STAFF EXCHANGE PROGRAMME REPORT

Submitted to
The Moi University Africa Centre of Excellence in Phytochemicals, Textile and Renewable Energy (ACE II - PTRE).

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PTRE-ACE II PROJECT

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Introduction

This staff exchange programme was undertaken within the framework of The Moi University Africa Centre of Excellence in Phytochemicals, Textile and Renewable Energy (ACE II - PTRE). This is a World Bank funded project through the Kenyan government in the framework of the Africa Centre of Excellence II (ACE II) Programme. The main objective of the Centre is to be a regional epicentre of excellence in postgraduate training in the thematic areas of phytochemicals, textile and renewable energy. The main activities of the Centre evolve around doctoral and master’s training in the key areas, setting up state of the art research laboratories and encouraging regional educational and research interactions through faculties/students exchange programs, among other activities.

One of the regional partners in the Centre is the National University of Science and Technology (NUST) of Bulawayo Zimbabwe and is expected to be actively involved in the activities of the project and in particular the staff/students exchange programs over the duration of the project.

The exchange activities for the visiting faculty member at NUST were guided by the following programme objectives:

1. Meetings to identify possible areas of joint research.
2. Meetings to discuss possibilities of joint grant applications.
3. Identification of staff training opportunities for capacity building.
5. Discuss possible areas of university-industry linkages

The exchange activities and objectives were achieved using the tentative schedule of activities given below:

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Arrival and settling

The staff arrived in Bulawayo on the 7th May 2018 in the morning after an overnight stay in Johannesburg, South Africa.

After checking into the accommodation facilities, the visiting staff was helped to acquire some basic necessities within Bulawayo town. A basic town orientation was made with references to the directions to-and-fro place of accommodation, and within to the National University of Science and Technology (NUST). Normal settling down followed thereafter.

Orientation

Elaborate arrangements were made by the Chairperson of the Department of Fibre and Polymer Materials Engineering for this purpose. The orientation process was spread over several days due to logistical reasons and availability of some of the university officers.

Meeting the Department of Fibre and Polymer Materials Engineering

The very first activity upon arrival at the University was being ushered to a warm departmental meeting where I was introduced to all present members of staff. We went through the introduction process and our areas of research interest. The bulk of the members are Masters’ holders since the Department has only 3 staff holding doctorate degrees. Eight (8) members of staff were at hand for this meeting. The staff present included:

i. Mr. Sizo Ncube

ii. Ms. Nothabo Hlabano
iii. Mr. Lloyd Ndlovu
iv. Mr. Zinti
v. Ms. Roselyn Ngobizitha
vi. Mr. Mgondisi Moyo
vii. Ms. Sithabisiwe Moyo
viii. Dr. Peeps Ngode

This opportunity was exploited to explain the objectives, duration and purpose of my visit and the possibilities the exchange programme had for the two institutions. The following were elaborated among other opportunities based on personal experience. The encouragement of regional educational and research in the areas of phytochemicals, textile and renewable energy, as captured in our ACE II theme included:

- Exchange of faculties/students;
- Collaborative research projects and joint publications;
- Joint supervision of postgraduate students;
- Exchange of information, library acquisition and publications;
- Special short-term programs for professional and academic groups;
- Promotion of lectures, research workshops, symposia, and other activities jointly developed by the universities.

A tentative counter schedule of activities prepared by the department was tabled and after deliberations, it was collectively adopted.

Some important observation made after the departmental meeting are:

- The department has achieved gender equality in terms of representation
- A good continuity in terms of skills and age distribution of staff
- Challenge of qualified staff to mount postgraduate courses

Meeting would be organised on a need-basis for the period of the visit.

An open door policy was agreed upon for consultations for the period the exchange staff would be at NUST. Everybody, staff and students were free to contact the visiting Professor any time. Clear communication lines were established between staff and the visiting professor.
Meeting with the Dean, Faculty of Industrial Technology, NUST
The meeting took place in the Dean's office. A presentation of the objectives of the staff exchange, its duration and outputs were explained. The Dean guided the discussions by introducing the Faculty of Industrial Technology as one of the University's three pioneer faculties that were established in April, 1991. The Faculty offers a five (5) different 5-year Bachelor of Engineering Honours Degree in the disciplines of Chemical Engineering, Civil and Water Engineering, Electronic Engineering, Industrial & Manufacturing Engineering and in Fibre & Polymer Materials Engineering (previously Textile Technology). The respective programmes are housed in the departments of:

1. Chemical Engineering
2. Civil and Water Engineering,
3. Electronic Engineering
4. Industrial & Manufacturing Engineering, and
5. Fibre & Polymer Materials Engineering

The School of Engineering at Moi University was introduced drawing on the many similarities between the composition of the Faculty of Industrial Technology and our School of Engineering. The School has 6 undergraduate programmes offering five (5) year Bachelor of Engineering degrees in Chemical and Process Engineering, Civil and Structural Engineering, Electrical and Electronics, Telecommunications Engineering, Mechanical and Production Engineering, and Industrial and Textile Engineering. These are housed in five departments, although we have a sixth department that is newly created that houses only postgraduate courses.

1. Chemical and Process Engineering Department
2. Civil and Structural Engineering Department
3. Electrical and Communication Engineering Department
4. Mechanical and production Engineering Department
5. Manufacturing, Industrial and Textile Department, and the youngest being
6. Department of Energy Engineering

In terms of specific programmes offered, we found almost a mirror reflection between the two universities. This is key when it comes to collaboration due to similarity of the requisite human and infrastructural facilities.

An interesting discussion erupted while trying to understand why NUST was only offering Electronic Engineering and not or with Electrical Engineering? Electrical is more basic and
important in supporting other engineering professionals in the Faculty while as Electronic is a bit of a specialisation of Electrical. In a nutshell and ideally, electronic should come after electrical engineering.

At the Postgraduate level, the Faculty of Industrial Technology at NUST has limited postgraduate programmes compared to the School of Engineering at Moi University. While at Moi we have seven MSc programmes and 3 PhD programmes, at NUST they have only a handful of MPhils.

The visiting staff took the opportunity to again explain the relationship between the academic programmes and the opportunities ACE II project has offered to Moi University, Kenya, and the East and Southern Africa region in areas of research and human resource capacity building. Other unique facilities at Moi University include the Rivatex factory and the many postgraduate programmes available. The already existing collaboration between the two universities that contributed to joint research and scholarship projects whereby staff participated in field research exchange and Masters' training featured. Specifically, the case of two staff from NUST who already benefitted or is benefiting from Masters Scholarship from another project (METEGA) hosted at Moi University was highlighted.

**Opportunities and Challenges**

Joint research was discussed as one area that we should target in order to strengthen our collaboration.

Postgraduate programmes: The Dean of the Faculty narrated the challenges they face at NUST, as a young university, with the development and implementation of postgraduate programmes, especially due to shortage of qualified staff and facilities. The staff exchange was identified as a possible vehicle to address this considering that MU has a strong human resource capacity. Possibility of exploiting this option was discussed.

**Meeting with the Vice Chancellor**

Arrangements had been made to meet the Vice Chancellor of NUST but this did not materialise because of the following reasons:

- The Vice Chancellor was newly appointed, and was barely two months in office at the time of the visit. This meant that he was still engaged in diverse university activities related to his full orientation in the office. Hence:
  - He was engaged in activities out of the office for a period of about a week,
• That he had major engagements with staff, students and stakeholders and therefore his dairy was fully booked and could not accommodate the courtesy call

The organising team therefore opted to organise for a meeting with the Pro-Vice Chancellor (that is the Deputy Vice chancellor)

**Meeting with Pro-Vice Chancellor - Professor Samson Sibanda**

The visiting faculty member took the opportunity to explain the objectives of the visit during this courtesy call. It turned out that the Pro-Vice Chancellor was:

A chemist by profession and therefore the activities related to Phytochemical, textiles and renewable energy (the main thematic areas of interest for Moi University, ACE II project) were of great interest to him.

That he had fond memories of Moi University, Eldoret, having visited the University and Eldoret town back in 1987 for a conference / workshop when Moi University was very young. The discussion therefore was very lively and briefing on how Moi University had grown in stature and student numbers was enjoyable. Academic matters relating to curriculum implementation, industry collaboration,

The Pro-Vice chancellor explained that NUST was made up of the following seven (7) faculties namely; Applied Sciences, Built Environment, Commerce, Communication & Information Science, Industrial Technology, Medicine and Science & Technology Education.

Opportunities for collaboration especially for the postgraduate programmes, joint research and staff exchange were endorsed as priority areas the two institutions should focus on. The Pro-Vice chancellor promised to give any required support towards making this a success.

**Visiting workshops and laboratories**

An important objective of the staff exchange programme is benchmarking, sharing of information, ideas and knowledge, and research and training facilities among collaborating institutions. Consequently, the component of visiting laboratories, workshop and other resource centres at NUST was paramount.

The Department organised for these visit to the Fibre and Polymer Materials Engineering labs, to the workshops for both Department and for Mechanical and Industrial engineering, chemical and Physical laboratories, DNA analysis laboratory, etc.
Workshops
Some selected workshop resources are provided in Figures 1 to 3.

Figure 1: standard bench vice and working table (Mechanical and Industrial engineering lab)

Figure 2: Standard drilling and tooling machines

One of the new machinery acquired by the University is the CNC machine. Computer Numerical Control (CNC) is the automation of machine tools by means of computers executing pre-
programmed sequences of machine control commands. The machine, shown in Figure 3 is used for manufacture of precision components.

![CNC Machine](image)

Figure 3: CNC Machine

In the training of the engineering students in the workshops and laboratories, interesting products have been fabricated either through reverse engineering or product design. This applied equally for the final year student projects. Using these laboratories and workshops, students have come up with innovative products that can be incubated and up-scaled.

To minimise on wastage and use of materials, machinery use and students’ time, the university plans for use of some of the products students develop under workshop practice. Since these are products made for academic use, the pricing of the products to the market is usually slightly lower than the current market price. In most cases, some of these products are fabricated to cater for the university requirements. A good example of such products is the rakes shown in Figure 4, which are made for commercial use.
Laboratories
As part of their research facilities, they have a component for energy studies which the department acquired from the Austrian Development Cooperation, see Figure 5.

Figure 4: tools (rakes) made by students being developed for commercial use

Figure 5: Solar energy analysis laboratory
It has the state of the art facilities for simulating solar energy studies as shown in Comparative solar power generation studies can be done. The facility would be very helpful for the PTRE-ACE II project especially the component of renewable energy.

In general, the textile laboratory at NUST has some of the standard testing equipment found in an ordinary physical and chemical testing laboratory. The testing equipment was purchased quite some time back, and some require replacement. However, they have one very remarkable equipment - a 3D printer shown in Figure 6.

![Figure 6: A 3D printer](image)

This is a very important piece of equipment for current research in digital 3-D polymer applications and manufacturing, which Moi University can benchmark and exploit for research. In a snapshot, 3D printing is any of various processes in which material is joined or solidified under computer control to create a three-dimensional object with material being added together (such as liquid molecules or powder grains being fused together). 3D printing is used in both rapid prototyping and additive manufacturing (AM). Objects can be of almost any shape or geometry and typically are...
produced using digital model data from a 3D model or another electronic data source such as an Additive Manufacturing File (AMF) file (usually in sequential layers).

**Supervision issues**

The departmental board meeting was used for a candid discussion on the matter of supervision. Importantly it was agreed that among other things, a successful supervision must be based on:

- Building a good Professor-Student working relationship, and
- That the student must understand the opportunities this relationship has for the student on their future endeavours.
- That the relationship is a mentorship for life.

Another important aspect discussed was the nature of expectations and methods of management:

- Supervisors should be well versed with the student’s work.
- Supervisor should show interest in the project.
- Quick responses from the supervisor
- Supervisor should add value to what the student is doing
- Supervisor should be approachable when a student has grievances and challenges.
- Supervisors should be patient.

It was acknowledged that no meaningful work can be achieved unless the students take the initiative and understands the responsibilities bestowed on them. These include:

- Delivering work on time.
- Making regular appointments with the supervisor.
- Students shouldn’t hide relevant information from the supervisor, and especially when not making good progress
- Students should have the initiative to meet the supervisor.

The discussion on the need and importance of publishing the research output by the student was tabled. The roadmap planning for the research must include strategies for publishing the work as key evaluation points, hence:

- Agreed that research work that cannot be published is of no value and therefore the output is technically unethical.
• That as part of the deliverables of student research work, and in most cases in line with university requirements, researchers should publish results from their work.

**Postgraduate training**

The department of Fibre and Polymer Materials Engineering at NUST is still young and therefore requires catalysing to ensure it grows. This growth can only be realised through postgraduate training. There is need therefore to build capacity that is capable of handling Masters (MPhil) and PhD supervision. The basic minimum for this is a PhD, as demanded by the respective commissions that hand university education in our countries. The team therefore agreed that:

• More PhDs be encouraged in the department for the bulk that have Masters degrees
• Those on staff development (without Masters) should enrol for masters studies immediately
• The capacity would in future assist in Masters and PhD supervision
• To ensure that the research work can attract funding to the department

In concluding this sub-topic, it was explained that:

• The department of Manufacturing, Industrial and Textile Engineering at Moi University has two Masters programmes (in Industrial and Textile Engineering) and 2 PhD programmes (in Industrial and Materials and Textile Engineering), a vertically integrated textile factory (Rivatex), among other facilities still open to NUST staff members. Areas of interest include phytochemicals, textiles, industrial engineering and renewable energy. Sponsorship is available from the African Centre of Excellence (ACE II). NUST staff who would like to spend their contact leave at the factory are most welcome.
• Proposals – which we should endeavour to develop multidisciplinary proposals that attract external funding. It was worth noting that MOI has benefited from ACE II due to its partnership with NUST which has been on-going for a sometime now. We have had similar projects that enhanced our positions.

**Postgraduate Guidelines**

Postgraduate guidelines differ from one institution to another and even from one discipline or programme to another within the same institution. To drive the point home, a comparison was
made between MPhil postgraduate programme at NUST and MSc programmes at Moi University. The differences and advantages of a taught MSc compared to a research only MPhil include:

- In the taught MSc, a student can select or participate in getting a guide on the research topic, this won’t happen in MPhil as there are no planned interactions
- Establish more contacts during lectures and therefore can get to interact with different lecturers who may guide on different aspects formally and informally, something that can’t happen in MPhil
- In MPhil, students are better more placed in research work since they have the time entire to conduct research without attending coursework
- In MSc, you may also get to study other areas/disciplines which widen your knowledge base and this comes in handy for multidisciplinary reason and project writing skills
- With MSc, skills and competences gained during taught courses are directly used during the research work planning and presentation sessions

In the circumstances of students enrolled in research only postgraduate programmes, the following was identified and suggested for adoption to ease the challenges:

- There is need for intensive interaction between supervisor and student before the start of the project to thrash out gaps in the planning
- That some students may not be able to communicate, hence provision for taking care of this shortcoming
- That students’ prior knowledge on experimental design is important since one cannot write a good proposal that is weak on experimental design and succeed.
- That a good work plan becomes the student’s ‘curriculum’ since there are no curricula for research hence the delays students face in conducting and completing field research

In conclusion, it was agreed that the department at NUST adopted the MPhil model due to lack of enough qualified supervisors. However, the department can initiate a taught Master’s programme running in parallel with MPhil, and exploit collaborations with other university professors for teaching. This would widen the student catchment postgraduate areas for the department.

**Handling of DPhils**
The same conditions stated above for an MPhil equally apply for the DPhil. Another important issue to consider is that when graduates of MPhil enrol for PhD in institutions other than the one they
graduated from for their MPhil, there is likelihood that they would be subjected to a minimum coursework.

For both MPhil and DPhil, minimum institutional requirements to be met prior to graduation must be observed. In most cases, a minimum number of publications and conference presentation will be defined.

**Possible Scholarship Funding opportunities**

In view of the large number of members of staff in the department needing either to pursue their Masters or PhD studies, exploring scholarship opportunities became a priority. The discussion was open ended hence it was converted into a brainstorming session. In the end, the following were identified:

**NUST Research Fund:**

In spite of the many financial challenges that the university still faces, it still gives a descent amount of funds towards research. It was reported that up to US$10,000 can be availed towards MPhil research. Important requirements under ‘terms and conditions’ attached to the funding is the publishing the results in the NUST Journal.

**The South Africa National Research Fund (NRF)**

The South African NRF body is one of the most reputable research funder for scholars registered under South African Universities. With the strong connections Zimbabweans have with South African universities, the staff should exploit this opportunity. It is worth noting that NRF not only support journal publications, but also award scholars who publish according to the ranking of the journal.

**DAAD Deutscher Akademischer Austausch Dienst – Germany Academic Exchange Service**

One of the most dependable and generous funder for Masters, PhD and research in the African continent for over 40 decades has been the DAAD. This is further supplemented by the fact that DAAD offers one the most flexible scholarship system: supports scholars in their home country, within any other institution with Africa and also exclusive funding for the same within Germany. Recently, DAAD has collaborated with National orgisations that support similar efforts like NACOSTI in Kenya for other special cadre of scholarships where scholars have sandwich status ie in home and German institutions.
The PTRE ACE II project at Moi University (whereby NUST is one of the partners) has one of its objectives being to support Masters, PhD and research for scholars from home country and the African region. Therefore, those seeking Masters and PhD scholarships can freely contact the NUST contact person for further details on how to apply. Currently there are open opportunities which we hope staff will come forward for.

Commonwealth Scholarships
Zimbabwe recently received a warm welcome back to the club of Commonwealth of Nations. This is a good chance for Zimbabweans to again explore possibilities for acquiring the Commonwealth scholarships – Masters, PhD and Postdoc fellowships.

The Flemish Inter-University Council – Institutional University Cooperation Scholarships -Belgium
The Flemish Inter-University Council - Institutional University Cooperation (Flemish acronym VLIR-UOS), on behalf of the Belgian government and Flemish Universities has over the last 20 years been supporting international scholars from developing countries. This is the organisation that administers the academic support on behalf of the Belgian government, for the Flemish part of the country. They award scholarships to applicants from 31 eligible countries in Africa, Asia and Latin America to attend trainings or master's programmes taught in English at a Flemish university or university college. There are scholarship opportunities also for doctoral studies. The 5 main universities (to which university colleges are affiliated) are Ghent University, University of Antwerp, Free University of Brussels (VUB), Katholieke University of Leuven (KUL), University of Hasselt. VLIR-UOS also supports partnerships between universities and university colleges in Flanders (Belgium) and the South looking for innovative responses to global and local challenges. More information can be found at www.vlir.be

Flemish Universities (Belgium)
The individual Flemish universities normally have internal scholarships that they occasionally advertise and create scholars again mainly from developing countries. These scholarships are normally open for specific disciplines, and major a science based. The terms and conditions are outlined by the individual universities. Information can be found in their respective websites.
Chinese Government Scholarship (CSC) and Shanghai Government Scholarships (SGS)
In the last 20 years or so, China has emerged as a significant sponsor for international scholars wishing to pursue postgraduate studies in Chinese universities. These range from Masters to PhD and Postdoc. There are two main sponsors:

- The Chinese Government Scholarship (CSC) and
- Shanghai Government Scholarships (SGS) and other similar state governments scholarships

These scholarships are relatively open-ended, and since some members of staff in the department of Fibres and Polymer Material Engineering are beneficiaries of the scholarship schemes, connecting with the administrator of the scholarships and the requisite conditions to be met can be shared from with staff from within.

Personal Contact networks
There is a strong and invisible source of scholarships that can deliver under some of the most challenging circumstances and this is the network of friends in academics. It is therefore useful to maintain your networks open for friends and colleagues in those institutions.

From the discussion, I was revealed that currently NUST does not continue providing salary for those proceeding on full time study leave since other lecturers need to be engaged to take up the work load left behind by those proceeding to studies. This has a small negative ripple effect in that the staffs therefore become choosy on the quantity of funds scholarship support offer. This is understandable since they have to take care of their families even during the period of study.

Student activities (Undergraduate)

The timing of the staff exchange visit fell within a week to the start of examinations at NUST for the undergraduate students. Possibility of teaching was therefore eliminated but this provided an opportunity to observe formative and summative assessment and evaluation processes and procedures adopted at the university. The visiting faculty member therefore had students’ activities and engagement handled along the following thematic areas:
Final year projects
The students were still in the process of developing and finalising their final year engineering projects. These students had individual projects and therefore the interaction was on a one-to-one basis. The list of some of the project titles discussed in depth is given below:

- Use of leather trims waste in composite materials
- Developing water resistant mattresses protection using kapok fibres
- Development of natural based hybrid composites from jute fabric and milled carbon fibres for the automotive industry
- Development of hybrid composites using fly ash corn husks reinforced polymer for sound proofing
- Use of jute potassium perchlorlite composites for moisture control in agriculture
- Development of adhesives from natural latex from locally available trees
- Development of a composite film from keratin-starch-chitosan bio-fibres
- Reinforcement of bitumen with PET/PVC composites in road construction

The discussions and advice centred on the sciences principles employed, design, practicability and researchability, innovativeness and applicability.

In conclusion, all the students had practical oriented projects that proposed to solve locally existing problems within the industries (some collaboratively with industry) or the society with local solutions.

Supervision
Student supervision is an important component of training, mentoring and evaluation. The process is supposed to be a two way process and therefore has shared responsibility. NUST students were found to have similar traits like those from Moi.

Administration and Invigilation of examinations
As part of the benchmarking process, I was taken through the process of administering and invigilating of exams at NUST both theoretically and practically. All the university examinations are conducted in one main hall (the amphitheatre), where chairs and desks are arranged according to faculty and then departments, with clear labelling of the specific examination to be done. Wall clocks are displayed all over for the students to take note of time left. A display board is maintained outside the hall to allow easy reference.
The invigilation process is driven by: the main invigilators, an invigilator from department, officers from university examination office, Chairperson of the department and main course examiner (course lecturer)

The main invigilators is a special team university engages comprising of experienced, educated, respected and strong personnel who are not university staff but mainly retired citizens to be the main invigilators of university examinations. These senior citizens take care of all administrative procedures and make reports on conformity to laid down examination processes. They normally ensure and report on the attendance to the examination of the following:

- That the main examiner (course lecturer) reports 30 minutes before the start of the specific examination paper to ensure the right exam and number of question papers and scripts are available. (S)he remains in the examination room up to 15 minutes after the start of the examination to clarify all queries students have, and leaves the hall for good. The reasoning behind this is that students get tensed when examiner is in the hall, and that they are more relaxed in the absence of the examiner.
- That the departmental invigilator, the chairperson of the department and other university invigilators take over the process to the logical end. All examiners and invigilators sign attendance records.
- They file reports on any incidents that occur during the exams
- They use metal detectors to frisk students any unauthorised materials
- Ensure that no student enters the examination unless they have cleared all fees balances
- Other specific responsibilities are that students submit individual registration forms at the entrance and later sign while submitting they answer scripts.
- That the examination departmental staffs delivers all exam papers to the Main (external) Invigilators at the examination hall at least one hour before the start of the examination paper,
- That the internal (departmental) invigilators collect exam papers from main invigilators and place them upside down on the desks
- Once open, the examiners proof read the papers and perform any desired corrections or anomalies
Attachment
Collaboration with the industry helps the department in their process of attaching students in industries for a period of six (6) months.
The department had planned well for the interactions with students and therefore everything ran smoothly and efficiently.

Joint research and grants application
The status of part of the economy for Zimbabwe is much similar to that of Kenya. This is purely from the fact that the two countries’ economy is agricultural based. Looking through the thematic areas of the project, we realized that the area of leather development is central to the two economies and a lot can be achieved in this front.
This was squarely reinforced by the number of students at NUST focusing on the leather-related topics.
The team therefore settled on developing a proposal on waste elimination in the leather sector as the activities cut across the two countries. The visiting faculty will develop the concept and share it with the NUST team by July 2018.

Collaboration areas including formalization of MOU
The NUST team and the visiting staff held a meeting whereby a draft Partnership Agreement (PA) shared in advance was discussed clause by clause, see Figure 7. The main areas of interest that needed extensive contributions included: Staff exchange, student exchange, student supervision, scholarships opportunities, and joint research proposals.
Although Dr. A.B. Nyoni, the contact person in NUST for the PTRE-ACE II was not available for this meeting due to engagements in other university duties and hence out of town, his role in the project was well explained. Indeed, some of the departmental staff were already aware of some of the application details.
In the discussion, some elements in certain clauses appeared vague. These include:
- The clause on consultancy in the field of engineering; the question being why not in ALL possible fields where the expertise can contribute?
- The Masters and PhD scholars from Zimbabwe eligible for student scholarships; is it limited to members of staff from NUST only or non-staff Zimbabweans could apply?
- Staff and student exchange programme; who are eligible at NUST?

Other comments and statements in the document that had been unclear or not suitable for NUST were edited inline and the document with this input is attached for further processing. If Moi University and PTRE – ACE II is comfortable with the input from NUST after the comments from their legal officer, then the memorandum can be signed.

**Modality of staff exchange and joint supervision**

This section deals with some of the concrete ideas that were discussed concerning staff exchange (both staff and student staff), staff-students registered at NUST for both exchange and joint supervision. The two items will be discussed independently.

**MPhil students’ projects**

There are currently three (3) staff members who are registered for MPhil at NUST. They had been sensitised and therefore had prepared for the discussions. The engagements involved individual presentations followed by thorough analysis whereby comments on how to improve were shared. In essence, the following three student topics were discussed:

1. Enhancement of the functional properties of leather waste gelatine with indigenous fruit extract
b) Preparation and Characterisation of Leather Boards Prepared From a Mixture of Chrome Tanned Leather Waste and Cyperus Textilis Fibres for Automotive Interior Applications

c) Eco-friendly dyeing of leather

To complement the development of the proposals, the 3 MPhil students were taken through the process of preparing a log-frame matrix in a classroom setup. This involved the following process:

- Identification of the specific objectives
- Breakdown of each objective into a number of activities to be executed that enable the specific objective to be realised
- Quantification of procedures, materials and methods for actualising each activity to completion
- Costing of each activity to determine the budget for the activity, each specific objective and summation over the entire objectives hence determination of the entire project budget

In the process of working out the methodology (procedures and processes) for attaining the objectives, we demonstrated the correlation between the objectives and the outputs, conclusions and recommendations.

**Staff / Student exchange**

The possibilities of student exchange and support for conferences are contained in the proposed project Partnership Agreement (PA). There are opportunities for a NUST students and staff to undertake this activity to evaluate equipment available or work on their proposal.

For the staff, a position exists where a staff from NUST can make an exchange visit for a minimum and maximum of 14 days.

**Joint supervision**

The Department was in agreement that they would appreciate the contribution of the Moi University staff on joint supervision especially for the postgraduate students. This arrangement could help the department even start taught Masters programme. The staff from Moi are more than willing to assist in the joint supervision process.

**University – industry linkages:**
The department was kind enough to share details of how they have formulated and reinforced strategies that have enhanced their University-Industry linkages.

**Opportunities**

**University's support for contact leave (Staff attachment)**
NUST had a fantastic policy of contact leave (staff attachment) right from inception of the Faculty that enabled staff to spend a month in relevant industries in and out of the country for one month yearly. This was judiciously implemented when the economy was doing well, up to about the year 2009. The department had a unique opportunity of exploiting the contacts established for placement of both staff and students. The department has a good history of industry collaboration, something they have harnessed and improved our time. This grew into a strong bond that again helped anchor courses and projects to addressing practical industrial challenges. The remnants of that goodwill between the university and the industry still exist.

**Funded projects like EEEP**
The department has been holding regular workshops together with the industry for some time. Through these workshops, brainstorming sessions are held to discuss matters of mutual interest whereby both the university and the industry defines their needs and requirements. The industries have been attaching and training lecturers in their industries, and this has helped the lecturers in curriculum delivery. The departments have been identifying the core areas of the curriculum and finding corresponding industries related to them for collaboration implementation. University has been exploiting funded projects to meet their costs of attaching their staff. The beauty has been that industries do not need any financial facilitation to attending meetings or workshops organised in the university.

To make a real impact on the collaboration and to ensure its sustainability, the benefits of both industry and university are laid bare. The university has been targeting top industry personnel (General Manager, Managing Director, CEO, etc. as their industry counterparts.

**Challenges**

**Closure of Industries**
The closure of major manufacturing industries in the country due to economic difficulties and at times unfavourable production environment has led to difficulties in student and staff placement considering that student numbers have also increased with time.
Poor Industry Cooperation
The experience here is that most of the private industries provide an easy access to their facilities to both staff and students from the university. Unfortunately, government controlled industries have a serious red tape (bureaucracy) that has hampered accesses. According to the department’s experience, reference to government headquarters in Harare for approval many a times has led to missed opportunities for both university and the industry.

Industry Visits
This activity was implemented by a selected team of academic staff from Fibre and Polymer Materials Department together with the visiting scholar. A number of industries were visited as outlined below:

Rubber and Belts industry
This factory is co-owned by the private sector jointly with the Zimbabwean government. Arrangements were made to facilitate the visit but unfortunately due to communication breakdown, no response had been received from Harare on the material day, when the team had arrived at site. The team therefore could not be admitted into the factory for the planned visit.

Zimbabwe Grain Bag (Pvt) Limited
The company manufactures grain bags. The company was founded in 1986 and is based in Bulawayo, Zimbabwe. It operates as a subsidiary of Treger Products (Pvt) Ltd. Zimbabwe Grain Bag is a leading manufacturer of woven polypropylene packaging and is renowned for its proven track record for manufacturing large quantities of anti-slip full specification grain storage bags. Printed packaging bags for stock feed and for other agro industrial sectors. BOPP laminated packaging to supply roller meal market. Flexible Intermediate Bulk Containers (also known as Bulk Bags for export of minerals).

The team made a guided tour through the factory. It starting raw material is polymer chips for Polyester, Nylon and Polypropylene. The manufacturing processes include:

- Melting of chips followed by extrusion
- Drawing and waxing/oiling followed by winding
- Preparation of warping packages
- Weaving of the bags,
- Sewing of the bags according to customer size requirements
• Printing of bags according to client needs
• Finishing and inspection of the bags

The team was appreciated the level of automation the company has achieved, and the diversity of products made. These are some of their products:

- Grain bags
- Fertilizer bags
- Soda ash and salt bags
- Bulk bags
- Cement bags
- Poly woven cloth
- Chemical bags
- Sugar bags
- Mining bags

The team was ushered to meet the managing director of the company and used this opportunity to thank the company for their continued support over the years through participation in workshops, curriculum review, student and staff attachment and opportunities for factory visits.

**Leather Sector industry**

The team visited industries processing and manufacturing leather products. Through COMESA, the sector has been supported in acquiring modern shoe manufacturing equipment. Although the activities are still low, there is huge potential. The team was able to identify gaps in the sector; related to processing, manufacturing and capacity building in skills and competences. Collaboration between university and industry is important for the growth of the sector.

**Wrap up meetings**

The wrap up meeting was organized in Bulawayo town where all the members of the department available attended. The meeting was chaired by the Departmental Chairperson Prof. L.C. Nkiwane. It was a lunch–cum lap-up meeting.

Among the key issues agreed upon took place with

**Departure:**
I departed from Joshua Nkomo International Airport - Bulawayo on Sunday 20th May in the afternoon for Nairobi en-route through Johannesburg, South Africa.

Figure 8: Joshua Nkomo International Airport - Bulawayo

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