



Botswana International University
of Science & Technology

RESEARCH FLASH

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Issue 39

ANNOUNCEMENTS

PURE AND ORACLE INTEGRATION SUCCESSFUL



The BIUST PURE Award Management Module and Oracle Integration Team, which consisted of representatives from the Research and Development Directorate, Information and Technology Directorate and Finance Directorate, has successfully completed the **PURE Award Management Module** and **Oracle system** Integration.

The Pure Award Management module enables researchers to track, monitor and manage the entire research life cycle, from current funding opportunities, applications and their success rates, to awards and the related projects, as well as their outputs.

The integration would allow researchers to view the financial status of their grants from PURE anytime. The summarised financial status would reflect the real time budget vs actual expenditure of the project award.

ACCESS TO PURE - Research Information Management System

Go to: <https://biust.pure.elsevier.com/admin/login>

DEBSWANA AND BIUST SIGNS MOA FOR RESEARCH AND DEVELOPMENT OF BLASTING MODELLING USING ARTIFICIAL INTELLIGENCE



Prof. Rodrigo Jamisola Jr, Principal Investigator

BIUST and Debswana signed a memorandum of agreement for the research and development of artificial intelligence software to model and predict blasting. The agreement signed by Mr. T. Mompoti on his capacity as Debswana Head of Mining, and Prof. O. Totolo on his capacity as the BIUST Vice Chancellor will see Prof. R. S. Jamisola Jr. as the principal investigator receive just over **BWP 1.6 million** for the cost of the project.

This project is expected to advance the fourth industrial revolution in Botswana mining industry. Though Botswana wishes to diversify from mining, it is her wish to advance towards a knowledge-based economy. Incorporating artificial intelligence in mining decision processes and building local software as a solution to local problems drives Botswana to achieve her dream of a knowledge-based economy, supported by technology and BIUST is strategically placed to drive this change.

PROF. ADANE ABRAHAM WINS THE ALEXANDER VON HUMBOLDT FOUNDATION RESEARCH GROUP LINKAGE PROGRAMME FUNDING



Prof. Adane Abraham

BIUST's Prof. Adane Abraham from the Department of Biological Sciences and Biotechnology together with his colleague Dr. Gaolathe Rantong and his PhD student Mr Donald Omphile Kelemoge has been awarded a research grant from Alexander von Humboldt Foundation Research Linkage Program, Germany worth 54,896 euros. The approved research project entitled "**Molecular Diversity, Distribution and Importance of Viruses Causing Diseases on Legume Crops in Botswana**" is a collaborative effort with Dr. Wulf Menzel and his colleagues from German Collection of Microorganisms and Cell Culture-DSMZ, Germany.

The research aims to contribute to improved food security and income generation of the subsistence farmers growing legume crops in Botswana by generating scientific information leading to the development of effective management of virus diseases infecting the crops. The grant which has provision for reciprocal exchange visits by BIUST and DSMZ scientists involved in the project is also expected to lay a foundation to establish long-lasting research linkage between the two institutions.

PROF. NYAMUKONDIWA AWARDED BY THE GLOBAL RESEARCH FUND



Prof. Casper Nyamunkondiwa

Prof. Casper Nyamunkondiwa from the department of Biology and Biotechnological Science has been awarded an amount of **GBP 7,977** under a collaborative project titled EARTH OBSERVATION FOR WEATHER-SMART WORM CONTROL (GoatSat) which runs for a period of 2 years.

The collaborative GoatSat project comprising of multidisciplinary teams from Queens University Belfast, Rothamsted Research, University of Reading, University of Malawi, Lilongwe University of Agriculture and Natural Resources, University of Pretoria and BIUST, aims to generate disease risk forecasts, and to transform them into effective decision support tools for farmers and supporting organisations. The goal will be achieved through combination of state-of-the-art remotely sensed rainfall data with climate-driven models of helminths parasite biology to produce a disease forecasting tool that helps alert farmers to period of high helminths parasite risk and stimulate timely and threshold-based application of targeted treatment approaches and nutraceutical intervention.

ASTRONOMY IN THE BLINK OF AN EYE: SEARCHING FOR THE FASTEST EVENTS IN THE UNIVERSE



Dr. Emily Petroff



Dr. Jacobus Diener, Co-host

Dr. Emily Petroff from the University of Amsterdam/McGill University gave a talk on the discovery of brand-new type of transient called fast radio bursts, bright radio pulses that last only a few milliseconds and some of the most exciting new breakthroughs, Co-hosted by Dr. J. Diener and Astronomical Society of Botswana. Their origin is one of the newest unsolved mysteries of astronomy.

Dr. Emily Petroff is an astrophysicist jointly appointed as a Veni Fellow at the University of Amsterdam Anton Pannekoek Institute in the Netherlands and as a manager of the CHIME/FRB Collaboration based at McGill University in Canada. Her research has made her a leader in the study of fast radio bursts, mysterious distant radio sources that we are just beginning to understand.



RESEARCH ETHICS AND INTEGRITY AT BIUST

Research integrity is a topic that addresses adherence to ethical principles, national laws, institutional policies, and professional standards. All these components are important building blocks for the responsible conduct of research and can be traced back to the past four decades (Ndebele, 2015).

In the quest to uphold the ethics and integrity of Research, BIUST has policies that guides researcher on ethical research conduct namely,

- i. Code of Conduct for Research and Innovation
- ii. Human Research Ethics Policy

Furthermore, SENATE RESEARCH & INNOVATION COMMITTEE established three (3) sub Ethics review committees as follows:

- i. **Animal Research Ethics Committee** - to ensure the ethical and humane welfare and use of animals for scientific research purposes.
- ii. **Human Research Ethics Committee** - to ensure that all University research and relevant teaching activities involving human participants conform to ethical standards.
- iii. **Biosafety Research Ethics Committee** - to provide guidance on practices of minimizing health and environmental hazards related to biological agents used in research and teaching.

The committees comprise of the following members of BIUST staff, with Ms.Lediranye Motshidisi being the Secretariat of all committees:

Animal Research Ethics Committee	Prof. Boikanyo Makubate - Chair Dr. Tebogo Kwape Dr. Casper Nyamukondiwa Dr. Tsaona Mokgwathi Dr. Orapeleng Keletso Dr. Gaobotse Gaobotse
Human Research Ethics Committee	Prof. Goitseone Malumbela - Chair Prof. Amare Gessesse Dr. Lesedi Lebogang Dr Modisa Mosalaosi Dr. Gladys Gamariel Ms. Keneilwe Ogopotse
Biosafety Research Ethics Committee	Prof. Tsidu Mengistu - Chair Dr. David Nkwe Dr. Nerve Zhou Dr. Dawn Lyken-Segosebe Dr. Moatlhodi Wise Letshwenyo Ms. Maureen Kapunga

GET INSPIRED with Mr. Desmond Munyadzwe



This month's guest for our get inspired Q&A is a student researcher with the Mining and Geological Department, doing his master's degree in Mining Engineering. He has a track-record in decision modelling, mining productivity analysis, and mine management studies, with focus in mining project valuation and financial analysis. Desmond works as research assistant at the office of Research and Development. He spends his spare time advancing postgraduate matters including their research impact in the BIUST community.

Personal and Academic Background

I am an aspiring academic entrepreneur from Mathangwane. I did my basic education in Mathangwane and moved to Tonota for senior school - Shashe River School. I graduated with first class in BEng Mining Engineering from BIUST, class of 2019 and I'm currently pursuing my master's degree with BIUST.

Journey in BIUST

I'd consider BIUST to be my second home. I graduated a salutatorian for my bachelor's degree in BIUST and I'm also doing my master's degree in BIUST. Most of my career was built in BIUST. I joined BIUST in 2014 as a freshman and swiftly assimilated to the community through various success stories that involved giving back to the community. Beyond my academic prowess, I was actively involved in student governance and support structures, from founding a student academic and research support club for Mining Engineering students, to co-founding the Living and Learning Community in BIUST student residence, I had a positive role in moulding the academic and living experience for BIUST students.

Experience with funding

The university has provided me with an initiation grant of approximately P30,000.00 to undertake my research work. This has enabled me to purchase and rent resources that are necessary to model the outsourcing decision problem in the mining industry. I have been able to build a multicriteria decision analysis model for contract mining in Botswana, which is not only the first in Botswana, but in Africa and most developing economies. The model will enable mining professionals to objectively balance all criteria in selecting contract mining regimes for their mines, considering all aspects from Profits, Planet, and People.

Successfully Publishing Research Outputs

I have managed to publish an article from my undergraduate studies as one of the few if not the first student in my department to do so. Our area of study generally has the least publication mainly due to more professional than academic focus to the area and limited data and data

restrictions from the mines. Publishing requires a high level of commitment to sharing knowledge, ethical consideration, and the desire to make an impact. It is not merely a process to improve one's status in their academic profile but to create a meaningful impact to the world.

Point of View on Work-Life Balance

Everything I do, is well planned for. I determine my annual goals every new year and work on them. My career goals are separate from my family and balance goals. I value the time I spend with family and friends, on my health and at church as much as I value my career, so the strict but adjustable career and balance goals keeps me going. I strongly believe that everyone is a product of their thoughts and a sum of the company they keep - that's my motto.

FUNDING OPPORTUNITIES

CAPACITY BUILDING IN THE FIELD OF HIGHER EDUCATION

The Capacity-Building in Higher Education (CBHE) action supports international cooperation projects based on multilateral partnerships between organisations active in the field of higher education. The activities and outcomes of CBHE projects must be geared to benefit the eligible third countries not associated to the programme, their higher education institutions, and systems.

OBJECTIVES OF THE ACTION

- Improve the quality of higher education in third countries not associated to the programme and enhance its relevance for the labour market and society.
- Improve the level of competences, skills, and employability potential of students in HEIs in the third countries not associated to the programme by developing new and innovative education programmes.
- Promote inclusive education, equality, equity, non-discrimination, and the promotion of civic competences in higher education in the third countries not associated to the programme.
- Enhance the teaching, assessment mechanisms for HEI staff and students, quality assurance, management, governance, inclusion, innovation, knowledge base, digital and entrepreneurial capacities, as well as the internationalisation of HEIs in the third countries not associated to the programme.
- Increase the capacities of HEIs, bodies in charge of higher education and competent authorities of third countries not associated to the programme to modernise their higher education systems, particularly in terms of governance and financing, by supporting the definition, implementation and monitoring of reform processes.
- Improve the training of teachers and continuous professional development to impact the longer-term quality of the education system in the third countries not associated to the programme.

- Stimulate cooperation of institutions, capacity building and exchange of good practice.
- Foster cooperation across different regions of the world through joint initiatives.

Closing date: February 1, 2022

For further information visit: <https://www.kuleuven.be/global/projects/educational-programmes/erasmus-plus/capacitybuilding>

DAAD Postdoctoral Fellowships in Sub-Saharan Africa

The German Academic Exchange Service (DAAD) invites applications for its postdoctoral fellowships in sub-Saharan Africa. These enable postdoctoral researchers from sub-Saharan Africa to conduct cooperative research at selected universities within the region. Projects may be carried out in any subject area with strong relevance to national or regional development.

Current or prospective teaching or research staff at a sub-Saharan university or research institution, holding a PhD degree, may apply. Applicants should have completed their PhD degree less than six years ago and must be invited by a host institution. Candidates must be nationals of a sub-Saharan African country.

Closing date: You can apply for this opportunity at any time. Applicants should refer to the deadline information indicated by the specific institution..

For more information visit:

<https://www2.daad.de/deutschland/stipendium/datenbank/en/21148-scholarship-database/?detail=57191387>

PROSPECTIVE CALL: Seed Grant for New African Principal

With the support of the German Federal Ministry of Education and Research (BMBF), The World Academy of Sciences (TWAS) launches a new programme to strengthen the capacity of African countries lagging in science and technology. The new programme is aimed at young scientists who are getting established in their country or about to return home to an academic position. Under this scheme, grants are awarded to promising high-level research projects in Agriculture, Biology, Chemistry, Earth Sciences, Engineering, Information Computer Technology, Mathematics, Medical Sciences and Physics carried out in African countries lagging in science and technology identified by TWAS.

Eligibility

- Applying *Principal Investigators* must be nationals of an eligible country, who holds a PhD and has good research experience. The grant should operate within a university or a research institution in one of the African countries lagging in

science and technology. The PI must be 40 or under. Any applicant turning 41 in the year of application is not eligible.

- The PI must have obtained their Ph.D. within the last 5 years in a country other than their home country.
- The PI must have returned to their home country (refer to list in the guidelines) within the last 36 months or will return home before the end of 2021.
- The PI must hold, be offered or be in the process of accepting a position at an academic and/or research institution (including international research centers) in their home country.
- The PI must be national of an eligible African country that is lagging in science and technology (refer to list in the guidelines).
- Applicant must at the time of application NOT have an active research grant with TWAS or OWSD Early Career Women Scientists (ECWS) Fellowship.
- Applications from women scientists and those working in Least Developed Countries are especially encouraged.
- The applicant must submit a strong Research Proposal, you may find further information on how to write a strong proposal by visiting [AuthorAID](#).
- Please be advised that applicants may apply for only one programme per calendar year in the TWAS and OWSD portfolio. Applicants will not be eligible to visit another institution in that year under the TWAS [Visiting Scientists](#) the [Visiting Professor](#) programmes. One exception: The head of an institution who *invites* an external scholar to share his/her expertise under the TWAS [Visiting Professor](#) programme or the TWAS [Visiting Expert](#) programme may still apply for another programme.

Deadline: *Call will open in 2022*

For further information visit: <https://twas.org/opportunity/seed-grant-new-african-principal-investigators-sg-napi>

BIUST Academics' Recent Research Contribution

	Book/Book Chapter	Authors	Date	Source title & Link
1.	Ethiopian Lakes as paleoenvironmental and paleoclimate archives	Schaebitz, F., Lamb, H., Asrat, A., Trauth, M.H., Vogelsang, R., Viehberg, F.A., Foerster, V.	Nov-21	In Litt, T., Richter, J., Schäbitz, F. (eds.), The Journey of Modern Humans from Africa to Europe: Culture-Environmental Interaction and Mobility 14-21. DOI: https://doi.org/10.1016/j.quascirev.2021.107219
	Journal Contribution	Authors	Date	Source title & Link
1.	Deformation Monitoring of Dam Using GPS: Case Study Letsibogo Dam, Botswana	Selassie D. Mayunga, and Bokamoso R.	Nov-21	Journal of Earth Science and Engineering 9 (2021) 20-28 doi: 10.17265/2159-581X/2021.01.004
2.	The Carbonate-catalyzed Transesterification of Sunflower Oil for Biodiesel Production: in situ Monitoring and Density Functional Theory Calculations	Nyepetsi, M., Mbaiwa, F., Oyetunji, O.A., Dzade, N.Y., & de Leeuw, N.H.	Nov-21	South African Journal of Chemistry, 74, 42-49. https://dx.doi.org/10.17159/0379-4350/2021/v74a8
3.	"Hierarchical multilevel optimization with multiple-leaders multiple-followers setting and nonseparable objectives"	Addis Belete Zewde and Semu M. Kassa	Nov-21	RAIRO - Operations Research, 55 (5), 2915 - 2939. Doi: https://doi.org/10.1051/ro/2021146
4.	Changes in the cyclicity and variability of the eastern African paleoclimate over the last 620 kyrs	Duesing, W., Kaboth-Bahr, S., Asrat, A., Cohen, A.S., Foerster, V., Lamb, H.F., Schaebitz, F., Trauth, M. H. Viehberg, F.	Nov-21	Quaternary Science Reviews, 273: 107219. Doi: https://doi.org/10.1016/j.quascirev.2021.107219
5.	An integrated use of induced polarization and electrical resistivity imaging methods to delineate zones of gold mineralization in the Phitshane Molopo area	Pabalelo Sono, Elisha M. Shemang, Boniface Kgosidintsi and Thato Seane	Nov-21	Journal of African Earth Sciences Volume 174, February 2021, 104060. https://doi.org/10.1016/j.jafrearsci.2020.104060
6.	A comparative study on the comminution behavior of diorite rocks	Gaesengwe, G., Mamvura, T. A., Danha, G. and Sibanda, V.	Nov-21	Heliyon 7, e08337. https://doi.org/10.1016/j.heliyon.2021.e08337
7.	Investigating the effect of lip froth washing on coal yield during flotation of a high ash South African coal	du Plessis, C., Sibanda, V., Dworzanowski, M., Danha, G. and Mamvura, T. A.	Nov-21	Physicochemical Problems of Mineral Processing, 57(6), 169-181. https://doi.org/10.37190/ppmp/143171 .
8.	Biosurfactant production by halophilic yeasts isolated from extreme environments in Botswana	Daniel Loeto, Mosimanegape Jongman, Lerato Lekote, Mbaki	Nov-21	FEMS Microbiology Letters, Volume 368, Issue 20, October 2021, fnab146, https://doi.org/10.1093/femsle/fnab146

		Muzila, Margaret Mokomane, Koketso Motlhanka, Thando Ndlovu, Nerve Zhou		
9.	Automatic animal identification from drone camera based on point pattern analysis of herd behaviour	Tinao Petso, Rodrigo S. Jamisola, Dimane Mpoeleng, Emily Bennitt, Wazha Mmereki	Nov-21	Ecological Informatics, 66 (2021). 101485 https://doi.org/10.1016/j.ecoinf.2021.101485
10	Photocatalytic and toxicity evaluation of local dyeing wastewater by aluminum/boron doped WO ₃ nanoparticles	J.O Tijani, M.N Abdullahi, M.T Bankole, S Mustapha. T.C Egbosiuba. M. N Ndamiso A.S Abdulkareem and E. Muzenda	Nov-21	Journal of water process engineering. www.elsevier.com/locate/jwpe
11	Thermo-economic analysis of solid oxide fuel cell using human waste as a source of fuel	A.E Afolabi, K. Sunday, A.S Abdulkareem, Y.O Abdulsalam, A.S Kovo and P. Oladejo	Nov-21	Scientific African. www.elsevier.com/locate/sciaf
12	Environmental and Socioeconomic Impact of Copper Slag—A Review	Gabasiane, Tlotlo S., Gwiranai Danha, Tirivaviri A. Mamvura, Tebogo Mashifana, and Godfrey Dzinomwa	Nov-21	Crystals 11, no. 12: 1504. https://doi.org/10.3390/cryst11121504
13	Green synthesis of multilayer Graphene/ZnO nanocomposite for photocatalytic applications	Dineo P. Sebuso, Alex T. Kuvarega, Keadiretse Lefatshe, Cecil K. King' ondu, Nagla Numan, Malik Maaza, Cosmas M. Muiva	Nov-21	Journal of Alloys and Compounds, Elsevier Ltd, Vol. 900, 163526. https://doi.org/10.1016/j.jallcom.2021.163526
14	Effect of low energy Ag ⁺ ION implantation ON ZnO nanorods for enhanced visible light absorption-structural and optical analysis	Keadiretse Lefatshe, Cosmas Muiva and Morgan Madhuku	Nov-21	Optical Materials, Elsevier Ltd, Vol. 122, 111757. https://doi.org/10.1016/j.optmat.2021.111757
15	Neoarchean arc magmatism and Paleoproterozoic high-pressure granulite-facies metamorphism in the southern Motloutse Complex, eastern Botswana: Implications for the western extension of the Limpopo Complex	Thembisio O. Basupi., Toshiaki Tsunogae., Kazuki Takahashi., Yukiyasu Tsutsumi	Nov-21	Precambrian Research 369, Article 106534, p1-20. doi: 10.1016/j.precamres.2021.106534"
16	Dichrostachys cinerea: Ethnomedicinal uses,	Ofentse Mazimba*, Tebogo E. Kwape	Nov-21	The Natural Products Journal, Volume 12, Issue 7, 2022, ISSN: 2210-3163 (Online),

	phytochemistry and pharmacological activities - A review	and Goabaone Gaobotse		DOI: 10.2174/2210315511666210806144540"
17	Screening Maize Genotypes for Resistance to Maize Lethal Necrosis Disease in Ethiopia	Bayissa Regassa, Dagne Wakgari, Chemedi Fininsa and. Adane Abraham	Nov-21	Tropical Plant Pathology 46: 583-595
18	Non-invasive smart implants in healthcare: Redefining healthcare services delivery through sensors and emerging digital health technologies	Goabaone Gaobotse , Elliot Mbunge, John Batani, Benhildah Muchemwa	Nov-21	Sensors International, 3 (2022) 100156, DOI: https://doi.org/10.1016/j.sintl.2022.100156 "
19	Crystal Structure of Pyridin-4-ylmethyl 4-Nitrobenzoate, C13H10N2O4	James T. P. Matshwele, Sebusi Odisitse, Ofentse Mazimba, Florence Nareetsile, Lebogang G. Julius, And Dalitso Keitumetse	Nov-21	X-ray Structure Analysis Online, 2022, 38(1), 7."
20	Age of the oldest Homo sapiens from eastern Africa	Vidal, C., Lane, C., Asrat, A. , Barfod, D.N., Mark, D.F., Tomlinson, E., Tadesse, A.Z., Yirgu, G., Deino, A., Hutchison, W., Mounier, A., Oppenheimer, C.	Nov-21	Nature, Doi: 10.1038/s41586-021-04275-8.
21	Changes in the cyclicity and variability of the eastern African paleoclimate over the last 620 kyrs	Duesing, W., Kaboth-Bahr, S., Asrat, A. , Cohen, A.S., Foerster, V., Lamb, H.F., Schaebitz, F., Trauth, M. H. Viehberg, F.	Nov-21	Quaternary Science Reviews, 273: 107219.
22	A Review on Wingtip Devices for Reducing Induced Drag on Foxed-Wing Drones	Boitumelo Makgantai, N. Subaschandar, Rodrigo S. Jamisola Jr		Journal of XI'AN university of Architecture & Technology, JXAT Journal, Volume XIII, Issue XI, 2021, DOI: https://doi.org/10.37896/JXAT13.11/314115
	Conference Contribution	Authors	Date	Source title & Link
1.	A quantum algorithm for single parity check code	Senekane, M., Mafu, M., Maseli, M., & Taele, B. M.	Sep-21	In 2021 IEEE AFRICON (pp. 1-6). IEEE. DOI: https://doi.org/10.1109/AFRICON51333.2021.9570857
2.	A preliminary application of a machine learning model for the prediction of the load variation in three-point bending tests based on acoustic emission signals	K.Kaklis, O.Saubi,R. Jamisola,Z.Agiouta ntis	Nov-21	Procedia Structural Integrity,2021, Vol 33, pp.251-258, https://doi.org/10.1016/j.prostr.2021.10.031

3.	Parametric Analysis of Rib Pillar Stability in a Longitudinal Sublevel Open Stopping Operation in an Underground Copper Mine in Southern Africa	Kaklis, K. Agioutantis, Z. Masialeti, M. Yendaw, J. Betsi, T.B.	Nov-21	Mater. Proc. 2021, 5, 11. https://doi.org/10.3390/materproc202105011
4.	"Relative Jacobian-Based Cooperative Control of Multi-Rotor Drones,"	R. S. Jamisola, K. Z. Thebe, L. P. Ramalepa and O. Mbedzi	Oct-21	2021 International Conference on Communication & Information Technology (ICICT)
5.	Influence of post-heat treatment on microstructure, mechanical, and wear properties of maraging steel fabricated using direct metal laser sintering technique	Anand Kumar Subramaniyan, Sudarshan Reddy Anigani, Snehith Mathias, Akshay Pathania, Prasad Raghupatruni, Shubhendra S Yadav	Sep-21	Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications https://doi.org/10.1177/14644207211037342
6.	Investigation on pulsed electrolytically polished AlSi10Mg alloy processed via selective laser melting technique	S. Anand Kumar, Anigani Sudarshan Reddy, Snehith Mathias, Abhishek Shrivastava, Prasad Raghupatruni	Oct-21	Proceedings of the Institution of Mechanical Engineers, Part L: Journal of Materials: Design and Applications. https://doi.org/10.1177/14644207211045301

**Should you have any research news/output, kindly send the information to the contact details below.*

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