



# Utafiti

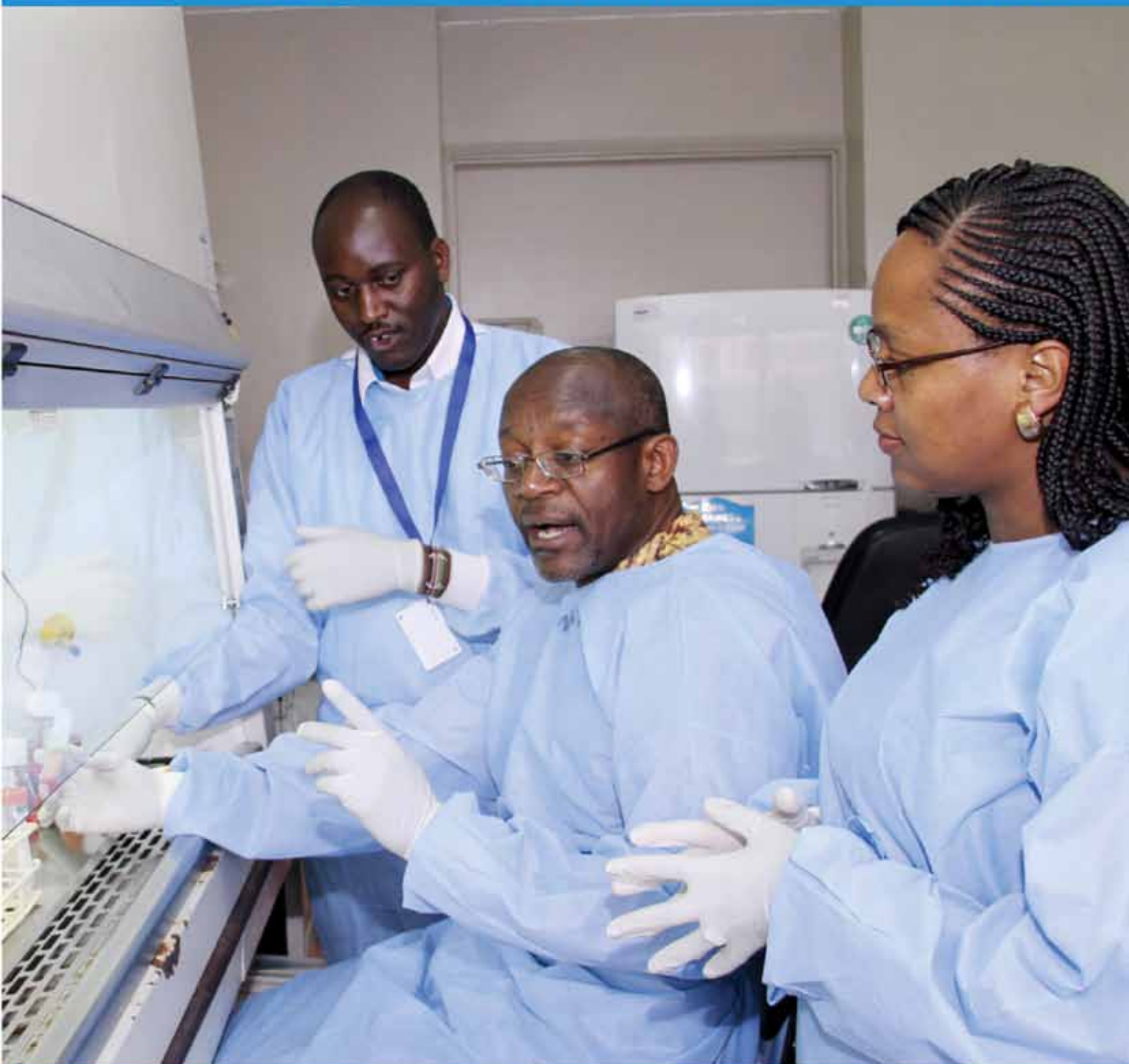
A Newsletter of the Research  
Production and Extension Division

## News

Issue No. 4

Spearheading Research and Development

December 2016



### Collaboration in Research

## Vision

Excellence in research, production and extension.

## Mision

To promote the discovery, application, and dissemination of knowledge through quality reseach and innovation.

## Core Values

- Freedom of thought and expression
- Innovativeness and creativity
- Team spirit and teamwork
- Professionalism
- Quality customer service
- Transparency and accountability
- Ethical practices

**Cover picture:** Prof. Omu Anzala (centre) Director, KAVI-ICR, with Research Scientist Dr. Marianne Mureithi and Laboratory Technologist Mr. Patrick Mwaura at the KAVI-ICR laboratories where the Institute is working towards establishment of a stem cell bank.





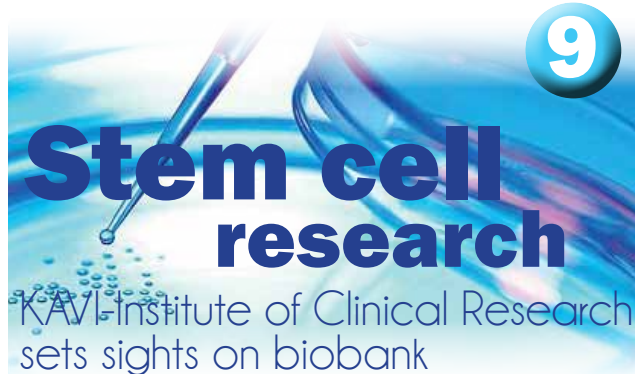
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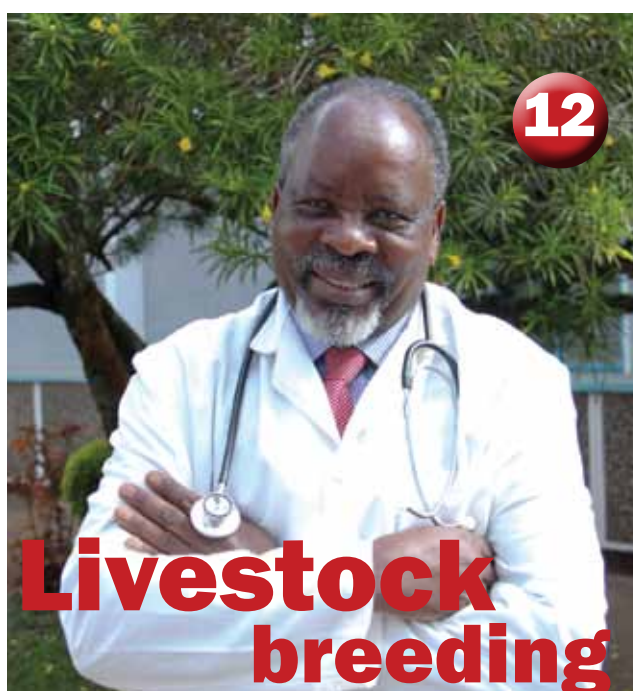
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Using emerging technologies at CAVS





# Message from the Newsletter Editor

## *Utafiti News* Issue 4 December 2016

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This is the fourth issue of *Utafiti News*, a research newsletter published by the Office of the Deputy Vice-Chancellor, Research, Production and Extension (RPE). The newsletter highlights the research activities of the University including related support services. *Utafiti News* is open to contributions by researchers from all disciplines.

I would like to thank the researchers who made time for our interviews as well as those who submitted their articles because in doing so they made the fourth issue of *Utafiti News* a reality. In addition, they provided the opportunity for our readers to know about the activities taking place in the workshops, laboratories, and other research spaces of the University. We hope that the information contained in this newsletter will find useful application.

The theme of this particular issue of the newsletter is "Collaboration in research", which is an important objective of the University as captured in the messages from the Vice-Chancellor and DVC (RPE). The Vice-Chancellor, Prof. Peter M. F. Mbithi, has affirmed that research collaboration is an important vehicle towards making the University truly world class in line with the institutional vision. The DVC (RPE), Prof. L. Irungu, on her part, conveys the Division's commitment to providing the support needed by researchers to engage in successful collaborative research arrangements.

Prof. Ben Sihanya offers expert opinion on the implications of research collaboration by answering the vital questions that researchers ought to consider before signing collaborative research agreements. One of the key messages is that researchers must be clear about intellectual property rights, ownership, and exploitation and how these issues relate to them and their institutions vis a vis other parties to the agreement.

In this issue also, Prof. L. Irungu reviews the last five years in office as DVC (RPE). She evaluates the Division's achievements and also challenges. Her plans for the Division going forward are outlined including the lessons she has carried to inform future actions.

In our research section, we learn about the intensive research work taking place at KAVI-Institute of Clinical Research in the area of stem cell research and why the Institute is ready to implement the ambitious plan of establishing the first stem cell bank in sub-Saharan Africa. Read about the journey so far and what it means to have a stem cell bank within your reach.

In another research story, follow the interesting description of the technological advances taking place in the area of livestock breeding from our researcher from the College of Agriculture and Veterinary Sciences (CAVS), including the production of Kenya's first test-tube calf. The researcher is looking at the possibility of providing farmers with gender-selected embryos.

Meet our researcher for this issue, Prof. George O. Rading, who will tell you about his work in material science and what drives him in an area of research that many of us are not familiar with, yet as he reminds us "everything we use is made of some kind of material". Perhaps this is a good time to show more than a passing interest in the materials around us.

Our researcher on climate change directs our attention to Mount Kenya and the disappearing glaciers. Should we worry? Yes, but most significantly we need to spring into action. The newsletter continues to emphasise the importance of communication between researchers and the non-specialist audiences. This issue introduces science communication and how researchers can get involved without being labelled as "rock star scientists". We have other interesting articles in this issue.

If you would like *Utafiti News* to feature your research work or explore and learn the activities of your department, please write to editor-utafiti@uonbi.ac.ke or dvcrcpe@uonbi.ac.ke.

*Pamellah Asule*  
Editor



**Prof. Peter M. Mbithi**  
Vice-Chancellor

**The University of Nairobi, therefore, is committed to continued engagement in research with other global partners, through international research networks such as the WUN and ARUA, with a view to realising significant benefits for our citizens and the World.**

## Message from the Vice-Chancellor

Internationalisation through participation in global research networks provides an essential avenue through which we may generate ideas, solve problems, innovate, and exchange opinions. It enables university research teams to experience a truly international perspective, which involves learning from the successes and challenges faced in similar situations by other researchers and communities across the globe.

Global research networks also serve as a catalyst for movement of staff and students between institutions and the participation in international seminars, workshops, and symposia, thereby significantly raising the global profile of the University as well as enriching the research experience for both students and faculty.

The University of Nairobi is therefore proud to have been invited to join the Worldwide Universities Network (WUN), a global network driving international research collaboration and developing research talent. The WUN membership includes 20 universities from 11 countries on 5 continents. The network currently fosters over 100 active research programmes, engages over 2,000 researchers and students, and works with governments, international agencies, and industry.

Within the WUN is the Global Africa Group that seeks to build research collaborations, innovations and impact in support of Africa's development agenda. The group builds on the existing expertise and international partnerships amongst WUN members in Africa and abroad to identify sustainable and equitable solutions to critical local, regional, and global challenges which have relevance to Africa.

The University is also an active member of the African Research Universities Alliance (ARUA), a partnership of 15 research universities in Africa, in which the University of Nairobi is the only member from Kenya. The focus of the alliance is to build indigenous research excellence thereby enabling the continent to take control of its own destiny, and at the same time participate as a significant player on the global stage.

In addition to impactful research output, studies among universities that participate in global research networks has shown a strengthening of global citizenship among its faculty and alumni through a growing appreciation for, and sensitivity towards, other cultural perspectives, as well as an enhanced ability to engage people from a wide range of national and social backgrounds. These attributes are directly in line with the University's Vision of becoming "A World-Class University Committed to Scholarly Excellence."

The University of Nairobi, therefore, is committed to continued engagement in research with other global partners, through international research networks such as the WUN and ARUA, with a view to realising significant benefits for our citizens and the World.





**Prof. Lucy Irungu**  
Deputy Vice-Chancellor  
(Research, Production & Extension)  
& Professor of Entomology

**The need for interdisciplinary and multi-contextual research is on the rise, which demands of researchers and institutions to be alert and prepare themselves for the requirements of these new and complex situations.**

## Message from the DVC-RPE

**R**esearchers and their institutions consider collaborative research as an attractive way of developing their research portfolio. This newsletter contains examples of different kinds of research collaboration arrangements existing in the University. We have, for example, the interdepartmental collaboration that is taking place in the College of Health Sciences to conduct clinical trials in stem cell research. We also have collaboration under the umbrella of the African Materials Science and Engineering Network (AMSEN) spread across institutions in six African countries. The University has entered into more than 200 collaboration arrangements with institutions and organisations across the globe, some of which have research components. Our aim is to increase the number of collaborative research agreements by about 10 percent annually.

Besides providing innovative approaches to problem solving, collaborative research can be a rewarding experience because of benefits like pooled funding and shared expertise and research facilities. Research collaborations also help researchers to enhance their skills and expand their networks, not forgetting the fact that it is strong on joint publications. The ability to work with a team of people from diverse backgrounds, including different cultures sometimes, is in itself a good experience.

On the other hand, collaborative research has become increasingly challenging because of the changes taking place in the research environment. The need for interdisciplinary and multi-contextual research is on the rise, which demands of researchers and institutions to be alert and prepare themselves for the requirements of these new and complex situations. Researchers who are already engaged in some of these arrangements understand the hurdles, while those who are planning to enter into collaborative research should prepare themselves adequately to avoid misunderstandings later on.

Our Research Policy offers broad guidelines on the conduct of research while the Intellectual Property Policy has specific guidelines on the management of intellectual property, which is key in collaborative research. We should also conduct our research activities within the boundaries of the national laws relating to research as well as the provisions contained in relevant international regulations pertaining to specific areas of research. My office and other units such as the Centre for International Programmes and Links (CIPL), the Intellectual Property Management Office (IPMO), and the Grants Office also offer support for researchers seeking to understand specific issues relating to collaborative research arrangements.

This newsletter contains a comprehensive article on the basic information that researchers should have when preparing to enter into collaborative research arrangements, one of which is to understand our expectations and those of collaborating partners. It is clear that we need to do our homework before signing the agreement.

The RPE Division will continue to support the endeavours of our researchers as they work towards developing the quality of research at the University because research is an important avenue through which we demonstrate our relevance to society.

May I take this early opportunity to wish you all a Merry Christmas and a prosperous new year. I would also like to thank you for your continued support for the RPE Division.

**Prof. L.W. Irungu**  
Deputy Vice-Chancellor  
(Research, Production & Extension) & Professor of Entomology

# Five years on

## Reflecting on the Research, Production and Extension Division – Interview with Prof. Lucy W. Irungu

By Pamellah Asule and Rosemary Omwandho

**Q. Recently, you completed five years as Deputy Vice-Chancellor of the Research, Production and Extension (RPE) Division. What would you consider as your greatest achievements given that you were the first person to head the Division?**

**A.** Let me begin by saying that we have made a good amount of progress in supporting our researchers in the last couple of years, and the RPE Division will continue to strengthen the institutional support to provide even better services.

I would like to thank the Vice Chancellor, Prof. Peter M. Mbiti, and other members of University Management for supporting the Division's activities. May I also take this opportunity to welcome Prof. Madara Ogot who recently joined the RPE Division as Director of Research and Extension.

In the last five years, the RPE Division established the relevant institutional structures needed to enhance the conduct and management of research. Under my leadership the Division also established an administrative structure consisting of relevant boards and committees. We also put in place research infrastructural frameworks such as the Research Grants Management Information System and the Postgraduate Tracking systems. We revised some of the existing policies and developed new research-related policies. A lot of work also went into the enhancement of the University institutional repository, as a way of increasing the visibility of University research, and currently our digital repository is ranked among the best in the continent.

I will also mention the effort to raise awareness on avoidance of plagiarism, which we supported through establishment of a Plagiarism Policy and making available the plagiarism detection software to all academic staff and students.

**Q. What were the main challenges of providing leadership in this very important function of the University?**

**A.** First, we had a slow start in terms of the management of our commercialisation contracts, which were not bringing in revenue as per the signed agreements. I will add here that we have continued to streamline our processes to ensure compliance.

Second, our extension activities did not receive the desired level of support due to inadequate resources. The lack of funds also delayed implementation of the Innovation Fund and the Creativity Award Scheme which were supposed to encourage and incentivise research and innovation.

Finally, I will single out the problem of low staffing levels in the Division and within the research support units, which hampered the timely achievement of some of our targets.

**Q. What lessons are you carrying forward to ensure the RPE Division's effectiveness in expanding the research function at the University?**

**A.** Let me say that efficient administrative and management structures are necessary if we want to enhance our support for researchers and also manage the research function effectively.

I have also observed that good data management is invaluable in the research management process and for conducting strategic research, including evaluation and research reporting.

**Q. What is at the top of your agenda during your second term as DVC (RPE)?**

**A.** I will be working with all the relevant organs of the University, our stakeholders, and of course the researchers to ensure that the



**Prof. Lucy W. Irungu - Deputy Vice-Chancellor (Research, Production and Extension)**



research function at the University reaches the highest level possible. Within the Division, I will be keen on achieving the following targets:

- A functional Technology Transfer Office (TTO)
- A Strengthened UoN Press
- Effective research uptake management to translate our research into practice (in terms of impact and relevance)
- Implementation of the Graduate School
- A strengthened Grants Management Unit

**Q. How is the Division prepared to achieve the targets you have mentioned?**

**A.** Two committees are in place; one is working on the issues affecting the UoN Press and the other one on enhancing the Science and Technology Park with a view of setting up a Technology Transfer Office. The Office of Director Research and Extension has been created and filled for the purpose of enhancing Research Uptake Management and research uptake in addition to providing support for researchers. Regarding the Graduate School, we are already moving towards full implementation. Soon, I shall be presenting my proposals on how to strengthen the Grants Management Unit.

**Q. Research uptake was an important part of your activities during the last five years. How can you explain your very visible interest in research uptake and briefly mention the achievements made in this area?**

**A.** There is no doubt that the University engages in high quality research, but there is little evidence that the research we do is effectively communicated to stakeholders to inform policy and decision making for impact at the local and national levels.

My active participation in research uptake was, therefore, meant to enhance the communication of research findings to stakeholders to address societal and development challenges thus making University research relevant to society. Our achievements in research uptake can be summarised as follows:

- The RPE division has supported a number of extension activities being undertaken by our researchers
- The University competitively joined the Development Research Uptake for Sub-Saharan Africa (DRUSSA) programme through which we managed to train staff in science communication and research impact evaluation.
- We received bursaries for PhD and Masters programmes. The programme also guided the revision of research-related policies and the development of relevant strategies such as the research uptake strategy.
- Through benchmarking with best practices in research uptake, we established the office of Director of Research and Extension.

**Q. You personally went out of your way to sensitise researchers about funding opportunities available on Research Professional Africa Funding platform and other avenues.**

**What are the results of these initiatives?**

**A.** Our research portfolio has grown to Ksh 4.6 billion and more UoN researchers are actively seeking and responding to calls for funding.

**Q. What is your advice for early career researchers seeking to improve their chances of success in finding funding opportunities?**

**A.** I will break this up into seven points for clarity:

- Know the funding sources, the key people in these organisations, and upcoming opportunities and programme areas
- Build relationships and networks with the funding bodies and take time to interact with the key people in research circles
- Undertake relevant research which addresses pertinent development issues
- Begin by working with senior colleagues as you build your portfolio
- Write competitive proposals
- Ensure that you deliver on your commitment once you get the grant (better use of funding leads to more funding)
- If your application for a grant is rejected, ask for feedback and address the issues raised to build yourself as you prepare for the next opportunity

**Q. Let's conclude by hearing your views about the level of research collaboration in the University.**

**A.** We have a very high level of research collaboration in all our disciplines and UoN researchers are becoming more focussed about the kind of collaboration they are getting into. We have improved our systems to process our collaboration agreements faster, with the result that more local and international organisations and institutions are seeking to collaborate with our researchers. Certainly, we shall have better results in our next review.

*Prof. Irungu continues to supervise PhD students in entomology and parasitology. She is an active researcher in vector biology and host-vector-parasite relationships. Her specific area of interest is malaria vectors and parasites of neglected diseases. Prof. Irungu belongs to several regional networks such as African Women in Agricultural Research and Development (AWARD), East African Research Innovation Managers Association (EARIMA), and African Research Universities Alliance (ARUA) among others.*



**Prof. Madara Ogot**  
Director, Research and Extension

## Introducing Director, Research and Extension

**P**rof. Madara Ogot joined the RPE team as the Director, Research and Extension, effective June 1, 2016. Prof. Ogot, a faculty member from the Department of Mechanical and Manufacturing Engineering, graduated from Princeton University in 1987 with a BSE (Hons) and from the Pennsylvania State University in 1991 with an MSc and PhD in Mechanical Engineering. He joined the Department of Mechanical and Aerospace Engineering at Rutgers University in August of the same year. In 1997, Prof. Ogot received an MBA from the Rutgers Graduate School of Management. In 2014 he received a PhD in Business Administration (specialising in Strategic Management) from the University of Nairobi. After working for 12 years at Rutgers, he joined the Department of Mechanical Engineering at Penn State University in 2003-2006. In 2006, Prof. Ogot was appointed the Managing Director of the University of Nairobi Enterprises and Services Ltd (UNES), a position he held until November 2011. From 2011-2014, he was the Deputy Vice-Chancellor (Academic Affairs) at Maseno University. He was also a member of the Ministry of Higher Education, Science and Technology Taskforce that developed the Universities Bill 2012; Science, Technology and Innovation Bill 2012; and the Technical, TVET Bill 2012 all of which became Acts of Parliament. He is a co-author of the Higher Education, Science, and Technology chapters in the Sessional Paper No. 14 of 2012 on Education.





# Science Communication

## Way to reach public audiences

By Pamellah Asule

**Dr. Nshemereirwe observes that communication with the public can be made as simple as writing an opinion piece in one's area of specialisation for the newspaper or participating in open discussions among other options.**

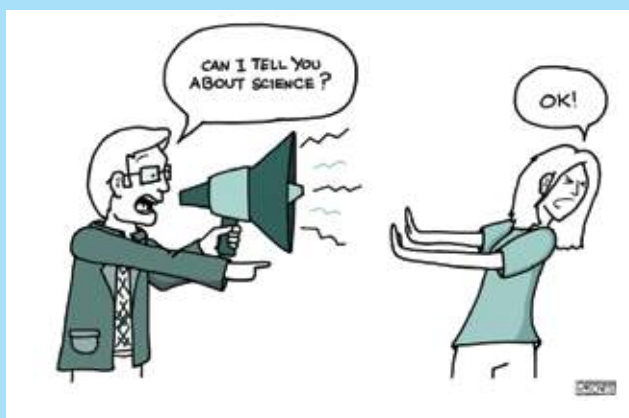
Scientists: Engage the public!" is the striking title of an editorial calling upon researchers to freely share what they know. The editorial, which was published on 22 December 2015 in the open access journal *mBio* (Vol. 6 Issue 6), suggests that it is no longer "cool" for scientists to confine themselves in the ivory tower. The authors, Shugart and Racaniello, also argue that only science can address the science component of the problems affecting society, and the share is substantial. They further sound the warning that "If scientists do not participate in these dialogues then others will fill the void and the information will not be accurate ...."

Every day, we receive loads of information, some of it not accurate, from many sources to the extent that misconceptions exist about almost everything. One scientist I spoke with confirmed that some of our

leading newspapers sometimes carry inaccurate technical information but rarely will scientists follow up with a correction. "Scientists are not trained this way", he says, when I try to enquire why scientists are seemingly uninterested or perhaps reluctant, to engage with the public. A good number of researchers have simply never considered that they could engage with general audiences on serious issues arising from their research work. On the other hand, those who may be interested in interacting with general or public audiences are not familiar with the approaches to use for this purpose.

It appears that scientists may not have much say on the decision to engage or not engage with the public for much longer as the requirement increasingly features in requests for funding, research budgets, and evaluation scorecards. The need to submit lay abstracts to some scientific journals, institutional





review boards, and funding agencies further emphasise the importance of bridging the gulf between researchers and the public. Research institutions and universities are also in it because they stand to benefit from increased researcher-public interaction in terms of visible research profiles and associated spinoffs. In view of these indications, the question of how to effectively communicate technical research issues with public audiences is imperative and the onus is on researchers to figure out ways of communicating beyond the structured framework of the journal article.

In an online article for *The Conversation* published on November 9, 2016 with the title “African scientists must step out and speak up if they want to add value”, Researcher Connie Nshemereirwe of the Partnership for African Social and Governance Research (PASGR) based in Nairobi argues that “scientists do science to improve society” and they can only achieve this goal by interacting with people in society. Dr. Nshemereirwe observes that communication with the public can be made as simple as writing an opinion piece in one’s area of specialisation for the newspaper or participating in open discussions among other options. In her case, the mutual benefit of communication between researchers and the public is identification of relevant research issues and making information available where it is needed.

Science communication is one way of promoting engagement between researchers and the public. Science communication professionals use their skills to promote the research conducted in their institutions to the outside world. They assist researchers in identifying the key messages which will appeal to different groups of general audiences and the channels through which to disseminate such information. Science communication professionals also work as intermediaries between researchers and the media to identify and promote the reporting of ongoing research activities in their institutions.

As part of the process of developing staff capacity in science communication, the University, through the Research, Production and Extension (RPE) Division, has trained the first set of science communicators. In 2015, three members of staff, namely Esther Obachi (Librarian), Susan Muchina (Office of the DVC-RPE), and Pamellah Asule (Science Editor, UoN Press) participated in the first African Online Course in Science Communication conducted by Centre for Research on Evaluation, Science

and Technology (CREST) of Stellenbosch University, South Africa. The course attracted participants from universities and research institutions across Africa and beyond. The intensive 12-week certificate course was developed in partnership with the Development Research Uptake in Sub-Saharan Africa (DRUSSA) programme. The purpose of the DRUSSA programme, whose activities ended in September 2016, was to build institutional and staff capacity aimed at promoting the utilisation of research conducted in African Universities, with research communication as an important component of the programme.

In April 2016, the three members of staff also attended the DRUSSA-sponsored train-the-trainers workshop for science communicators in Johannesburg. The purpose of the training was to enable the transfer of science communication skills. The RPE Division will put in place a science communication sensitisation and training programme for this purpose. Meanwhile, researchers who may be interested in learning more about communicating research to public or non-specialist audiences can find very useful tips in the manual entitled “*A Research Communicators’ Guide for African Universities*”. The detailed and easy-to-read manual can be accessed from the website at [researchcommunicationguide.drussa.net](http://researchcommunicationguide.drussa.net). The manual was prepared by Marina Joubert, science communication researcher from Stellenbosch University, who also conducts the popular online science communication course now in its third session. Researchers are also encouraged to look out for other training opportunities in science communication and also visit the Science Communication Africa Facebook page, which was established by Marina Joubert during the inaugural science communication course.

Researchers may also take up the challenge and learn the skills needed to communicate with general audiences without the need for science communication intermediaries. In the 1970s, American astronomer, the late Carl Sagan, for instance, achieved unprecedented levels of fame through his popular writing and television appearances on space science. Described by some as a “celebrity scientist”, Sagan stirred interest in science and influenced public attitudes and policy on space matters. On the flip side, the term “Sagan Effect” was coined to refer to scientists who were perceived to be spending less time doing actual research than they did talking science with the public. This description, however, did not fit Sagan who was an accomplished researcher with more than 500 research publications to his name and a reputation of churning out one published article every month.

In contemporary times, the gains and drawbacks associated with researchers’ efforts to engage with the public are exemplified by the work of Lee Berger, the South African archaeologist, who has been described as a “rock star scientist” for taking along a battery of reporters to cover his fossil finding expeditions. Researchers, however, need not use the most extreme of approaches to engage with the public when simple ones will do just as well.

# Stem cell research

## KAVI-Institute of Clinical Research sets sights on biobank



**Prof. Omu Anzala, Director, KAVI-Institute of Clinical Research.**

**“The local interest is there and we at KAVI-ICR have the knowledge and human resource capacity to do this”, says Prof. Anzala about the Institute’s level of preparedness for the major project.**



**Prof. Anzala (standing far left) with Dr. Marianne Mureithi and Mr. Patrick Mwaura during a laboratory session at KAVI-ICR.**

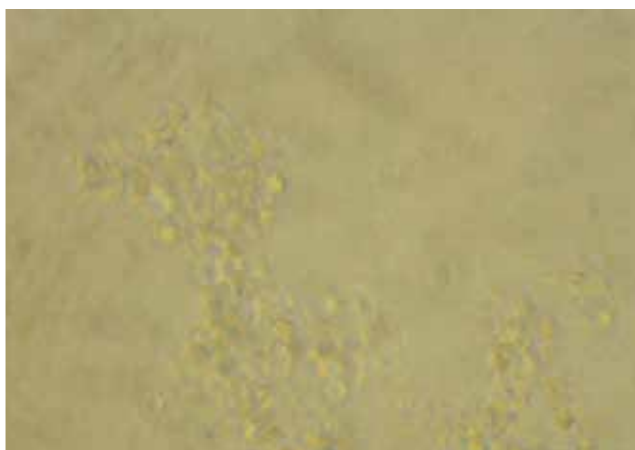
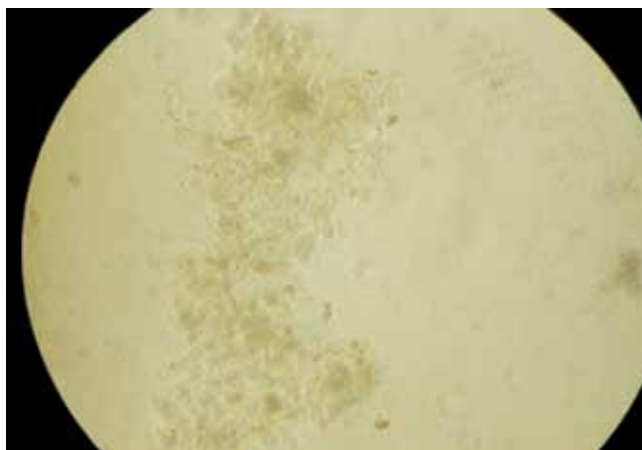
One of the priority projects at KAVI-Institute of Clinical Research (KAVI-ICR) is the establishment of a biobank of human stem cells. Prof. Omu Anzala, the Director of KAVI-ICR, is very excited about the prospect of having this very ambitious facility in place after several years of intensive research and consultation. A biobank is a resource containing biological samples, which may be used in biomedical research and the treatment of diseases. If everything goes according to plan, the stem cell bank at KAVI-ICR will be the first one of its kind in sub-Saharan Africa. “The local interest is there and we at KAVI-ICR have the knowledge and human resource capacity to do this”, says Prof. Anzala about the Institute’s level of preparedness for the major project.

Stem cells are described as “undifferentiated cells”, which

means that they are yet to assume a definite structure or function. This unique feature of stem cells confers versatility because of the possibility of transforming these cells into other types of cells to perform specific functions in the body. The medical implication of this characteristic, and which is being exploited by KAVI-ICR, is that “stem cells can be used to repair or replace body tissues that have been damaged by trauma or disease”.

According to Prof. Anzala, the value of stem cells lies in their regenerative capacity or ability to produce new cells of the same kind. “We get injured all the time, but how does the body repair itself?” he asks and goes further to explain that healing of wounds is brought about by new cells produced by stem cells. Prof. Anzala points out that there is great potential in the use of





### Preliminary results at KAVI-ICR: Distinctive cobblestone morphology of stem cells harvested from cord blood.

stem cells for treatment of disease in what is referred to as regenerative and reparative medicine, but the challenge lies in harnessing the possibilities for wider application especially in sub-Saharan Africa.

As a research institute, KAVI-ICR is widely recognised for its cutting-edge research in infectious diseases and cellular humoral and mucosal immunology. Prof. Anzala, who is also a founder member of the Institute, is a Professor in the Department of Medical Microbiology in the College of Health Sciences. He is a leading HIV vaccine investigator in Kenya and was a co-principal investigator in the first HIV vaccine trial in Kenya (the second in Africa) using a DNA plasmid. Prof. Anzala has also served as principal or co-principal investigator in 11 major HIV vaccine trials in adults and in the first paediatric HIV vaccine trial in Kenya with funding from the International Aids Vaccine Initiative (IAVI) and various other international collaborators. The researcher has authored over 91 peer-reviewed publications and supervised and mentored over 23 Masters and 6 PhD students to successful completion of their studies. Prof. Anzala has been instrumental in spearheading the expansion of KAVI-ICR into other areas of research.

Since the expansion of the mandate of KAVI-ICR to cover research in the cell biology of stem cells, which Prof. Anzala describes as “a fascinating yet crucial area of medicine”, the Institute has concentrated on consolidating and developing its resources and research capacity in addition to building

networks. The Institute has also conducted numerous activities to increase the level of understanding of stem cell research and regenerative medicine among local researchers to ensure that the country joins the rest of the world in tapping into the potential of stem cell therapies.

Stem cells can be found in different parts of the body, but the studies at KAVI-ICR are based on stem cells from cord blood derived from the placenta and adipose tissue which is present below the skin in many parts of the body. Another important distinction is that the work at KAVI-ICR focuses on adult stem cells. During the last several years, Prof. Anzala has been leading researchers at the Institute in laboratory investigations which have culminated in the successful isolation, identification, and manipulation of stem cells. The researchers have also managed to generate more stem cells from harvested human tissue and to successfully store these cells. They have further established the feasibility of using standardised methodologies in the laboratory to achieve the desired results at every stage of the trials.

An important milestone by the researchers from KAVI-ICR is putting in place clinical interventions to test the viability of the stem cells grown in the laboratory. For a couple of years, the KAVI-ICR research team and researchers from the Department of Surgery and the Department of Obstetrics and Gynaecology, have been using stem cells from the KAVI-ICR trials in the clinical management of chronic wounds and burns. They will extend the clinical trials to cover

the treatment of shoulder and knee injuries, fractures, and problems of the cornea as soon as they obtain ethical approval. The Institute’s goal is to ultimately provide the expertise and resources needed for the application of stem cells in the treatment of some of the devastating diseases and conditions such as blindness, diabetes mellitus, genetic bone marrow disease, prostate diseases, and kidney cancer among others for which high potential has been indicated. The practice of cosmetic surgery will also benefit greatly from advances in stem cell research.

A stem cell bank is a crucial resource in the application of stem cell research and therapy. The idea behind a stem cell bank is that individuals choose to have their stem cells kept in the facility for future use in the event that they require cell-based treatment of diseases. Stem cells can be kept in the biobank for indefinite periods of time and treatment based on the individual’s own stem cells may help to avoid unnecessary person to person organ transplants. According to Prof. Anzala, already some Kenyans are making use of cord blood banking facilities in South Africa and other places. The researcher is convinced that a local facility, which is more accessible and certainly affordable, will help to spread the potential benefits of stem cell therapies to more Kenyans. The Institute is already involved in aggressive sensitisation activities to educate members of the public about stem cell therapies and stem cell banking in preparation for the establishment of the biobank resource. ►►

Notably, Dr. Marianne Mureithi is one of the researchers working closely with Prof. Anzala and who is equally keen on the development of stem cell research and associated therapies in Kenya. “Stem cells have major applications in sports medicine”, she says in reference to the fast-growing sports industry in Kenya.

Dr. Mureithi is a Research Scientist at KAVI-ICR and also chairperson of the Cell Biology and Regenerative Medicine Network of Young Scientists in Africa under the mentorship of the Africa Academy of Sciences (AAS). Apart from conducting research in the area of stem cells, she is part of a dynamic international scientific team in the Vaccine Immunology Science and Technology for Africa (VISTA) programme, which is under the International AIDS Vaccine Initiative (IAVI). The team of talented researchers is responsible for designing and assessing the next generation of AIDS vaccine candidates for Africa, and indeed the rest of the world. In September, Dr. Mureithi’s outstanding work in medical research placed her at the top of the list published annually by the Business Daily to recognise Kenya’s top 40 women achievers under the age of 40 years. The stem cells research project at KAVI-ICR also benefits immensely from the skills of Mr. Patrick Mwaura,

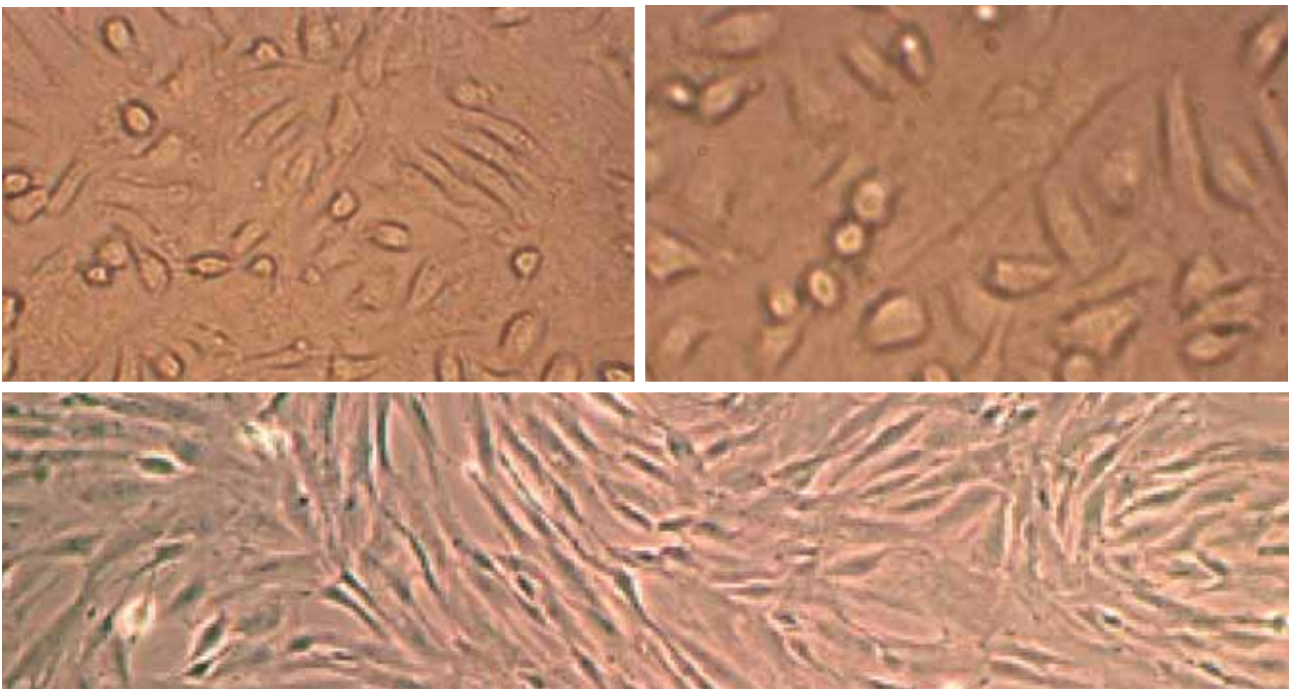
Laboratory Technologist, who is also pursuing a Master’s degree in stem cell research.

According to Prof. Anzala, KAVI-ICR is taking measures to consolidate the local interest as well as leverage on the existing knowledge and expertise to strengthen research in stem cells and regenerative medicine. In the College of Health Sciences (CHS), the Institute is involved in collaborative research with the Department of Plastic Surgery and Department of Obstetrics and Gynaecology. The Institute also has ties with Beaux Surgery International Centre of Stem Cell Therapy and Regenerative Medicine of the Thatcher Medical Centre of California, USA, and the Da Vinci Aesthetic Plastic and Reconstructive Centre in Nairobi.

Earlier in the year, KAVI-ICR held a mini-symposium where more than 70 local and international experts from diverse disciplines congregated to share knowledge and experiences in stem cell research and its application in Africa. The forum was an excellent opportunity for networking among academicians, researchers, clinicians, and regulators who proposed the establishment of a training and research programme to cover resource sharing, capacity development and other forms of collaboration. Prof. Anzala has

indicated that the proposed Centre for Stem Cell Research and Regenerative Medicine (SCeReM) at the College of Health Sciences will be “an innovative way of harnessing all the potential aspects of stem cell research and regenerative medicine.” Dr. Mureithi, who is also a lecturer in the Department of Medical Microbiology, describes the proposed centre as “An African hub of innovation, which will also serve in training and mentoring the next generation of stem cell and regenerative medicine scientists.” The researchers agree that the centre will elevate the position of the University of Nairobi in the field of stem cell research and application globally.

As KAVI-ICR forges ahead in its plans to establish a stem cell bank, Prof. Anzala reveals that the Institute is actively seeking collaborators from the private sector and other organisations within government and outside to support the development of key infrastructure. So far, KAVI-ICR has supported crucial research activities in the area of stem cells using internally generated funds, but there is need for seed funding to fast-track the purchase of equipment and key reagents needed to set up the biobank. The Institute will also engage closely with the University Advancement Office for support in expanding its network of international collaborators.



**Preliminary results at KAVI-ICR: Adherent spindle-shaped morphology characteristic of mesenchymal stem cells.**





# Livestock breeding

## Using emerging technologies at CAVS

**The passion with which Prof. Mutiga goes about his work is evident not only in the manner in which he discusses his ongoing research work at the office, but also the way he interacts with his students and the staff in the department.**

“The real value in livestock lies in quality, rather than numbers, if we can exploit the genetic resources better by using the right genes”. Prof. Erastus R. Mutiga, to whom this statement is attributed, knows exactly how this goal can be achieved. As Professor of Theriogenology in the Department of Clinical Studies at the College of Agriculture and Veterinary Sciences (CAVS), Prof. Mutiga has more than three decades of research experience in efficient ways of producing improved livestock breeds. He explains that in Veterinary Medicine, Theriogenology is a specialised area of research and practice dealing with reproduction in animals, “much like the fields of Obstetrics and Gynaecology in humans”, he adds with a light touch.

The passion with which Prof. Mutiga goes about his work is evident not only in the manner in which he discusses his ongoing research work at the office, but also the way he interacts with his students and the staff in the department. He takes the time to show interest in what everyone is doing in the various sections of the department. As would be expected, Prof. Mutiga is at his best with animals. During a tour of the department’s facilities, he explains the reason for keeping the various animals where they are; the sheep and horses grazing in the field, the cows and pigs in the animal hospital, and the dogs in the surgery room among others. Anyone not familiar with animals will





**Prof. E. Mutiga performs an embryo transfer procedure on animals at the University farm at CAVS.**



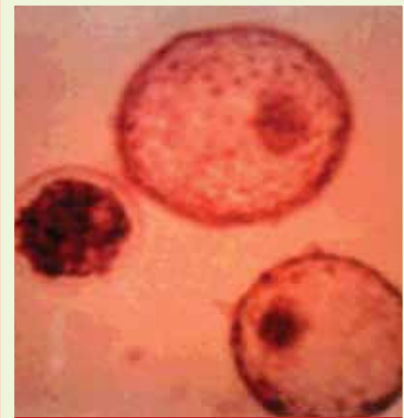
**Prof. Mutiga examines a research animal at the Large Animal Hospital in the College of Agriculture and Veterinary Sciences (CAVS), Kabete.**

very easily see from Prof. Mutiga's interaction with them that they are not "just animals" as many of us often say. There is a lot more going on in the world of animals than we can imagine, and just to scratch the surface, our discussion focuses on how research is tapping into nature's vast reproductive potential of this interesting kingdom to develop a thriving livestock industry.

"Animals have an extremely high reproductive potential, but the natural process of reproduction is extremely wasteful", says Prof.

Mutiga as he begins our discussion. He explains that for many species of mammals, the male releases billions of spermatozoa, or sperm cells, in a single ejaculation, but only one of these is required to fertilise one ovum (commonly called egg) from the female to produce one offspring. "The rest of the spermatozoa are wasted", he observes, adding that this happens countless times throughout the life of the male animal.

On the part of female mammals, Prof. Mutiga, indicates that each animal is born with the potential to



**Day 7 in vitro fertilised embryos ready for transfer.**



produce over 200,000 eggs from its ovaries during its lifetime, but only a small proportion of these eggs will actually mature, get the chance to be fertilised, and produce viable offspring. "Again, we see a lot of wastage in the reproductive capacity of the female animal", he adds and goes further to explain this point using an interesting analogy from one of his classes. "I often remind my students about how lucky they are to have been the products of a similar wasteful process", he remarks. According to the researcher, under natural conditions a good cow is capable of producing one calf per year up to a maximum of about ten calves in its lifetime. He indicates that we can achieve much more from such a choice animal using emerging technologies in animal reproduction. "Actually, we can get as many as ten calves per cow in a year", he says and promises to explain the meaning of this statement later upon noticing the look of surprise on my face.

As Prof. Mutiga delves into the specific technologies being used



to improve outcomes in animal reproduction, he carefully outlines a set of four particularly useful technologies under the umbrella term In Vitro Embryo Production (IVEP). The technologies include Artificial Insemination (AI), Embryo Transfer (ET), Ovum Pick-up (OPU), and In Vitro Fertilisation (IVF). These technologies help to curb wastage of the reproductive potential of male and female livestock. A fifth technology, called semen sexing, is especially useful in giving farmers the chance to choose whether to raise male or female animals from the onset depending on the purpose of their farming enterprises.

Prof. Mutiga and his colleagues in the Department, namely Prof. H. M. Mutembei (Director of the Wangari Mathai Institute) and Prof. V.T. Tsuma (Head, Theriogenology section) have undertaken extensive research studies involving the use of these technologies. The researchers are especially keen to see the technologies being made readily available to farmers and the livestock industry in general. Prof. Mutiga makes the clarification that some of the technologies mentioned are not entirely new although they have undergone major improvements since introduction. Artificial insemination, for example, was introduced in Kenya in the 1940s. The technique principally involves obtaining the male ejaculate from choice bulls and dividing it into portions for use in fertilising eggs from

**The technology of embryo transfer allows the cow to go through the natural reproductive cycle during which one mature egg is released from its ovary every month. With great precision in timing, the egg is then fertilised as it makes its way down the female reproductive system to the uterus.**

several females instead of just one as is the case in natural reproduction. The spermatozoa are frozen in between the period of collection and insemination.

The embryo transfer technology is a favourite subject for Prof. Mutiga because it is at the core of his research interests since his days as a PhD student in Australia about three decades ago. In Kenya, the researcher is widely recognised as a pioneer in embryo transfer technology, having been in the team of experts that introduced the technology in

the country. He is also a leading consultant in the field across sub-Saharan Africa.

Embryo transfer, as the term implies, entails the removal of a fertilised egg (technically called an embryo) from the uterus of one animal (called a donor) and placing it in the uterus of another animal (called a surrogate) which then goes through the gestation period. The resulting calf carries the genes of the donor, which are not in any way influenced by the genetic constitution of the surrogate mother.

The technology of embryo transfer allows the cow to go through the natural reproductive cycle during which one mature egg is released from its ovary every month. With great precision in timing, the egg is then fertilised as it makes its way down the female reproductive system to the uterus. The egg is fertilised using spermatozoa introduced by artificial insemination. At the right time, the fertilised egg or embryo is collected from the uterus of the donor and placed in the uterus of the surrogate female.

Prof. Mutiga explains that the success of this delicate process requires careful synchronisation of the reproductive cycle of the donor animal and the surrogate animal. The two females have to be at the same stage in the reproductive cycle to ensure, as much as possible, that the same environment is maintained for the embryo as it is transferred between the donor and surrogate animals. For instance, the embryo reaches the uterus of the donor animal on day four since the release of the mature egg from the ovary and is collected and transferred on day seven. The researchers have to ensure that the surrogate animal is also in day seven of the reproductive cycle at the time when the embryo is being transferred. In the absence of such precise synchronisation, the embryo transfer process will not be successful.

The natural process usually allows the release of only one egg from the ovary during one monthly cycle, which is a rather slow process according to Prof. Mutiga. In order to maximise on the economy of scales in



**"Kabete one" - a test tube calf with the surrogate mother.**







**Prof. Mutiga in his office at the Department of Clinical Studies, CAVS.**

livestock breeding, it is important that a donor releases more than one egg. This is achievable using a technique called super-ovulation in which the cow is injected with hormones to trigger more eggs to mature at the same time. Prof. Mutiga indicates that super-ovulation can result in as many as 36 eggs being harvested from the same animal in one monthly cycle. The possibilities of triggering pregnancies in several surrogate animals using eggs from one cow are therefore enormous. The idea of getting ten calves from one cow in a single year becomes clear at this point. Usually, the donor cows are selected for desired attractive attributes like the ability to produce a lot of milk in the case of dairy cows.

The Ovum Pickup technology

helps to produce a large number of mature eggs in much less time than the natural process. The technology involves getting to the ovary and harvesting a good number of eggs, usually at different stages of development. The harvested eggs are subjected to controlled laboratory conditions to cause them to mature. Prof. Mutiga indicates that it takes about 24 hours for the eggs to mature in the laboratory, after which they can be fertilised immediately or they may be frozen for future use.

The egg-harvesting procedure does not interfere with the normal bodily functions of the animal and can be done at any stage of the reproductive cycle. Alternatively, developing eggs can also be harvested from the ovaries of choice animals

from the slaughter house. Using the process of in vitro fertilisation, it is possible to fertilise such stored eggs in the laboratory using stored sperm and the resulting embryos implanted inside surrogate females. The result is the so-called “test-tube” calf, to signify that fertilisation took place outside the natural conditions of the reproductive system of a female cow. Prof. Mutiga and his colleagues produced the first such test tube calf in Kenya with the name “Kapiti one”. They have since produced several other calves in this manner but this technique is still not readily available to farmers.

Prof. Mutiga’s ambition is to see the establishment of a thriving bank of gender selected embryos in the Department. He emphasises that there is no such facility in Kenya yet. He indicates that the development of human capital to carry out such high precision research is underway, and that the basic equipment is also available. The major requirement is the acquisition of adequate freezing equipment, which he acknowledges requires collaborative effort because it is a costly undertaking. He would also like to establish collaborations with farmers across the country who own “top cows” so that the Department can harvest eggs from such cows, fertilise them, and freeze the embryos for other farmers to benefit from the high quality breeds. Of course, he recognises that many factors will have to be considered before this idea can be implemented. Currently the technologies of AI and ET are readily available in the department.

Away from his work at the University, Prof. Mutiga keeps a few animals of his own. He also uses his free time to advise farmers in the dairy industry about milk production and fertility management of their herds. The researcher is a consultant and external examiner for a number of institutions in his area of specialisation. His main duties as a lecturer involve teaching veterinary undergraduate and postgraduate students in the areas of Theriogenology (Veterinary Andrology, Gynaecology, Obstetrics and Animal reproductive management). He has published extensively in his area of specialisation.



# Climate change impact on Mount Kenya

## Let's save the glaciers

In this article, Dr. Shazia Chaudhry draws our attention to Kenya's highest mountain and why we should protect its glaciers from the effect of climate change for the sake of human security.



In October, Dr. Shazia Chaudhry of the Department of Diplomacy and International Studies presented a research paper at the 2016 World Mountain Forum, held in Mbale Uganda, where she raised the alarm over the receding glaciers on Mount Kenya and the associated human security threats. Dr. Chaudhry, who used evidence from various studies to trace the changes that have taken place on Mount Kenya found that over a century ago, the Mount Kenya summit was covered by 18 glaciers, but many of these have entirely disappeared while others have become thinner. In 2013, for instance, the Lewis glacier had reduced by 90 per cent over a period of 76 years. A more shocking discovery pointed to the disappearance of an adjoining glacier called Gregory during the same period. Dr. Chaudhry attributes the severe degradation taking place on the Mount Kenya ecosystem to global warming and local climatic changes.

Dr. Chaudhry, whose research work focuses on international relations, climate change, human security, and diplomacy underscores the need to pay serious attention to mountains and the associated features so as to achieve better protection of these important natural resources. She indicates that glaciers are a source of vital resources such as fresh water, minerals, forests, timber, fisheries, and agricultural products which sustain human security especially for the people living adjacent to the mountain. According to the researcher, the unique mountain habitats support a rich diversity of plant and animal life. For those who appreciate nature, the

mountain forests, which have distinct bands of vegetation as one ascends to the summit, add to the sheer beauty of mountain ecosystems. The researcher observes that unfortunately, most of the world's mountain regions are experiencing environmental degradation and loss of key resources due to climate change.

Dr. Chaudhry's research work in the Mount Kenya region reveals that the depletion of resources arising from the effects of climate change can lead to innumerable human security threats. At lower elevations where land is under cultivation, recurrent periods of drought induced by climate change have resulted in severe water scarcity, crop failures, and food insecurity. In addition, diminishing watering points and pasture are key factors that will often trigger inter/intra group conflicts especially among or between the pastoralists and farmers. These conflicts undermine the personal and political security of the local communities. Sometimes, heavy rainfall and flash





floods cause landslides, destroy standing food crops, and generally lead to loss of life and property. Floods and drought directly increase the risk of malnutrition and poor health due to waterborne diseases like diarrhoea, cholera, and malaria.

Similarly, the scarcity of resources due to climate change around the Mount Kenya region often leads to increased incidents of crime, human–wildlife conflicts, and resource-based clashes between and among local communities. According to Dr. Chaudhry, receding glaciers affect natural ecological systems as seen in loss of habitat and biodiversity, thus causing environmental insecurity. These changes have profound impact on the biological diversity of mountain regions. It is expected that due to increasing temperatures, and glacial recession, bioclimatic zones are decreasing in surface area. As a result, mountain species are likely to suffer drastic decrease in available habitat and may be pushed towards higher elevations (though elevated parts of a mountain have a smaller surface area). Some species living at high altitudes may become extinct because they had adapted to snow and cooler climate. Consequently, depletion of mountain ecosystem services and glacier retreat, may affect tourism, and loss of local and national revenues.

But what level of change is likely to bring about the said effects? Dr. Chaudhry explains that international glacier monitoring data reveals that since 1894, continuous and robust retreat in the length of glaciers has been taking place globally. Scientific data further indicates that even if global warming were to be controlled to 2°C, many small to medium sized glaciers will completely disappear in the coming decades. Vanishing glaciers are also leading to formation of new lakes in low areas of glacier beds. Much as such new lakes may offer interesting sights for tourists and offer potential for hydropower generation, they also represent a far-reaching menace for flash flood waves, debris flow, and avalanches. These occurrences may cause other environmental hazards with substantial loss of life and property.

In terms of the actual incidence of climate change in our region, Dr. Chaudhry indicates that the minimum temperature rise around Mount Kenya has been recorded

between 0.1 – 0.7 C° while the maximum temperature rise has been between 0.8 – 2.0 C°. Likewise, change in amount and timing of rainfall has been observed consistently in all parts of Kenya. The amount of average yearly rainfall has declined but it comes with greater intensity. For example, observations suggest that in areas surrounding Mount Kenya, the number of rainy days have declined during the long rainy season which extends throughout March-May. Rainfall has been more intense in April and May while it is less frequent during the month of March. The amount of short rains (October-December) has specially reduced over the last few decades. Recently, some parts of Kenya have been experiencing a third rainy season (during August) known as the continental rains. These changes are having significant implications on the Mount Kenya snow covers and other ecological systems.

The researcher indicates that due to climate change and global warming, Kenya's mean annual temperature is predicted to increase with a greater frequency of hot days and nights (1°C by 2020, 4°C by 2100). This raises further concerns on how to save the few remaining glaciers on Mount Kenya.

Dr. Chaudhry expresses concern that the vulnerability of the Mount Kenya glaciers, and the human security risks associated with this problem, call for enhanced governance of the national heritage against the effects of climate change in the region. Kenya has taken some bold steps to tackle the issue of climate change through the National Climate Change Response Strategy and the National Climate Change Action Plan, but the human security problems in the mountain areas still need distinct approaches. The researcher recommends building the institutional capacity to deal with climate change-led human insecurities using multi-dimensional, multi-sectoral, and multidisciplinary approaches. The country must also capitalise on education and awareness on climate change, and particularly on increasing levels of human security, with a key focus on the mountain communities. Lastly, the researcher believes there is room to bridge the knowledge gaps and provide funds for empirical research on climate change and human security of the mountain communities.



**Ice loss on Lewis Glacier, 1900s to early 2000s according to UNEP.**

# Meet our researcher

Prof. George O. Rading



**P**rof. George O. Rading of the Department of Mechanical and Manufacturing Engineering clearly has a passion for two things: his research work in the mechanical behaviour of materials and teaching. Prof. Rading's love for the engineering workshop is driven by what he terms "scientific curiosity", which began with his first encounter with science subjects way back in his secondary school days. After the lessons of the day, young Rading would listen in to the conversations and watch with admiration as the older students tried to outdo one another in putting

into use the new knowledge they had learned from their Chemistry and Physics classes.

They seemed to hold very intellectual discussions as they mentioned things he was yet to encounter himself, having only begun his secondary school journey. It was from these conversations that Rading first heard about the reference to water as " $H_2O$ ", its chemical formula. "I did not want to be left out of such intelligent conversations and so I developed a lot of interest in science", he remarks. The same curiosity still drives Prof. Rading today as he goes





**Prof. Rading earned his BSc degree in mechanical engineering from the University of Dar es Salaam and a Masters in the same field from the University of Nairobi.**



- ▲ **Top: Prof. George Rading demonstrates how to test the hardness of materials using some of the equipment acquired through the support of AMSEN.**
- ▶▶ **Right: Prof. Rading stands next to the Fatigue Testing Rig which he constructed during his MSc studies in 1980.**



about his research work in the department's workshops.

Prof. Rading earned his BSc degree in mechanical engineering from the University of Dar es Salaam and a Masters in the same field from the University of Nairobi. One of the department's workshops still has a fatigue testing rig, which Prof. Rading built during his MSc studies in 1980. The essential piece of equipment is still in use. His PhD was in material science and engineering at the University of Alabama in the United States. The researcher specialises in the study of the fatigue properties of materials. "Research intrigues me. I want to know why things are happening differently from what I expected", he says about his passion for research which has seen him publish 28 journal articles, three books, and one monograph in addition to contributing to over 40 conference proceedings.

The research work of Prof. Rading entails the testing of materials to understand their mechanical behaviour based on factors like hardness and fatigue properties. These kinds of tests make it possible to determine the suitability of materials for particular uses. For instance, if we are clear about the fatigue properties of a certain material, we can use the material appropriately and mitigate equipment failure in addition to determining when to service the equipment. According to Prof. Rading, fatigue testing





**Prof. Rading explains the use of a polisher machine in the Department of Mechanical and Manufacturing Engineering.**

basically entails studying the behaviour of the material as it is loaded and unloaded, which is a simulation of what happens when the material is actually in use.

In some cases, the researcher applies the results of his investigations to recommend the required structural modifications to a piece of equipment so as to achieve the desired function properties. In his line of research, it is not uncommon to begin with the desired material properties in mind and then create the material if it does not exist. Prof. Rading gives the example of the vaulting pole used in the pole vault sport; it should be light with the ability to spring. "You will not find a material with these properties in nature so you create it", he says. The researcher, who studies metals mainly, observes that these materials can be put to many uses because of their varying properties. "You will find metals in aircrafts, vehicles, hoes and many other kinds of equipment. It all depends on their properties", he says. Prof. Rading also makes it his business to know the reason why equipment fails so that he can find solutions if they are related to material properties.

Turning to his second passion, which is teaching, Prof. Rading derives satisfaction from seeing good results from his students. The don, who began his teaching career at the University in 1984, elaborates that at the end of his teaching sessions, he often looks back to reflect on whether he made a difference. In the end, he has pride in the knowledge that he has produced good engineers who will join the industry and tackle the problems they find there with confidence. He has successfully supervised six PhD and six Masters students. On the other hand, when things do not work as expected, the don cannot help feeling frustrated at what he considers a waste of time. "It is very disappointing if the students don't get it". He would like the education system to maintain a high calibre of students in the engineering courses.

Prof. Rading, whose teaching courses include Materials Science, Solid Mechanics, Composite Materials, and Testing Materials, divides his time between research and teaching. He is very much aware of the diverse career options available to the students after they graduate but he would prefer to have many of them enter mainstream

engineering in industry or even come back to the University to teach. He sees a threat to the development of the discipline when some of the best engineers choose to work in audit firms instead.

The researcher has taught at Moi University and also had a short stint teaching at the University of Alabama soon after completing his PhD studies. He also shared his knowledge and skills with students at the Kigali Institute of Science and Technology (KIST), in Rwanda while on sabbatical leave and is currently adjunct professor at Kenyatta University and Technical University of Kenya.

From time to time, Prof. Rading works with industry on specific problems but observes that the level of collaboration is rather low. He attributes the situation to reluctance by industry to use local experts. "We have tried to approach industry to solve problems that we know they have but the response has not been encouraging", says the researcher. He has two ways of explaining the situation. First, many of the industries operating in the country, and which may require his kind of expertise, are branches of large international companies which usually seek solutions to their engineering problems from the parent companies abroad. Second, he perceives a certain degree of lack of trust in the capacity of local experts to effectively solve problems, but nothing could be further from the truth. Prof. Rading has worked with Mobil Oil and several aircraft companies.

In terms of developing the quality of research, teaching, and learning, the researcher indicates that the department has received immense support through the African Materials Science and Engineering Network (AMSEN), which consists of six African universities. The other five members of the network are University of Botswana; University of Ghana; University of Namibia; Federal University of Technology, Akure (FUTA), Nigeria; and University of the Witwatersrand (Wits) in South Africa. Members of the network share research facilities and human resource expertise. University of Nairobi PhD students, for instance, frequently use the facilities at University of Botswana and Wits.

On the other hand, the department has purchased a good number of modern equipment through the support of AMSEN, whose funding comes from the Carnegie Corporation of New York. The department has been able to replace some of the old equipment in its laboratories with modern ones that have better precision than the manual ones they were using previously. He is grateful to the network and funding agency for the support which has helped to raise the department's quality of teaching and research.

Prof. Rading, 61, is a registered engineer and Fellow of the Kenya National Academy of Sciences. He belongs to several professional organisations and has been an external examiner for a number of local universities and technical institutions including Moi University, Kimathi Institute of Technology, Egerton University, and Jomo Kenyatta University of Agriculture and Technology. He undertakes similar assignments in Botswana and India. Prof. Rading is in support of the development of a much higher level of research culture in the region as the best way of finding solutions to problems.





Ms. Annah Njui,  
Grants, Partnership and  
Project Manager - ICIPE


# Managing research grants

## Tips from a Grants Manager

Susan Muchina asked Ms. Annah Njui to share some insights into the important issue of grants management based on her experience as the Grants, Partnerships and Projects Manager at the International Centre of Insect Physiology and Ecology (ICIPE). Ms. Njui was one of the participants at the Grants Management Training organised by the Consortium for National Health Research (CNHR) for its member institutions in July this year. ►►



# Grant Management



The office works with principal investigators, coordinators, managers, and the Finance Office to ensure the successful implementation of projects.

**Question: Why do research institutions require a Grants Management Office?**

**Answer:** The Grants Management Office provides overall leadership, management, and oversight of the ongoing research and development projects in an organisation. The office works with principal investigators, coordinators, managers, and the Finance Office to ensure the successful implementation of projects. The aim is to build a relationship of trust with funding agencies and also make the grants management process within institutions orderly and procedural.

**Question: What should researchers expect from the Grants Management Office in their institution?**

**Answer:** The expectations are enormous. Once a grant proposal has been funded, it is essential to study the terms and conditions of award and seek clarification of issues that may be unclear. This should be done as promptly as possible.

The grants management office should also maintain a project file to be used in documenting all major actions from grant award to closeout. The office should have in place, for every funded project, a file containing the following:

- Copy of the executed grant agreement including the approved budget
- Copy of the grant budget reflecting how it will be processed through the accounting system and eventual preparation of financial statements
- Key correspondence with funding agency
- Financial Statements filed with the funding agency
- Narrative progress reports filed with the funding agency
- Audit and project closeout documentation

**Question: Your role as Grants, Partnerships and Projects Manager revolves around managing grants on behalf of the researchers. Describe briefly, what this role entails.**

**Answer:** My major role is grants monitoring and reporting which involves working with teams from management, scientists, and Finance. The purpose of grant monitoring is to review and ensure progress against the grant's goals and address any problems or issues before the end of the grant period in consultation with the funder. I am involved in the whole spectrum of activities relating to the grant such as partnership and project management, implementation and compliance, reporting and monitoring, and closeout.

**Question: In your opinion, what is the role of Finance Department in the grant management process especially elaborating on the relationship with the PI and the grants management office?**

**Answer:** Essentially, the main role of Finance is to provide a reporting system that fairly and accurately documents the spending of grant funds. The Finance Office should work jointly with the PI and the Grants Office to ensure that all financial transactions are clearly documented and recorded in a manner that facilitates comprehensive financial reporting, easy referencing, and maintenance of a clear audit trail. This integrated approach provides real-time access to financial information to assist project managers in controlling their activities. Budget controls should be based on project management accounts to ensure the expenditure is within the funder-approved budget. Finance Office should also design and implement policies that minimise the risk of loss, ensure protection of assets, encourage cost-effective employment of resources, and safeguard against irregularities. ►►

**Question:** Why is it that some researchers, and even institutions, attract and retain funders while others seem to be struggling to receive even a minimal amount of funding?

**Answer:** The secret to “attracting and retaining” funders lies in establishing a sound relationship and compliance system. Funding agencies support individuals and not institutions! Every grant award letter and the accompanying grant agreement will contain information about applicable compliance requirements. The award letter is a binding document. To demonstrate compliance, the Grants office should make a checklist of the grant requirements, which cover issues like personnel and procurement policies as well as reporting obligations, and ensure that these are strictly adhered to. If for any reason a deviation is imminent, then the grants office should immediately inform the funding agency and provide the justification and proposed action to remedy the situation. Such a proactive approach eventually builds trust and effective and efficient grant management mechanisms. It also helps to develop and maintain a professional working relationship with funders and other partners who become motivated to collaborate with researchers.

**Question:** It is often said that “A grant is not a gift!” What would you say is the reward for the researcher whose proposal has attracted a good amount of funding?

**Answer:** Obtaining a grant for your research is a phenomenal achievement! Funders give support because they believe the work will make a difference in a cause they care about. Their funding is an investment in the work they expect to be accomplished by the research. If this is well-communicated and articulated in the proposal, then you are good to go and achieving results as defined in the proposal is the best way to show appreciation to your funders.

For the researcher, receiving a research grant signifies career progression and peer recognition. Ultimately, the reward is the satisfaction achieved and results obtained while implementing the project. To maintain and even enhance this milestone, the researcher should create performance measures pertaining to project management and activity completion.

**Question:** How should a researcher handle a situation where not all funds have been expended by the end of a project?

**Answer:** Having unused funds at the end of a project is something that needs to be considered carefully because the actions you take with one funder may just set the

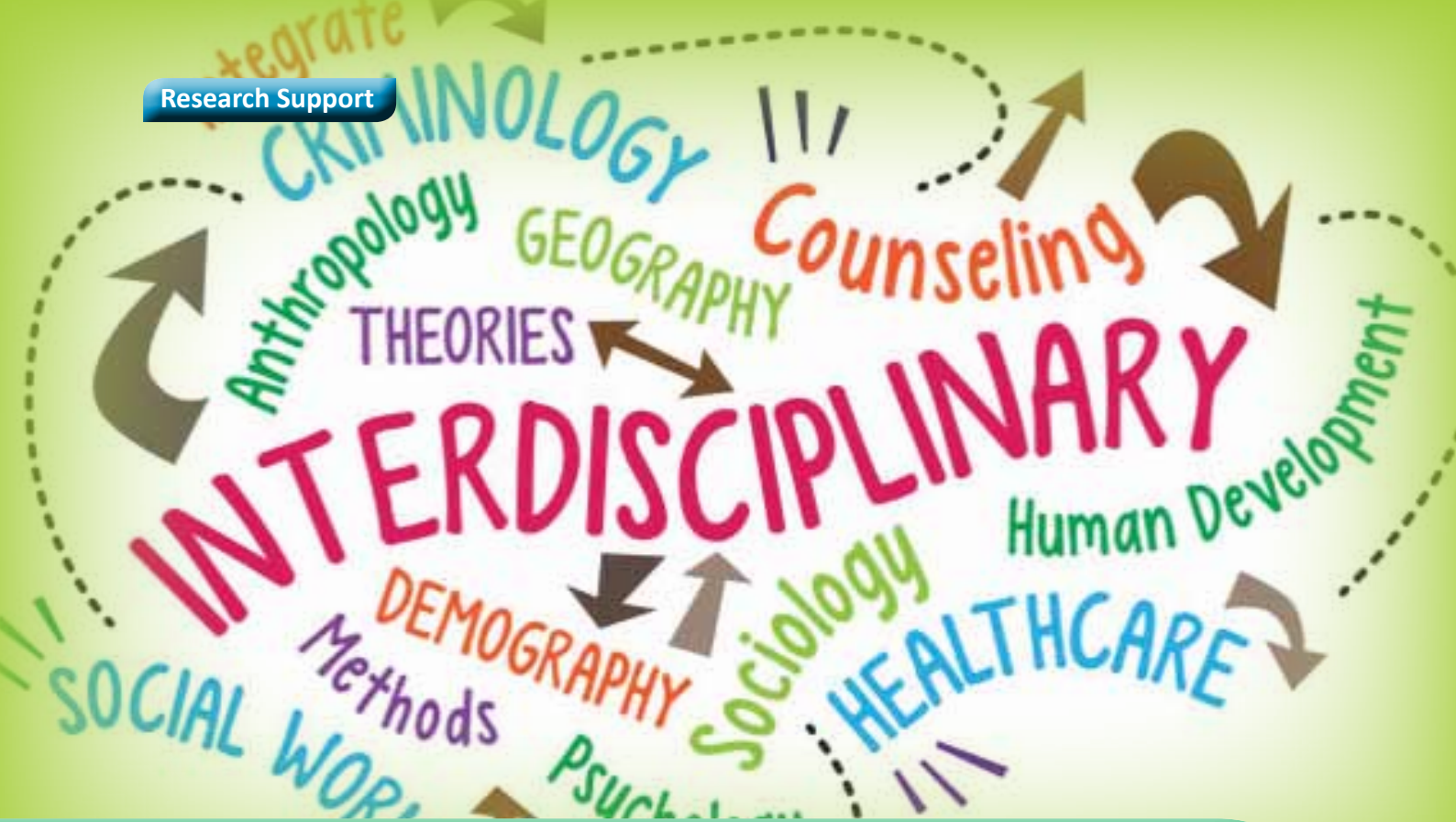
standard upon which others will view you/your institution in future. One way of preventing such a problem from occurring is to regularly review and reconcile your project expenditure against your activities and project timelines. If things are not progressing according to plan, request the funder for an appropriate grant amendment.

In all grant agreements, there is usually a clause that spells out how modifications should be handled. An appropriate modification should be sought, through the institution’s grants office, to extend the period of performance (usually referred to as no-cost extension (NCE) and a request to utilise the unexpended funds. The request should be made in the form of an official letter signed by the authorised institutional representative (usually the one who signed the Grant Agreement) as the request is binding to the institution. The request should contain a brief explanation of achievements made so far; reasons for project delays; a mention of the pending activities; and a confirmation that the resources are adequate to support the extension. It is also important to append a work plan and associated proposed budget revisions for the NCE. Under no circumstances should grant funds be spent beyond the grant end date without an approval.

**Question:** Based on your experience as a grants manager, what advice would you give to institutions seeking to improve grants management as a core research support function?

**Answer:** Improving grants management as a core research support function will certainly revolutionise an institution’s grants management and resource mobilisation activities. I have been in this game for over 16 years and managing research grants certainly requires a significant amount of proficiency. Pertinent to this is building the right skills set for staff in the grants office, who should also have knowledge of the current trends in grant management. Training is therefore a key requirement.

My academic qualifications as a project development specialist has equipped me with appropriate skills to oversee the Grants Management Office at ICIPE. I have also received invaluable training through the Training Health Researchers Into Vocational Excellence in East Africa (THRiVE). I would say the extraordinary impact of the THRiVE training and backing from my supervisors and other focal persons has enabled me to become part of a professional forum of health research administrators in Africa. We hold discussions in this forum, conduct training, and undertake analysis and benchmarking of best practices. I would recommend similar forums to institutions seeking to foster a sustainable grants and research projects environment.



# Importance of interdisciplinary research and studies

## Experience from law and sociology

By Scholastica Omondi

This article is based on the experiences of Dr. Scholastica Omondi who practiced law for many years, ventured into sociology, and is now a socio-legal expert.

**A**n interdisciplinary approach is the way to go when addressing the challenges in our society because it offers us the opportunity to analyse issues using a wider lens. I worked in the legal profession for many years, but it is only after venturing into the field of sociology that I was able figure out answers to some difficult questions that I had to grapple with for the better part of my career in law.

After completing my bachelor's degree in law, my first job assignment was to work as a state counsel, which I did for one





year. Later, I served as a magistrate for 15 years during which period I presided over the criminal court, the traffic court, and the children's court at different times. Fundamentally, the work of a magistrate is to implement the law, which is concerned with whether or not the accused person committed the crime in question. The law goes further to prescribe the sentence that must be passed if an accused person is found guilty. I must emphasise that the law is not concerned with the "why" or cause of a crime.

Going back a little, my fascination for the law began when I was a young girl growing up in the village. At an early age, I was attracted to the chief's baraza (meeting). Every Wednesday, the village residents would assemble under a tree near my home to listen to the chief as he addressed the disputes presented before him. I attended these meetings whenever I had the opportunity to do so. What attracted my attention most was the way the chief handled marital disputes and cases relating to theft, sexual assault, arson, and trespass including leaving animals to graze on another person's farm. The chief drew his powers from the Chief's Act, which was a very powerful colonial legislation. My assessment of these experiences was that there was a lot of injustice and the victims' concerns were never really addressed. My opinion was strengthened even more by the outcome of an incident involving my own family.

One day thieves broke into my parents' house and stole several items. There was no one at home but a young boy, aged eight years, said he had seen the thieves. He led the police to a shamba less than 100 m away from our house where all the items were recovered. He also identified the thieves whom he knew well because they were neighbours. The suspects were prosecuted but the magistrate set them free on grounds that there was no corroborating evidence. The law did not allow conviction on the evidence of children alone. I could not understand why the thieves were set free. This is the point at which I developed interest in studying law.

During the years that I worked as a magistrate, I realised that society

seems to favour a punitive approach when it comes to the sentencing of offenders. The public will see justice to have been done if the sentence is harsh. It is not lost to me, however, that despite the punitive sentences given by the courts, the level of crime continues to rise. I tend to attribute this situation to existing disparities between the law and society. If we regard the law as a tool to address society's problems, then the lawyer or magistrate must understand the society in which he or she is applying the law. In my case, the probation officers' reports widened my scope in the attempt to understand society, law, and the individual. I came to appreciate that my law degree was not enough, and that I may as well have been implementing the law in a vacuum because I did not quite understand the society in which crime occurred. This realisation led me to enrol for a Master's degree in Sociology.

At the same time, it occurred to me, as I continued to study the probation officers' reports that if the courts were to develop an interdisciplinary approach to criminal justice then we would help many offenders to reform. I experimented with this approach by exploring restorative justice, which gives offenders a chance to reform, as opposed to the punitive approach. Many of the offenders who were subjected to this approach are responsible citizens in society today.

The courses I studied in sociology helped me to understand human relations and the causes of crime and civil disputes. I learnt about how individuals respond to different circumstances. In the course of my studies, I remember presiding over a criminal case involving two young men who were charged with robbery with violence. The young men, aged 21 and 23 years, had been working for the complainant in her restaurant for over five years then one day they allegedly robbed her at gun point. She was able to identify them and members of the public who arrested the suspects recovered the stolen items. At the sentencing stage, the young men pleaded for leniency while the complainant asked the court to forgive them. The probation report

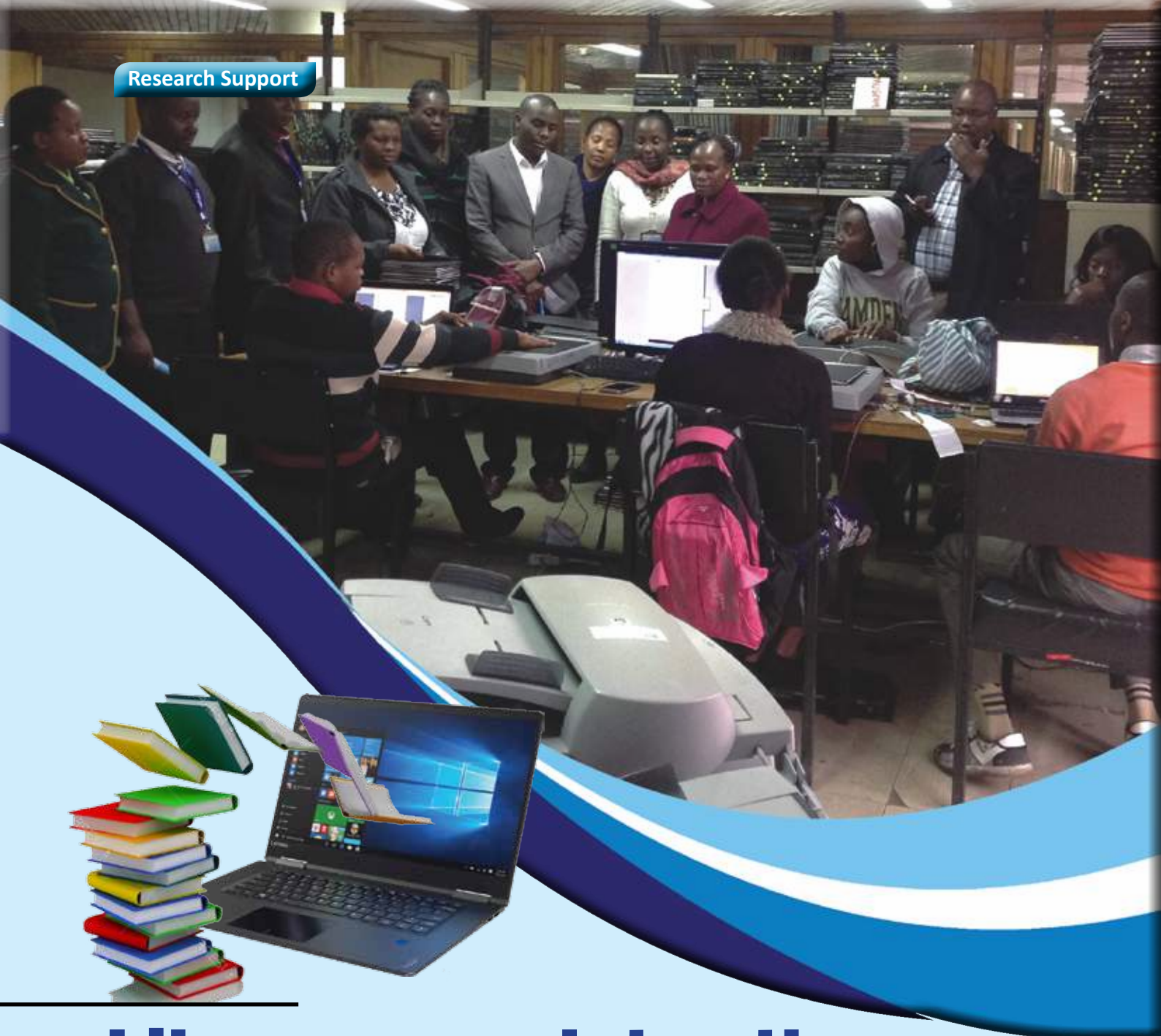
showed that the accused persons were orphans who had been fending for themselves since childhood.

The punishment for robbery with violence is a mandatory death sentence. I painfully read the sentence to them, as I had no other option. It was the law. That was the first and last death sentence I passed in my 15 years of judicial service because I resigned shortly thereafter. As I wrote my Master's thesis on "Challenges faced in implementing the Children's Act 2001 to protect children from abuse and neglect in Kenya", I was certainly in a better position to understand the socio-legal issues involved in the matter.

Later on, I wrote my PhD thesis on "The implications of the adversarial legal system's trial procedure on the special needs of child victims of sexual abuse in Kenya". Again, I used my knowledge from sociology to argue that subjecting a child victim of sexual abuse to testify in court, in the presence of, and to be cross-examined by, the abuser amounts to institutional re-victimisation by the criminal justice system. I recommended the need to take a child-friendly approach in cases of this nature.

In my everyday work as a lecturer, consultant, and researcher in socio-legal issues, I make it a point to consider issues from the wider socio-legal lens. I appreciate from sociology, for instance, that those who attempt to commit suicide are overwhelmed by problems and need help. The law, however, treats them as offenders who must be punished. Similarly, in cases of spousal abuse or domestic violence, sociology recommends the need to find and address the causes of the abuse to prevent them from occurring rather than reacting to their occurrence. I firmly believe that demanding for punitive sentences for abusers is not the solution either. I am certain that the criminal justice system can be improved by embracing an interdisciplinary approach to issues as opposed to a purely legal one.

*Dr. Scholastica Omondi is a lecturer in the Department of Public Law, School of Law, University of Nairobi.*



# Library completes the digitisation of theses and dissertations

By Rosemary Otando and Milka Gikunju

**T**he Library recently concluded the task of digitising its collection of theses and dissertations previously held in print format. The completion of this task, which covered about 20,000 items for the period 1950 to 2012, means that the knowledge contained in these materials will be better preserved for posterity. This accomplishment will also increase the visibility of university research to the community of scholars and at the same time raise the

profile of the institutional repository.

According to Directory of Open Access Repositories (OpenDoar) 2016, Africa has 140 registered repositories with the University of Nairobi repository being one of 23 such facilities to be found in Kenya. In the July 2016 edition of rating institutional repositories, the University of Nairobi repository was ranked as first in Kenya and fifth in Africa.

The digitisation of grey material containing locally



**In Kenya, many libraries keep theses and dissertations under restricted access where they remain largely underutilised, implying wastage of the human and financial resources that went into the process of knowledge generation.**



conducted research seems to be some kind of wave sweeping across institutions on the African continent, which is still lagging behind in the production and dissemination of research. In Kenya, many libraries keep theses and dissertations under restricted access where they remain largely underutilised, implying wastage of the human and financial resources that went into the process of knowledge generation. Sometimes these materials fall into the hands of fraudulent library users who plagiarise the works. As a result, a number of university libraries have taken up the challenge to capture, preserve, and disseminate the grey content generated in their

institutions.

By undertaking to digitise, the University affirms the importance of theses and dissertations as a rich resource for national development which must be made accessible. The actual task of digitisation of the print material was carried out by an external company with the support of library staff. Since 2013, the Library has been receiving theses and dissertations in electronic form from the Board of Postgraduate Studies leading to continuous expansion of the institutional repository.

Digitisation has numerous advantages. It implies preservation of the original source, rare/brittle and fragile materials for sustainability and posterity, hence safe custody of local content. Digitisation enhances accessibility and sharing of local research materials and researchers whose work is accessible through the digital repository have the opportunity for wider recognition than is possible with the print material. Overall, digitisation increases the visibility of research for easy access, retrieval, and ranking of the University due to the improved organisation and tracking of research performance. Finally, due to the tracking of documents in the repository by Google crawlers, it is possible to achieve enhanced Google analytics statistics and indexing properties.

Completion of the task of digitising theses and dissertations is a major boost to the University repository because it makes it possible to measure the impact factor of local content. For continuity, however, the Library will need to improve the infrastructure to maintain the standards. In addition to the acquisition of software for indexing and maintaining the security of content, the library will need to incorporate social media platforms in the repository to measure impact more efficiently. The use of altmetrics will make it possible for readers to see the attention that the research is attracting. The good news is that the Library is already working towards embedding altmetrics in the repository, which already has a Content Analysis and Statistics Module in place. The module provides value added services such as page views per item and the geographical location, by country, where the content is accessed from. This kind of information, which comes in the form of graphical statistical representation, can be used to make decisions for improvement of services.

Our experience has shown that although accelerated digitisation is critical, it must be supported by an effective digitisation strategy and proper planning. Collaboration between the public and private sectors is also important for the purpose of sharing knowledge and expertise. Furthermore, the achievement of successful digitisation requires the support of management. Other departments within the institution can also share their technology, skills, and expertise to help close the gaps that are likely to interfere with the digitisation journey. More important is the need to share best practices to avoid duplication and at the same time ensure uniformity and quality service delivery.

*Rosemary Otando is the Librarian at the College of Agriculture and Veterinary Sciences (CAVS) while Milka Gikunju is Systems Librarian based at the Jomo Kenyatta Memorial Library on Main Campus.*





# Commercialisation of intellectual property

## At the University of Nairobi

By John Maina

Innovation is the major source of improvement in the quality of life. It is through innovation that we are able to overcome many of the challenges that confront our society. Intellectual property, which helps to define how we utilise innovations, not only promotes innovation but makes it possible to capture the economic value of the innovation process. Intellectual property also encourages investment in research and development (R&D), while also enabling the sharing of the social benefits of innovations. In this context, the University of Nairobi has a long history of contributing to national development through its research activities. The University recognises that the public benefits from new products, processes, plant varieties, and other intellectual creations that result from discoveries, inventions, and creative activities by staff, students, and associates.

### Process of innovation

In research, invention refers to the discovery of new ideas or new solutions to problems. It is the act of devising or fabricating a novel device or process, or service. Whereas the invention process encompasses the initial conception of a new product or process, it does not include the act of putting these into use. The term “innovation”, however, describes both the development and application of a new product or process. Innovation can assume many forms

including incremental improvements to existing products, application of existing technology to new markets, and use of new technology to serve an existing market.

Generally, research is conducted with two main objectives: to explore and develop new knowledge and to solve specific development problems. In the first case, the goals of research are often diffuse, which makes it difficult for a single institution to monopolise the accruing benefits. Research that is conducted to address development issues has clearly targeted results which are also easier to appropriate. In the latter case, it is possible to move beyond publications and convert research outputs into commercially viable products. The University, through the Intellectual Property Management Office (IPMO), has a programme involving the commercialisation of the institution’s research outputs.

The IPMO offers assistance relating to the identification of research outputs with commercial potential, assessment of the value of such outputs, and their protection through ownership. The IPMO also facilitates the actual process of commercialisation of intellectual property.

### Issues to consider in commercialisation

The commercialisation of inventions takes place through a technology transfer process and includes product/process development, manufacturing, and marketing in addition

to the research that supports these activities. The three key issues to consider when embarking on a technology transfer process for an invention include determination of whether the idea, invention, or product is patentable; availability of a market for the invention; and availability of business partners interested in commercialising the technology. Successful commercialisation depends on the existence of adequate industrial infrastructure. Usually, the process of technology transfer at the University begins with acquisition of intellectual property rights for an invention followed by the search for a partner to undertake product development and commercialisation.

In order to achieve successful commercialisation of technology, a number of conditions will need to be fulfilled. First, the commercialising entity must have the capacity to finance new technology ventures. Second, the commercialising entity should be in a position to hire and train skilled scientists, engineers, managers, and production workers, it must also have the means to acquire or access the complementary skills and technologies required to make an innovation useful. Finally, the product must gain market acceptance because business owners have to be convinced about certain factors before making the commitment to take up a new technology for commercialisation. They will consider the anticipated profits, size and nature of potential markets, and the cost of commercialisation. Potential partners in the commercialisation undertaking will also need to satisfy themselves that the price consumers are willing to pay for the innovation will cover their costs.

The University has commercialised three agricultural technologies so far and continues to build a portfolio of commercially viable research outputs. The commercialisation of other products is also in progress using the lessons learned from the past experiences. The University has applied for 14 patents and utility models, registered 23 new plant varieties, and acquired trademarks for various units including the Fountain of Knowledge logo and the Nairobi Innovation Week logo. Two products developed by the Science and Technology Park (STP) and which have already been prototyped have also acquired patent applications. The technologies for which patent applications have been submitted include pharmaceutical compositions, chemical sensors,

engineering products, and innovations in agriculture and biotechnology.

The other activities being undertaken include the marketing of products to potential licensees through consultation with the inventor for information on possible candidates, providing required information, and contacting relevant industry partners. A major setback to commercialisation is limited manufacturing potential in the country for some of the products, but the IPMO is also considering partnerships with foreign entities. Consultation has also been taking place with marketing experts to help in the implementation of business models and other relevant processes. Internally, the IPMO is working with the Science and Technology Park to develop prototypes of some of the technologies for use in marketing.

The process of innovation commercialisation varies dramatically across industries and product lines. Each product requires its own strategy of marketing and business model as well as teams with different skills. With regard to new plant varieties, the University has embarked on the commercialisation of new bean varieties. The process of licensing new plant varieties consume a lot of time and resources because some of the steps require several planting cycles in conjunction with the regulatory bodies before the final products are approved.

The commercialisation of innovations is a lengthy, complex, and expensive process. The IPMO has plans to engage the industry in partnerships on innovation. Such collaboration between industry and academia will raise awareness about the research output of the university. A close working relationship between the two entities will also enable the university to identify the problems that the industrial sector would like to be investigated. One of the main challenges of industry/academia collaboration, however, is that the industry perceives universities as being extremely bureaucratic and hence slow. As a starting point, perhaps the University should be willing to sign simple contracts and engage in projects whose outcome is based on results rather than delivery time.

**Mr. John Maina is the Intellectual Property Management Officer at the Intellectual Property Management Office (IPMO).**



**Innovation commercialisation workshop held at the Nairobi Safari Club on 1-2nd August 2016 during which the main speaker was Prof. Evans Baiya.**



# The role of intellectual property law in collaborative research

By Prof. Ben Sihanya

In this article, Prof. Ben Sihanya, JSD (Stanford) explains the key issues that researchers must be clear about before entering into collaborative research agreements. Prof. Sihanya is a scholar of Intellectual Property and Constitutional Democracy at the University of Nairobi Law School and author of “Intellectual Property and Innovation Law in Kenya and Africa: Transferring technology for Sustainable Development” (2016).



## What is Collaborative Research?

Collaborative research is where two or more individuals or organisations come together with the aim of actualising a common goal or project. It involves research of mutual interest to the parties with shared obligations, rights, and access to results. The applicable agreements in collaborative research range from simple contractual documents to very complex arrangements. The number of collaborative research agreements is increasing rapidly partly because

universities and other academic institutions, research organisation as well as industry are adopting these agreements in their research, innovation, technology transfer, and commercial intellectual property (IP) and related activities or processes.

## What is the role of IP law in collaborative research agreements?

Most of the universities tend to focus on patent, plant breeder's rights (or plant variety protection) and material transfer agreements. Yet copyright,

trade mark, utility model, industrial design and trade secrets are equally important. Collaborative research agreements are negotiated and implemented in the context of the Constitution, national IP laws, and the relevant institutional IP policies and practices. Intellectual property law is crucial as it recognises, protects and promotes human creativity, innovation, and invention embodied in tangible or material form. The most contentious aspects of research, development, and commercialisation agreements often relate to intellectual

property rights, ownership, and exploitation. This is partly because every party to the agreement has its own interest and understanding.

The question of who owns or has what rights or interest in the IP resulting from collaborative research usually arises, partly because IP is a reward or incentive in research. The key issue lies in determining what specific IP each party to the agreement is bringing into the research.

One of the most important goals of collaborative research is to develop innovations or new technologies that can be commercialised. Intellectual property and commercial rights to the arising intellectual property are negotiated, and can vary depending on the nature of the collaboration and the contributions of both parties. Consequently, some of the key provisions in these agreements relate to the intellectual property produced through the research, rather than existing innovations or inventions.

### **What is the legal and institutional framework promoting and protecting collaborative research agreements in Kenya?**

Collaborative research in Kenya is governed by various laws such as the law of contract and intellectual property law. The Contract Act Cap 23 provides the basics for all contracts and agreements in Kenya. It provides that a contract or agreement should be in writing, signed by the parties to the agreement and the signatures attested to (or witnessed) by third parties. All the parties to a research agreement must also have the legal capacity otherwise it will be void.

Intellectual property laws such as the Copyright Act 2001, Trade Marks Act, Cap 506, and the Industrial Property Act 2001 provide for IP rights in such contracts and agreements. The Copyright Act 2001 recognises joint authorship where it describes “work of joint authorship” to mean a work produced through the collaboration of two or more authors in which the contribution of each author is not separable from the contribution of the other author(s). All the parties involved have moral and economic rights in relation to the work and collaborators may license, assign, or

transfer their IP rights.

Various academic and research and development (R&D) institutions in Kenya have gone a step further to explicitly provide for collaborative research agreements in their research and IP policies. The University of Nairobi provides for collaborative research agreements in its Research Policy 2013, Incubation Policy 2015, and Intellectual Property Policy 2013.

Article 8 of the University of Nairobi IP Policy 2013 provides for the ownership of intellectual property rights. It provides that where a researcher is a staff member or student of the University, the University is entitled to the IP concerned if the research was done in the scope of the student programme, staff employment, or commission unless otherwise agreed in writing. This clause gives the parties to a collaborative research the freedom to agree on the ownership of or interests in the IP rights. Article 21 of the Policy also provides for dispute resolution where parties to collaborative research disagree on any issue including ownership of IP rights.

National institutions that have a mandate on collaborative research include National Council for Science, Technology and Innovation (NACOSTI), Kenya Medical Research Institute (KEMRI), Kenya Agriculture and Livestock Research Organisation (KALRO), and Kenya Institute for Public Policy Research and Analysis (KIPPRA). The same applies to IP institutions such as Kenya Copyright Board (KECOBO), Kenya Industrial Property Institute (KIPI), Anti-Counterfeit Agency (ACA), and Kenya Plant Health Inspectorate Service (KEPHIS). There is need to establish and strengthen collaborative research institutions in the arts, humanities, and social sciences.

### **What are the basic issues that researchers should know before engaging in collaborative research agreements?**

A comprehensive collaborative research agreement should address at least seven consequences and mechanics associated with the IP that will result from the collaborators’ relationship. First, who decides the

form of IP protection (copyright, trade mark, design, utility model, trade secret)? Second, which parties hold the rights to utilise, perform, work, or practise the IP, and in what field(s) or markets? Third, who decides in which jurisdictions or markets such IP filing, registration or other promotion are made or pursued? Fourth, who can license, assign or pledge the IP to whom? Fifth, who earns any royalties earned as a result of licensing the IP? Sixth, who can transfer or alienate the IP? Finally, who can enforce the IP by way of alternative dispute resolution (ADR) or bringing a civil suit or a complaint for criminal prosecution?

These questions are critical to any collaborative research agreement as they lay the foundation for each party’s rights and obligations towards the research and to each other. It is therefore important for parties to agree on the issues raised in these questions before entering into a strategic alliance, joint venture, or other collaboration. This will help to eliminate any form of conflict over rights or ownership once the project is on course or has been concluded.

The ownership of, or an interest in, intellectual property resulting from joint or collaborative research can be difficult to determine. Some institutions leave intellectual property in the hands of their researchers, while others share or claim ownership or rights. In reality, the issue of rights or ownership is complicated because the rules often depend on who exercises skill and judgment or the entity funding the research. Moreover, it may be difficult to practically assess which party has the greater claim to creativity or invention resulting from the research. There is, however, need to agree on the basics, including IP rights.

### **What are the basics of a collaborative research agreement?**

A basic collaborative research agreement should address the foregoing as well as the following six matters.

First, the agreement should clearly indicate the obligations of each party and a description of what each party is bringing to the research project.





This includes skill and judgment, technology, materials, and funds.

Second, the agreement should have a provision on who holds the intellectual property rights emerging from the research. The IP may be shared. This is a very important aspect as it helps avoid conflict over rights or ownership once a project is completed. This provision should contain the economic and moral rights of each party to the agreement.

Third, confidentiality, privacy and trade secrets are key aspects in collaborative research. The main aim of research is usually to come up with an innovation or invention that is not yet available in the public domain. It is, therefore, imperative that the process or product developed during the research be kept confidential and that collaborating researchers agree on when, how, and where to publish or disseminate the findings. A collaborative research agreement should therefore have a clause on confidentiality, privacy, and non-disclosure agreement (NDA) or non-compete agreement.

Fourth, a collaborative research

agreement should have a publication clause. The main aim of research is usually to publish the findings. A publication clause should protect the interests of the parties by balancing the policies of “publish or perish” in the academy and “publish and perish” in the traditional patent world. What I prefer to call an appropriate “publish and prosper” publication policy and strategy, however, promotes the IP. Parties should reserve a right to review and comment on all public disclosure by the other party.

Fifth, it is very important to include a dispute resolution clause in the collaborative research agreement as disputes are likely to occur. Such a clause should emphasise alternative dispute resolution (ADR) mechanisms like negotiation, mediation, and arbitration before resorting to civil or criminal litigation.

Sixth is the issue of termination of the research agreement; all agreements should have a specific date upon which the research collaboration or cooperation ends. There are no specific rules that govern termination in collaborative

research agreements. It is up to the parties to the agreement to agree on the procedure for termination of commitments or rights and obligations. Termination clauses may be included in the research agreement stipulating when and under what conditions each party may elect to terminate the agreement before the end date. The end date may be extended through the amendment process, if both parties agree. Trade secret or NDA clauses extend beyond the termination period, on reasonable terms. There is need to clarify any recourse a party has where there is an unlawful termination.

The foregoing provides a basis for an effective collaborative research and intellectual property agreement in Kenyan universities and industry.

*Prof Ben Sihanya is also a poet, mentor and author of a blogspot to be found at :[www.sihanya@innovativelawyering.com/blogs](http://www.sihanya@innovativelawyering.com/blogs).*



**LINDA ADUDA,**  
Administrative Assistant, CIPL

## Appointment

**M**iss Linda Aduda was recently appointed as an administrative assistant at the Centre for International Programmes and Links (CIPL). She is a social work graduate, with human resource management expertise and is about to complete her MSc in Health Systems Management at the Kenya Methodist University.

Miss Aduda's duties at CIPL will include liaising with the Office of the Deputy Vice Chancellor (RPE) and Director Research and Extension in the following activities: development of projects; monitoring and tracking of the implementation and achievement of Memoranda of Understanding (MoUs) and agreements between the University of Nairobi and other collaborating universities; initiating new partnerships and renegotiation on expiry of MoUs and agreements for extension; and renewal or termination of the same. She will, in liaison with the Legal Officer, be responsible for ensuring proper preparation and amendment of MoUs and agreements between the University and partner universities. Miss Aduda will also be in charge of the international students' database and other matters relating to international students.

Miss Aduda previously worked as an Assistant Halls Officer, at Student welfare Authority (SWA) and has also acted as the Customer Relations Officer.

# Funding opportunities

## **Georg Forster research award**

Alexander von Humboldt Stiftung – Alexander von Humboldt Foundation

This is granted in recognition of a researcher's entire academic record to date. The award is worth €60,000 and the winner will also be invited to Germany to conduct a research project of their own choice. An additional €25,000 is available to cover participation in conferences and the cost of junior researchers. Up to four awards are available.

**Closing date: 15 Jan 17**

<http://www.researchprofessional.com/funding/opportunity/1438939>

## **International research ethics education and curriculum development award (R25) NIH: National Institutes of Health**

This award aims to support educational activities that foster a better understanding of biomedical, behavioural and clinical research and its implications by strengthening research ethics capacity in low- and middle-income countries through increasing the number of LMIC research intensive institutions that can provide advanced education in research ethics.

Application budgets are limited to US\$230,000 in direct costs per year for the maximum period of five years.

**Closing date: 18 May 17**

<http://www.researchprofessional.com/funding/opportunity/1733400>

## **Robert S McNamara fellowships World Bank, US**

These enable candidates from developing countries to conduct development-related PhD research under the supervision of a research advisor at a host institution in a World Bank member country. Fellowships are worth up to USD 25,000 for a period of six to 10 months.

**Maximum award:** USD 25,000

**Closing date:** 02 Nov 16 (recurring)

[https://www.researchprofessional.com/funding/opportunity/254812?\\_\\_mhid=90510381](https://www.researchprofessional.com/funding/opportunity/254812?__mhid=90510381)

## **Partnerships for enhanced engagement in research (PEER) – SERVIR priority countries – environmental management and climate change resilience Agency for International Development (USAID), US**

This enables developing countries use the information provided by Earth observing satellites, and geospatial technologies, for managing climate risks and land use.

Grants are worth between US\$40,000 and US\$100,000 for one to three years.

- Maximum award: USD 300,000

- Closing date: 13 Jan 17 (recurring)

[https://www.researchprofessional.com/funding/opportunity/1487624?\\_\\_mhid=90510381](https://www.researchprofessional.com/funding/opportunity/1487624?__mhid=90510381)





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