of your existence despite all hindrances. I wish to particularly say this that your positive impact on LAUTECH environment, other Nigeria tertiary institutions and academic world in general cannot be overemphasized in terms of publications, academic prowess and hands on tools training. I am proud without any prejudice or discrimination but rather as a nanotechnology engineer to say it clearly here that your research group stands out of many in all Nigeria institutions. Once Again, accept my congratulations, and I wish you fruitful deliberations at the workshop.

Dr. K.K. Salman, Department of Agricultural Economics, University of Ibadan.

Leading countries in the world today in terms of innovation and competitiveness were ranked based on the three types of economic development - agricultural, industrial and knowledge-based economy. An undiluted knowledge seeking and research efforts would therefore be needed for a guaranteed economic development and its required sustainability. Despite all hurdles, challenges and effort frustration that characterized Nigerian research industry, I am amazed that a research group, *NANO*⁺ at LAUTECH could still remain focused. Their cutting edge research embarked on and training programme for the young scientists are indeed societal development oriented.

Although, persuading or convincing the policy makers to consider utilizing recommendations from our research findings could be challenging, I still see the vision and mission of the research group as a strong key suitable enough to open the doors of the policy makers. I strongly wish Nanotechnology research group (*NANO*⁺) more and more achievements. Congratulations.

Dr. E.O. Akanni, Department of Medical Laboratory Science, College of Health Sciences, LAUTECH, Osogbo.

..... Looking into the future through the glass of nanotechnology!

About 4 years ago, **Heinrich Rohrer**, the father of nanotechnology from Switzerland, and the winner of the 1986 Nobel Prize in Physics, passed away at the age of 79. His passing however did not leave a vacuum, because of the inspiration he left for the forward thinking and brilliant minds that comprise the leadership of the LAUTECH Nanotechnology Research Group (*NANO*⁺) and other eminent scholars in the field. The birth of nanotechnology research in LAUTECH was conceived by the group a couple of years ago. This seed of excellence, which has germinated in our resource-limited environment, is developing rapidly through collaboration with like minds across faculties of the University and indeed is now spreading to other Universities in Nigeria and Africa. It is now obvious that solutions to the numerous challenges facing mankind are now being sought beyond currently applied technologies. Attention is increasingly shifting towards applying nanotechnology to address specific scientific, agricultural and medical problems. Thus, establishing the LAUTECH nanotechnology research group is a most timely development and will provide leadership in the following activities:

- Development of quality nanotechnology-based research through the application of locally available materials,
- Strengthening of the nanotechnology collaborations across different scientific fields and breaking down barriers in the fields,
- Creating awareness regarding channels for funding, as well as partnerships for nanotechnology laboratories, and providing some core facilities to promote academic and professional development.

As we welcome you to this maiden workshop on nanotechnology, a passionate appeal is hereby humbly made to public spirited individuals, private companies, University management, the National Universities Commission, Tertiary Education Trust fund (TETFUND) and the Federal Government of Nigeria to invest into this initiative by raising its status to that of an institute where we shall be gazing into the future through the glass of nanotechnology. Congratulations!!! Long live *NANO*⁺ !!! Long live LAUTECH!!! Long live Nigeria!!!

Dr. J. A. Adejuyitan, Department of Food Science and Engineering, LAUTECH, Ogbomoso.

It is without doubt that nanotechnology as an emerging discipline with undeniable social and economic benefits, has found a place of abode in LAUTECH. It is therefore a great blessing to LAUTECH community to have crops of brilliant scholars who have been well trained in this emerging field of research. These erudite scholars have come out with primary focus of advancing research by providing latest technology solutions that enhances learning and teaching. I hereby congratulate LAUTECH Nanotechnology Research Group (*NANO*⁺) for her laudable achievements and for her maiden workshop on the synthesis, characterization and applications of nanoparticles. I humbly appreciate and admire her mastery in this research field. Wishing LAUTECH Nanotechnology Research Group (*NANO*⁺) greater heights in all her enterprising endeavours. May the Almighty God crown your efforts with good success (Amen). Kudos! Bravo!! Congrats!!!

Dr. O.A. Adebayo, Department of Agricultural Engineering, LAUTECH, Ogbomoso.

Nanotechnology is an emerging interdisciplinary technology that has been thriving in many areas in the recent decade. It has been found to have very broad applications. To this end, I congratulate Prof. A. Lateef and the entire Nanotechnology Research Group of Ladoko Akintola University of Technology (LAUTECH), Ogbomoso for this landmark attainment despite all odds, placing LAUTECH at the forefront of nanotechnology research in Nigeria. Without an iota of doubt, I believe that this maiden workshop tagged “synthesis, characterization and applications of nanoparticles” will go a long way in re-positioning our dear country, Nigeria in line with current worldwide pursuit in Nanoscience. As part of my preparations for taking up a Postdoctoral Position in one of the South African Universities on the effect of various nanomaterials additives on biogas yields of selected Agricultural residues using batch reactor at mesophilic and thermophilic temperatures, I made a visit to Prof. Lateef’s Laboratory of Industrial Microbiology and Nanobiotechnology and was amazed at the facilities on ground and the quality of research outputs from the laboratory. I will also encourage all participants to make a visit to the laboratory before departing to their various destinations. I wish you fruitful and highly rewarding deliberations. Congratulations to *NANO*⁺.

Dr. O.O. Oladapo, Department of Science Laboratory Technology, LAUTECH, Ogbomoso, Visiting Fellow, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana.

I must say that I got to know Nanotechnology Research Group (*NANO*⁺) at her tooting stage when the vision was being shared and communicated. It is commending and challenging to see the group grow at a speed of light. The tentacle of the group has spread from the four walls of LAUTECH where it was conceived and birthed to other Institutions both home and abroad. I personally witnessed students in my Department being baptized and immersed in this niche of research as they carried out their final year projects in this field. It was a very rewarding experience. The progressional increase of the researchers and the various publications in reputable journals with high Impact factors are commendable. It is obvious that the knowledge from the Nanotechnology Research Group will continue to thrive considering the huge trainings and collaborations embarked upon. It is clear that all the past efforts of the group have now formed a beautiful tapestry in the fabrics of academic research. I wish the group the very best in the maiden edition of their workshop.



We appreciate our esteem collaboration with *NANO*⁺ on Nanotechnology

Prof. E.B. Gueguim-Kana, Department of Microbiology, and Ms. L.S. Beukes, Microscopy and Microanalysis Unit, School of Life Sciences, University of KwaZulu-Natal, Pietermaritzburg, South Africa.

As collaborators from the Department of Microbiology, and Microscopy and Microanalysis Unit at the University of KwaZulu-Natal, Pietermaritzburg, South Africa, we would like to congratulate Prof. A. Lateef and the Nanotechnology Research Group (*NANO*⁺) of Ladoke Akintola University of Technology, Ogbomosho, on their outstanding efforts in remaining in the forefront of research related to the synthesis, characterization and applications of nanoparticles. Since the beginning of our partnership in 2014, our collaborative efforts have generated some **fifteen (15) publications** in a short period of 3 years in high impact journals. The team has pioneered vigorous and imaginative ways to achieve cutting edge research with limited funds. The quality and rate of knowledge generation by the research group is highly commendable. We feel very proud to be associated with *NANO*⁺, and we would like to thank Prof. Lateef and his team for their hard work in establishing this research network and wish them all the success for the maiden workshop and future endeavours.

Dr. S.H. Abbas, Centre of Excellence in Nanotechnology Research Institute (CENT), King Fahd University of Petroleum and Minerals, Dharan, Kingdom of Saudi Arabia.

We (CENT) are happy to be involved as research-collaborators with LAUTECH Nanotechnology Research Group (*NANO*⁺). This group has been involved in various areas of research in the field of nanotechnology and the syntheses of nanoparticles for various applications. We try to provide some facilities for the characterization of these freshly prepared nanomaterials, such as; FESEM, EDX, Mapping, XRD, DLS, DSC/TGA and Raman among others. For more information, follow the link:

<http://www.kfupm.edu.sa/centers/CENT/SitePages/en/ContentDetailsPage.aspx?CUSTOMID=58&LinkID=LinkV5>.

We are glad to share and provide our expertise to LAUTECH. We also believe that with many benefits of collaborative research: collaboration increases the probability that the knowledge, skills and techniques required will be available among the collaborators, and the time spent learning information or skills is minimized. This is particularly relevant given the increasing complex nature of research. Relatedly, transfer of knowledge of various field and skills often occurs within collaborative research relationships. Frequently, a sharing of perspectives and

ideas can substitute inspiration and expand knowledge that would not occur during individual research initiatives. Collaborative relationships may provide researchers with unique opportunities to work with other researchers and their field of interest that they would otherwise not be exposed to, creating increased opportunities for joint publications that are extremely valuable and beneficial to research careers at both ends!!!. We are therefore proud to be associated with *NANO*⁺, and commend the activities of the group.

Dr. L. Azeez, Department of Chemical Sciences, Osun State University, Osogbo.

The experience of collaborating with *NANO*⁺ group has been worthwhile. This is a group which has assisted budding scientists in understanding basics of nanotechnology and its applications. Under the tutelage of *NANO*⁺ headed by our experienced Prof. A. Lateef, I can now call myself a nanoscientist courtesy of **four papers** published on nanomaterials in *Biologia*, *Journal of Taibah University for Science*, *Journal of Nanostructure in Chemistry*, and *Applied Nanoscience* and with several others under review and in preparation. This is the best of time for me and several others as we are gearing up to present our researches on nanotechnology during the forthcoming conferences. Wish everyone happy stay.

Dr. V.B. Kamble, Zeal College of Engineering and Research, Pune, India.

May I humbly congratulate you and further express my profound admiration and deepest appreciation of your kind gesture to “Nano” researchers through an empowerment program of Nanotechnology: Key to Sustainable Development and National Integration. On the whole, nanotechnology is, ‘the creation and application of materials, devices and systems at the level of atoms, molecules and supramolecular structures. Nanotechnology may transform the ways in which we obtain and use energy. The development of more effective energy-producing, energy-absorbing, and energy storage products in smaller and more efficient devices is possible with this technology. Also, the field of electronics is set to be revolutionized by nanotechnology. It raises the possibility of microscopic recording devices, which would be virtually undetectable. In the medical world, nanotechnology is seen as a boon since these can help with creating “Smart drugs”. The essence of nanotechnology is the ability to work at these levels, to generate larger structures with basically new molecular organizations. These newly formed smallest human made objects the ‘nanostructures’ display new physical, chemical and biological properties and phenomena. The aim of nanotechnology is lean to exploit these properties, and efficiently manufacture and utilize these structures for the benefit of the society. I truly acknowledge quality research outcomes and efforts of your research group for transforming LAUTECH to a centre of excellence in Nanoscience and Nanotechnology in Nigeria. You are inheriting a great team, and I’m sure that your ability to motivate will make them even more effective. I am indeed honored to receive this highly coveted invitation as I know that it comes rare and far. I once again, would like to congratulate you for your commendable efforts for organizing such a momentous workshop and hope that the same spirit will continue in future also. Thank You!

Agharkar, M. Scientific Writer (Nanotechnology), Research & Analysis, Springer Nature Publishing and Technology Solutions, Pune, India.

I have to say that I was astonished when I came to know that Nanotechnology Research group (*NANO*⁺) at LAUTECH is about to organize its own first workshop. To give a little background, back in 2014, Dr. M.A. Azeez was a postdoctoral researcher in nanotechnology at Pune University, Chemistry Department. My colleagues; Sachin, Manjunath, Mrunal and Vaishali, Dr. Azeez and I were all like a family, and Dr. Azeez was like our big brother. Dr. Azeez had become extremely popular in our Department for being a cheerful guy from Nigeria and even today when I occasionally walk into a canteen, at least a couple of people ask me about him.

During this period, all of us shared our lunches, dinners along with our thoughts and ideas regarding nanotechnology. This exchange of ideas even gave birth to couple of fine publications on nanotechnology. It seems like yesterday when Dr. Azeez told me that his friends at LAUTECH are starting a nanotech group, I remember thinking that this group, like any new research group in India or any other developing country, is going to face many challenges with funding, resources and I am sure that it did. It must have been the dedication and efforts of all of you along with my friend Dr. Azeez that made it possible to overcome all the challenges and progress. I have been following the progress of your group for the last three years, I have read some of the publications that your group has published, I have also been a reviewer of one of the papers published by your group in *International Nano Letters*, and I have to say that you all are doing really good job. I would also like to mention the out of box thinking that your group has. I am sure that your article on synthesis of nanoparticles using cobweb published in *Applied Nanoscience* with ISI/Thomson Reuters impact factor of 3.325 is capable of putting a big smile on the face of any nanotechnology researcher. It is certain that what your group has achieved till date is just a beginning, and the future of Nanotechnology Research Group at LAUTECH is full of many fine researchers, quality research, revolutionary ideas and excellent publications. On behalf of my colleagues in Pune University, I would like to wish you all the best for your future.

Kochrekar, S. Junior Research Fellow, DST-SERB project, Department of Applied Chemistry, Defence Institute of Advanced Technology, Pune, India.

Congratulations to all the members of Nanotechnology Research Group (*NANO*⁺). I know what kind of efforts goes into building a group and how hard you all must have worked to attain the heights. I am following this group very closely; it has grown from strength to strength and has become an event, which brought like-minded researchers together to advocate, and promote investigations for a more cohesive and coordinated intervention towards development of nanoscience and technology. You have been a great example. I mark this occasion for looking back on past struggles, efforts and accomplishments of the *NANO*⁺ and more importantly looking forward to the unending opportunities and untapped potentials that await in this group. I believe, the maiden workshop on nanotechnology by this phenomenal group will insemminate the seed of nanoscience in the minds of young scholars and flourish nanoscience and technology for the betterment of environment and society. Wishing you all fruitful and rewarding workshop. With warm regards.



Be inspired: Thanks for insightful supervision in Nanotechnology research

Adelere, I.A, B.Tech, M.Tech. (LAUTECH), Department of Microbiology, Federal University of Technology, Minna.

Nanotechnology is a multidisciplinary field that encompasses diverse areas of science and engineering. It involves the synthesis and stabilization of various nanoparticles. The advent of biological principles has recolonized the technology and has broadened its applications. Nanotechnology has found applications in numerous areas notable among them are biomedicine, catalysis, material science, production of antimicrobial agents and others. Nanotechnology, through the production of nanofoods can improve food production to cater for steadily growing global population. However, application of nanotechnology is still at infant stage, efforts are still required to sensitize people to the greater opportunities embedded in the science. This task has been taken up by a group of scholars in LAUTECH, under the auspices of *NANO⁺* that is led by my supervisor, Prof. A. Lateef. I have the very rare opportunity of being the **first student** to work in this area under his tutelage, while I was on my M.Tech programme, which led to a publication in *International Nano Letters* (Springer) in 2015. Since then, it has been a forward march, as I have **co-authored two articles** with Prof. Lateef on nanotechnology. I'm therefore pleased that *NANO⁺* has taken this giant step to sensitize the scientific community further on the prospect of nanotechnology. I wish the gathering a successful workshop.

Ojo S.A, B.Tech, M.Tech. (LAUTECH), Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

I feel honoured to be part of the various testimonies about Nanotechnology Research Group (*NANO⁺*) LAUTECH, Ogbomoso presided over by a man of excellence, Prof. A. Lateef. The establishment of this research group to me was not a coincidence, but by providence, it came to be. I was privileged to be among the first set of students to work with and under the watch of this research group and since identifying with the group, nothing has indeed remained the same. This establishment has done a lot by threading on another path of scientific research in this part of the world and consequently attracting the attentions of prospective researchers in the field of Nanoscience and experts from various disciplines. This organization has exposed me and other beneficiaries to

quality and sophisticated research facilities. It has afforded me opportunity to work and interact with high profile researchers within and outside Nigeria. As a post graduate student pursuing his career in the field of nanotechnology, I can categorically say that this group has added a lot of academic values to me, and with the collaborative supports that I received from members of the group, I can boast of **twelve co-published papers** on nanotechnology in reputable journals; all during my Master degree programme. This missive today is just a fragmental part of a whole lot of experience that I have with the group. I am glad once again to be part of the success story. Long live *NANO*⁺ research group! Long live Ladoke Akintola University of Technology, Ogbomoso!! Long live Nigeria!!!

Elegbede, J.A, B.Tech (LAUTECH), Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

I humbly write to congratulate the LAUTECH Nanotechnology Research Group (*NANO*⁺) for the hosting of this workshop which is the first of its kind in the institution especially in this area of science and technology. Also I want to commend the doggedness and the tenacious spirit possessed by the members of the group, headed by my exceptional and admirable supervisor Prof. A. Lateef for successfully carrying out series of novel researches within the past three years since the inception of *NANO*⁺ and training several students, both undergraduates and postgraduates among which I am. My current research work is based on production of fungal xylanases from corncob, its biotechnological applications in fruit juice and bakery processes, and its subsequent applications in the green synthesis of silver, gold and silver-gold alloy nanoparticles which displayed excellent antimicrobial, antioxidant, catalytic, thrombolytic and anticoagulant properties. LAUTECH Nanotechnology Research Group has indeed made undeniable landmark achievements in the area of green synthesis of nanoparticles which is evident in the number of research publications it has produced. Even as a postgraduate student currently pursuing M.Tech degree, it is gratifying that I am a **co-author of three articles** published in *Nanotechnology Reviews*, *Journal of Cluster Science*, and *Journal of Photochemistry and Photobiology, B: Biology*, in **addition to two accepted articles**. I wish the group greater success in years to come and may the good Lord strengthen the group.

Odediji, R. B.Tech (LAUTECH), Department of Mechanical Engineering, LAUTECH, Ogbomoso.

I most humbly write to congratulate members of LAUTECH Nanotechnology Research Group (*NANO*⁺) and to further express my profound admiration and appreciation of your kind gesture to the students of this institution and our dear country, Nigeria. Application of nanomaterials is gaining attention in modern day industries and academia. Nanotechnology is an important field of modern research dealing with design, synthesis, and manipulation of particle structures ranging from approximately 1-100 nm. Nanotechnology has made and still making remarkable contributions to many fields of specialization. I consider it necessary to make a brief remark on my personal experience with the application of nanoparticles in coating technology where I am carrying out my postgraduate research. Interestingly, the quantity of nanoparticles needed as additive in paint formulation to impact wide range of advantages is unimaginably minute. Various physical and chemical methods have been used for synthesizing and stabilizing nanoparticles, however environmental friendly methods of synthesizing nanoparticles is one of the core mandates of this research group using green chemistry which has advantages over conventional methods involving chemical agents associated with environmental toxicity. I hereby urge the members of *NANO*⁺ to keep up with the good work towards achieving the vision of the group. Congratulations on the organization of this maiden workshop on nanotechnology. Thank you.

Akinwale, A.S, B.Tech (LAUTECH), Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

It is a privilege for me to send this message of best wishes and support to the Nanotechnology Research Group (*NANO*⁺), which is poised to be a leading research group in Nigeria as exemplified by the significant contributions to nanotechnology and biomedical research recorded so far in a short period of three years of its existence. Imagine a world characterized with various proactive measures of embattling pathogenic microbes through coating of prosthetic and surgical devices, incorporation to bolster effects of the common antibiotics, solar panel cells and cancer therapy among other untapped importance, we are getting there and as the saying goes 'a good head and a good heart are always a formidable combination'. I believe this seminar will be effective in making this sojourn on the path of scientific research a unique reality. The *NANO*⁺ is here to stay as the beacon of hope to us all, most especially in the aspect of mentorship and training of students. As an undergraduate, I was given the opportunity of receiving direct mentoring from the founders of *NANO*⁺, notably Prof. A. Lateef and was privileged to be **co-author of three articles** on nanotechnology published in *Biologia*, *IEEE Transactions on Nanobioscience*, and *Notulae Scientia Biologicae*, which I am grateful for. Finally, the importance of this workshop cannot be overemphasized. I wish you all a wonderful and inspiring moments at the workshop.

Oladipo, T.O (nee Oluyide), B.Tech (LAUTECH), Department of Science Laboratory Technology, LAUTECH, Ogbomoso.

I write to congratulate the LAUTECH Nanotechnology Research group (*NANO*⁺) on this occasion of its maiden workshop holding in Ogbomoso, Oyo state. It is an endeavor that needs to be appreciated. I am so privileged to be part of this huge success train and I want to use this opportunity to specially appreciate my amiable mentor, supervisor and role model in the person of Prof. A. Lateef and Dr. I.C. Oladipo as well as the entire members of this great research group. Your mentorship, constant support, training, guidance and words of encouragement have been determining factors of where I am today and what I am aspiring to be in the nearest future. I am opportune to be introduced by you into the world of Nanotechnology and research during my final year project in this great citadel of learning, whereby I was privileged to work on the Green Synthesis of Gold Nanoparticles and its numerous microbial and medical applications through diligence, hard work, endurance, tolerance and perseverance earned through the able mentorship of the pioneering members of this research group. From the investigation, I became a **co-author** with my respected bosses in an article published in prestigious *Journal of Photochemistry and Photobiology, B: Biology* in 2017. This has since broaden and sharpen the horizon of my knowledge, abilities and skills and will continue to be a source from which I will constantly draw strength and motivation from in my quest to become a great academician and researcher wherever I found myself in life. Once again, I am grateful. I hereby wish the LAUTECH-Nanotechnology Research Group success on this occasion. I am confident that the opportunities the workshop will present to the government, education, research and body of science at large will yield positive fruit. With annual conference and exhibition like this, LAUTECH-Nanotechnology Research Group deserves recognition for its contribution to the growth of science and research in Nigeria. It is my pleasure to be associated with the research group. Congratulation on the good work!

Folarin, B.I, B.Tech (LAUTECH), Department of Biological Sciences, Crawford University, Igbesa.

On behalf of the 2015/2016 Nanotechnology Project Students, I hereby congratulate LAUTECH Nanotechnology Research Group (*NANO*⁺) headed by Prof. A. Lateef on the occasion of the 2017 maiden workshop on Nanotechnology. This is a trail blazing step in the history of LAUTECH that will bring her a global attention for excellence. *NANO*⁺ has always been focused on developing manpower through research and knowledge impartation, and we are a product of this good gesture. Our experience in nanotechnology has been a notable one

that has set a foundation for our research minds. Having been convinced that there is "plenty of room at the bottom", we synthesized and exploited nanoparticles activities in antimicrobial, catalytic functions, larvicidal, thrombolytic and other applications; and working with *NANO*⁺ taught us diligence in research as well as finding new methods to solve challenges. We make bold to say we have a good grasp of the subject matter, having had in-depth research that has yielded **three publications** in *Journal of Cluster Science*, *Nanotechnology Reviews* and *3Biotech*, as well as several project reports yet to be published. Nanotechnology has good prospects in the life sciences; in fighting antimicrobial resistance, drug delivery, disease diagnosis, cancer treatment, plant growth enhancement, to mention but a few, which the participants can consider for their research activities. We believe that *NANO*⁺ will impact this nation in a dynamic way through nanotechnology. Congratulations.

Oladokun, S.O, B.Tech (LAUTECH), Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

Having benefited through wealth of experience of members of Nanotechnology Research Group (*NANO*⁺) especially through my supervisor, Dr. T.A. Yekeen, my goodwill message will be anchored on knowledge impacted on me and encouragement to train more manpower which I believe will assist in our nation building. I am bold to say a lot was gained during my tutelage as a project student in an emerging field of research called Nanotechnology. Nanotechnology as the name implies, is the study of relatively small structure. Nanotechnology is very useful in various industries such as medicine/biomedical and pharmaceutical industries, engineering field, agricultural sector, energy such as oil, gas, solar and renewable energy, environment, food and nutrition. Besides the knowledge impacted in me, I also benefited from the group by having my research project published in an international peer-reviewed journal which is a rare privilege for an undergraduate student. I appreciate Nanotechnology Research Group of LAUTECH, Ogbomoso and I'm also looking forward to work with the group in my future research activity in order to widen my knowledge in nanotechnology and make the best use of it. I wish the group success in the workshop and pray that God crown their efforts to impact knowledge with success.

Ajibola, A.A, B. Tech (LAUTECH), Department of Pure and Applied Biology, LAUTECH, Ogbomoso.

Nanotechnology Research Group (*NANO*⁺) is a pace setter in research and act of giving out without expectation of returns. This I am confident to say because I was one among many students that benefited from the research group through unquantifiable research experiences from the group members and my supervisor (Dr. Yekeen, T.A.), provision of most research materials for free, and most importantly publication of my research outcome in highly esteemed international journal under Elsevier publisher (*Journal of Taibah University for Science*). This added value to my curriculum vitae and has made me proud to be a graduate of LAUTECH. I learnt a lot from the biological approach to the synthesis of nanoparticles, characterization, applications and safety evaluation techniques. Organizing this kind of workshop will give opportunity to those still in doubt about this emerging field of technology and its applications. I am highly elated to have passed through you as a student and will be more than willing to come back for further studies under your tutelage in the field of nanobiotechnological research. Congratulations as you impact positively on the lives of upcoming researchers through information dissemination via workshop on synthesis, characterization and application of nanoparticles. More power to your elbow.