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# THE BIOSCIENCE NEWSLETTER

Official Newsletter of the UDS Faculty of Biosciences



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DEVELOPMENT  
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**TAMALE, GHANA**



## MESSAGE FROM THE DEAN

We have begun another academic year, and I would like to thank our exceptional staff, students and partners for the support over the past years. I am honoured to serve you all. The Faculty is on course to have great mentors, lecturers and scholars to produce graduates in the fields of bioscience who will be equipped with skills for creativity, communication, critical thinking, ethics, reasoning and problem-solving. The Faculty is focused on earning its recognition for academic excellence and innovation. It is my hope that you continue to support and rally behind each other to catapult the Faculty of Biosciences to greater heights by ensuring students and graduates have a strong and diverse set of skills to take up opportunities and challenges in this digital era. Let us be dedicated to the education of every single student as bearers of this essential responsibility.



**Prof. Elliot H. Alhassan, Dean**

This is the first issue of the second volume of The Bioscience Newletter (1<sup>st</sup> Edition of 1<sup>st</sup> Quarter of 2023) which showcases three Bioscience Discourse series, Postgraduate and Undergraduate study programmes in Biosciences, students practical training experience, publications by faculties in the quarter, and other interesting activities.

### BIOSCIENCE DISCOURSE

**B**ioscience discourse is a monthly seminar series of the Faculty of Biosciences of the University for Development Studies (UDS), where faculties and invited guest-scientists present their research work, innovations / ideas, scientific propositions, etc, to peers and students for a constructive discussion (discourse). BD was launched in January 2022 and has since hosted 26 speakers of various specialties in biosciences. The BD platform is shaping research in the faculty: promoting collaborations, peer review, quality research design, data handling / analysis and communication. In this edition, summaries of three thematic presentations made by senior and early-career researchers of the faculty in the BD series were included.



A snapshot of Bioscience Discourse session

*Photo Credit: FoB- RGSU*



## UNLOCKING THE POTENTIAL OF LIGNOCELLULOSIC BIOMASS FOR PRODUCTION OF LIQUID BIOFUEL

Abraham Kusi Obeng, PhD

Liquid biofuels are gaining increasing attention due to their potential to reduce greenhouse gas emissions and increase energy security. However, biofuels production from conventional sources such as sugarcane, corn and soybean are associated with various sustainability concerns. Hence, the need to explore alternative sources of biofuels. One of such sources is lignocellulosic biomass which is the most abundant organic material on earth. In a recent academic presentation, Dr. Abraham Kusi Obeng highlighted the potential of lignocellulosic biomass in Northern Ghana for cellulosic ethanol production.

Dr. Obeng's presentation focused on the potential of various agricultural by-products such as groundnut husk, sheanut husk, cowpea husk, millet husk, rice husk, yam peels, and dawadawa fruit husk in Northern Ghana for cellulosic ethanol production. He highlighted the abundance of these residues in the region and their potential as a feedstock for biofuels.

Cellulosic ethanol production involves the breakdown of cellulose, hemicellulose, and lignin present in lignocellulosic biomass to produce ethanol. This process entails several steps, including pretreatment, hydrolysis, fermentation and distillation. Dr. Obeng highlighted the challenges associated with each step of the process and the need for further research to optimise the production process.

The potential of lignocellulosic biomass for the biofuels production is vast, and Dr. Obeng's presentation highlighted the potential of agricultural residues in northern Ghana. However, there are still challenges associated with the production process that need to be addressed. Further research and investment are needed to unlock the full potential of lignocellulosic biomass for the biofuels production.



Fruits and peels of *Durio zibethinus*. Photo Credit: A.K.Obeng  
[Dr Obeng recovered glucose from the peels for bioethanol production during his PhD research in Thailand]



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### Specialty/Research Interest

Biomass Conversion & Applied Microbiology

## THE SCOPE OF FORENSIC SCIENCE PRACTICE IN GHANA : REFLECTIONS

Isaac Oboakoh, MPhil

**F**orensic science is a vital aspect of modern-day justice and security systems worldwide but its potential remains largely underutilised in many sectors of the economy in Ghana. In this edition of the bioscience discourse, Mr. Oboakoh's presentation highlighted various sectors of the Ghanaian economy where forensic science could be utilised to improve efficiency and effectiveness. He noted that the application of forensic science in these sectors could significantly enhance productivity, reduce fraud and corruption, and promote public safety.

He also stated that the limited employment opportunities and inadequate recognition of forensic science as a field of study and practice had resulted in a limited workforce and underutilisation of the field in the country. To maximise the utility of forensic science in Ghana, Mr. Oboakoh recommended several strategic actions. First, development of policies to promote the application of forensic science in different sectors of the economy, secondly, stakeholder involvement in the development and implementation of forensic science policies, next is investment in capacity building and education in forensic science, and ultimately, collaboration with other countries to learn from their experiences and share information.

Mr. Oboakoh's presentation also included several opinions for reflection, including the need for a legal framework to regulate the practice of forensic science in Ghana. The importance of effective communication and governance in the application of forensic science, and the need for maintenance and dissemination of information in the field. The recommendations made by Mr. Oboakoh offer a useful roadmap for policymakers and stakeholders to unlock the full potential of forensic science in Ghana.



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### Specialty/Research Interest

Forensic serology, Biology & human identification

## MEDICINAL PLANTS AND THEIR FINISHED MARKETED HERBAL PRODUCTS USED FOR TREATMENT OF LIVER DISEASES IN GHANA

Julius Dongsogo, MPhil

The use of medicinal plants for the treatment of liver diseases has a long history in Ghana, despite the safety and efficacy concerns. In a recent presentation by Mr. Julius Dongsogo, the need to determine the hepatoprotective or regenerative activity of plant materials used for herbal products was highlighted.



Some medicinal plants that exert pharmacological effects on humans and animals

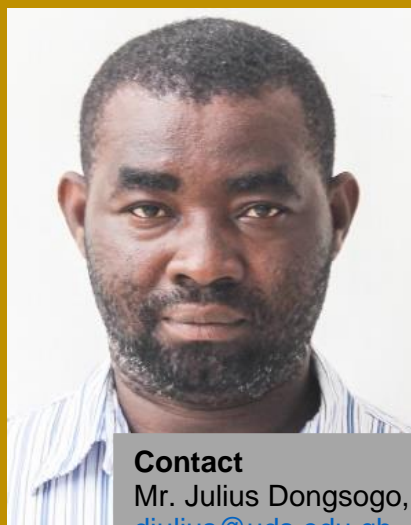
To achieve this objective, a market survey was conducted to gather major herbal drugs used for the treatment of liver diseases in Ghana. The plant species and parts used in the formulation of these products were compiled, and the hepatoprotective or regenerative activity data was inferred from scientific databases.

The study showed that *Khaya senegalensis* (Mahogany) was the most predominant plant used in formulating herbal products, possibly due to its abundance and efficacy. Leaves were the most prevalent part used in the manufacturing of herbal

products, probably because they are able to accumulate more plant nutrients, and have fewer toxins. *Cratogeomys oxyacantha* was the most reported in terms of parts used, whilst *Moringa oleifera* was the most reported in terms of extracting solvents and inducing models.

Interestingly, the majority of plants (73.2%) used for manufacturing herbal medicines in Ghana have scientific data supporting their usage. Traditional medicine can be incorporated into modern healthcare systems, provided that proper scientific research and validation are conducted.

In conclusion, there is the need for continued research into the safety and efficacy of medicinal plants used for the treatment of liver diseases in Ghana. Such research will help to promote the development of safe and effective herbal products and contribute to the overall improvement of healthcare in the country.



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### Specialty/Research Interest

Phytomedical safety & clinical microbiology

**FACULTY OF BIOSCIENCES – STUDY PROGRAMMES**

The Faculty of Biosciences has 6 Academic Departments that ran undergraduate and postgraduate programmes.

**Department of Biotechnology**

- PhD. Biotechnology
- MPhil. Biotechnology
- MSc. Biotechnology
- BSc. Biotechnology and Molecular Biology

**Department of Fisheries and Aquatic Resources Management**

- *PhD. Fisheries Science*
- *PhD. Sustainable Aquaculture*
- MPhil. Fisheries Science
- BSc. Aquaculture Technology and Fisheries Science
- Dip. Aquaculture technology and Fisheries Science

**Department of Biochemistry and Molecular Biology**

- *BSc. Biochemistry*

**Department of Microbiology**

- *BSc. Microbiology*

**Department of Biological Sciences**

- *BSc. Biological Science*

**Department of Forensic Sciences**

- *BSc. Forensic Science*

The programmes italicized are at advanced stages of accreditation consideration by the Ghana Tertiary Education Commission (GTEC). All other programmes are fully accredited by GTEC and are being ran with high enrollments.



## PRACTICAL TRAINING EXPERIENCE



Mr. F.I. Tia (left) and Mr. S.O. Dandi (Right) calibrating a multipurpose water quality parameter machine during a TTFPP supervision of Level 300 Fisheries and Aquatic and Resource Management students at Akosombo

*Photo Credit: E.D. Abarike*



Dr. E.D. Abarike [in white shirt] and Mr. S.O. Dandi [in striped shirt] educating level 300 Fisheries and Aquatic Resource Management students on the morphological features of tilapia during a TTFPP supervision at Akosombo

*Photo Credit: E.D. Abarike*



STUDENTS HANDS-ON TRAINING IN THE LAB

*Photo Credit: J. Payne*



### Chapter in a Book

1. Blair, M. W., Thapa, R., Wu, X., Edwards, M., **Yahaya, D.**, Hickok, D., Mackasmiel, L., and Cortes, A. J. (2023). Use of genomics and phenomics in grain amaranths for diversity assessment and breeding in the Americas in Farooq, M. and Siddique, K. H. M. (Ed.) *neglected and underutilized crops future smart food book 2023*. Pp 95-114.

### Journal Articles

2. **Alhassan, E. H.**, Osei, A. O., **Ampofo-Yeboah, A.**, and **Dandi, S. O.** (2023). Prevalence of Endoparasites and Hematology in Rdbelly Tilapia from a Shallow Tropical Rservoir in Ghana. *Tanzania Journal of Sciences*, 49(1), 15-25. <https://dx.doi.org/10.4314/tjs.v49i1.2>
3. Vicar, E. K., Alo, D. B., Koyiri, V. C., **Opore-Asamoah, K.**, Obeng-Bempong, M., & Mensah, G. I. (2023). Carriage of Antibiotic Resistant Bacteria and Associated Factors Among Food Handlers in Tamale Metropolis, Ghana: Implications for Food Safety. *Microbiology Insights*, 16, 11786361221150695.
4. **Duwiejuah, A. B.**, Abubakari, A. H., **Quainoo, A. K.**, Amadu, Y. and Bawa, A. A. (2023). Adsorption of lead, cadmium and mercury ions using groundnut and sheanut shells biochars. *African Journal of Biotechnology*, 22(1), 1 - 18.
5. Abbey, C. Y. B., **Duwiejuah, A. B.** and **Quianoo, A. K.** (2023). Removal of toxic metals from aqueous phase using cacao pod husk biochar in the era of green chemistry. *Applied Water Science*, 13(57), 1 - 8.



MONDAY, JANUARY 16, 2023



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# Lecturer advocates polices to intensify farming

By Samuel SAM

A senior lecturer at the Faculty of Bioscience-University for Development Studies, Dr. Damian Tom-Dery, has advocated the adoption of policies that will encourage intensification of farming rather than expanding more farmlands.

This, according to him, will ensure sustainable agriculture and the preservation of woody species that enhance food security and also encourage more youth into farming. Lack of policy and strategic placement continues to be a challenge for sustainable livelihoods in rural



communities.

He said research by the faculty revealed that though commercial farming generates jobs and provides some form of community support, the

practice also results in shortage of fertile land for smallholder farmers.

Dr. Tom-Dery however said large-scale commercial farms have negative social and

environmental consequences which can undermine the attainment of other SDGs (especially SDGs 13 and 15) at the local and regional scales. "Our survey in the field

revealed an estimated 19,117,837 individual trees, shrubs and saplings of woody species have been excavated as a result of 30 commercial farms," he added.

It was also revealed that large hectares of woodland that existed in 2015 were converted to agricultural farmlands by 2021 - which though it is good also poses a threat to the sector, he stressed.

Dean of the Faculty of Biosciences-University for Development Studies (UDS), Professor Elliot H. Alhassan said the faculty has over the years been encouraging students and lecturers to embark on research activities to help identify issues

confronting the sector; and also come out with sustainable remedies in order to boost the agricultural sector, which is the economy's backbone.

According to him, government's ability to focus on the tertiary institutions pursuing bioscience programmes into aqua-culture, Shea among others would help the faculty come out with more research, adding: "Research is very expensive and therefore needs support to enable the students and lecturers conduct the research needed for possible solutions."

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This story was based on the work done by Dr. Damian Tom-Dery, presented at the Bioscience Discourse 10

**Reference**

*B&FT Newspaper published on January 16 2023*

<https://thebftonline.com/2023/01/16/lecturer-advocates-polices-to-intensify-farming/>



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**Specialty/Research Interest**

Conservation Ecology & Climate change





# Eco-friendly Biochar is an effective soil-conditioner for ecological sustainability – UDS Scientists

An eco-friendly technique called Biochar has been found to be one of the most useful methods for ecological sustainability in modern farming, according to research by the University for Development Studies (UDS).

Recent research by a senior lecturer at the Faculty of Biosciences of the Nyankpala Campus of UDS, Dr. Abudu Ballu Duwiejuah, found that Biochar – a carbon-rich

product that is created by heating biomass, such as wood, in the absence of oxygen – was cost-effective, highly efficient, simple to use and ecologically sustainable and reliable.

The research was to assess the ecological risk of potentially toxic elements in groundnuts and Shea nuts shell biochar produced during slow and fast pyrolysis. It was also to examine the physico-chemical characteristics of the biochar as potential adsorbents and soil conditioners.

Dr. Duwiejuah stated that Biochar enhances crop yield by improving soil fertility, microbial activities, water holding capacity, structure, nutrients and health of the soil which aid in attaining zero hunger in the achievement of Sustainable Development Goals (SDG) 2 and 12. "It also helps in the remediation of inorganic and organic contaminants in water and soil that help in attainment of SDGs 3, 6, 14, and 15 (clean water and sanitation, life below

water and goal on land, good health and well-being)," he said.

In his recommendation, Dr. Duwiejuah stressed that further studies on the morphology and surface functional groups of the groundnuts and Shea nuts shells biochar should be carried out as they play a crucial role in absorption processes.

"Further research on some parameters and deeper understanding of their interactions between the

method of biochar production and feedstock should be carried out to serve as guidelines for charring conditions and selecting feedstocks based on their specific environmental and soil requirements," he said.

Another senior lecturer of the same faculty said that most of the research conducted was centred on plants and animals, and so findings were usually very helpful to the general public, the university and the world at

large. "If we, at the Faculty of Biosciences, do not share our findings with the public, they will continue to sit on the shelves and there won't be enough development as we all know the importance of research in development," he said.

He also appealed for support to enable the faculty to intensify its research activities in order to assist the Nyankpala community as well as for the growth of the nation.

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This story was based on the work done by Dr. Abudu Ballu Duwiejuah, presented at the Bioscience Discourse 12

## Reference

B&FT Newspaper published on January 17 2023

<https://thebftonline.com/2023/01/17/eco-friendly-biochar-is-an-effective-soil-conditioner-for-ecological-sustainability-uds-scientists/>



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## Specialty/Research Interest

Environmental Biotechnology





MONDAY, FEBRUARY 13, 2023

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## UDS Faculty of Biosciences seeks support to commercialise biofuel

By Samuel SAM

The Faculty of Biosciences of the University for Development Studies (UDS) has held its 13th Bioscience Discourse with a call for support to develop and commercialise biofuel production.

Biofuel, obtained from plant or algae material or animal waste, could become a viable alternative fuel to complement and diversify the country's energy mix, if promoted, says the university.

The Northern Region which is a hub of agricultural activities is home to lots of raw materials for its production. Shea nuts, millet and maize

husks among many others are some of the readily available raw materials suitable for biofuel.

With the given, the school is confident that with the right funding, it can transform these by-products into useful and cleaner energy to complement existing fuel sources.

This follows a research by a senior lecture of the Faculty of Biosciences, Dr. Abraham Kusi Obeng, which confirmed the huge potential for biofuel production.

The research dubbed "unlocking the potential of lignocellulosic biomass for production of liquid biofuel", found out that cellulosic materials were not easy to be

extracted as compared to sugar cane processing.

In view of this, the team was able to develop protocol to extract the sugars for further processing to be fermented into bio ethanol.

The investigation was aimed at identifying opportunities within agricultural waste products and the need to utilise them to augment the country's energy needs, particularly in this era of high fuel prices.

The Faculty, since its inception, has been embarking on research exercises to identify problems and opportunities in various fields as well as solutions to them. However, financial and logistical constraints remain

major hindrances.

The research lead for the biofuel project, Dr. Kusi Obeng, told the B&FT that the essence of the investigation was to identify alternative sources of energy.

He said the research discovered that non-food component can be used for biofuel. He, however, added the school lacks funding to be able to fine-tune the investigations and possibly commercialise the findings.

He therefore urged the government and the private sector to support the faculty to actualise the research findings.

"Our major challenge to help harness the potential is equipment, so if government or corporate organisations

could assist us, everything would be done here to create job opportunities for our youth," he said.

He also noted that it is very expensive to carry out such research works because some of the chemicals are imported, while the results have to be sent to other countries for verification.

"We are open to collaborating with industries that are into ethanol production," he added.

Dr. Francis Addy, a senior faculty lecturer and chairperson for the event, commenting on the findings, said it has come at the right time, as the country looks to diversify its energy mix.

According to him, unlike

conventional ethanol production from the Western world, the research is focused on the use of by-products from agriculture sector, which the country has in abundance.

The Vice Dean of the Faculty, Dr. Nelson Opoku, noted that the Faculty has been training graduates to venture into research so as to assist government and the private sector in building a resilient economy.

The event, he noted, aims to expose the Faculty through research, adding: "What we have realised is that most often when members of the Faculty conduct research, they are left on the shelves due to lack of funds, hence this discourse".

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This story was based on the work done by Dr. Abraham Kusi Obeng, presented at the Bioscience Discourse 13

### Reference

B&FT Newspaper published on February 13 2023

<https://thebftonline.com/2023/02/13/uds-faculty-of-biosciences-seeks-support-to-commercialise-biofuel/>



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### Specialty/Research Interest

Biomass Conversion & Applied Microbiology



# Forensic science key to human rights protection

By Samuel SAM

Senior Lecturer, Faculty of Bioscience, University for Development Studies (UDS), Isaac Oboakoh, has called on the government to strengthen forensic science institutions and training in the country so as to support human rights protection.

He stated that forensic science prioritization would enhance peace and justice

institutions to protect human rights, which would help to ensure proper security and safety for citizens.

Strengthening the institutions must include empowering institutions to issue accreditations and certificates and also regulate the ethics of the profession and seek forensic inputs for crime fighting, among others.

"The broadening of the knowledge of citizens in forensic science and the strengthening of the

institutions of the country ensure effective development and accountability and transparency at all levels of decision-making.

It would also help to protect human rights as well as curb indiscipline in the country, which would result in achieving the Sustainable Development Goal (SDG) - goal 16, which is tackles "peace, justice, and strong institutions and aimed at promoting peaceful and inclusive societies, providing access to justice for all, and

building effective, accountable, and inclusive institutions at all levels," he said.

The senior lecturer who spoke on the theme: "the scope of forensic science practice in Ghana," at a seminar held at the Nyankpala campus of UDS, said this, when done, would boost security in the country.

The event brought together experts in the field of forensic science to dialogue on how academia and forensic scientists can assist law

enforcement agencies and the legal system in fulfilling their primary functions, such as prevention, detection, investigation of crime and delivery of justice.

"Forensic science is science for justice. When a crime happens, the crime must be resolved and it must be resolved urgently. We need a comprehensive solution to crime," he added.

He called on government agencies and policymakers, law enforcement agencies,

educational institutions, forensic science professionals, the media, and other relevant stakeholders to work together to create an environment that supports the development and use of forensic science in the country.

He said the ability to include forensics into the educational curriculum would help enhance the knowledge of students on forensic investigations to address both academic and social issues.

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This story was based on the work done by Mr. Isaac Oboakoh, presented at the Bioscience Discourse 14

*Reference*

*B&FT Newspaper published on March 27 2023*

<https://thebftonline.com/2023/03/27/forensic-science-key-to-human-rights-protection/>



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**Specialty/Research Interest**

Forensic serolog, Biology & human identification



# Rising kidney, liver diseases attributed to herbal medicine misuse

By Samuel SAM

Senior Lecturer at the Bioscience Department of the University for Development Studies (UDS), Julius Dongsogo, has indicated that the rise in kidney and liver-related diseases among both the young and aged across the country is as a result of complications from continuous misuse of herbal drugs.

According to him, incidents of herbal drug abuse emanating from self-medication, overdose, wrong diagnoses, unapproved concoctions, among others, have been identified as the underlining factors for most in kidney and liver diseases in recent times.

He cautioned against unprescribed use of drugs, whether herbal or orthodox.

"People with a preference for herbal products must be conscious and crosscheck the content of the drugs because some of them are adulterated. Also, buyers



need to check for the Food and Drugs Authority (FDA) label on the product to ensure they are purchasing the right product," he said.

Prof. Dongsogo mentioned that research conducted revealed that the majority of the practitioners have low knowledge of the drugs, and that they inherited the practices from their

ancestors who believed that by mixing different kinds of herbs, it can treat all illnesses.

The senior lecturer, who disclosed this in an interview with the B&FT, further noted that the treatment for liver and kidney diseases is very expensive, hence, the need to exercise caution.

He, however, mentioned that herbal medicine is very

effective if well-prepared and taken according to prescription.

"The use of herbs for treatment has been a part of the traditional medicine system for thousands of years. Herbs have been used to treat a variety of conditions from minor ailments, such as headaches and indigestion, to more serious conditions like

diabetes, cancer and heart disease; but the abuse by quack practitioners in recent times is a challenge we need to address as a society," he stressed.

## Importance of herbal treatment

According to him, herbs are natural and can be more

suitable than synthetic medications.

However, like any medication, he noted that herbs have side effects, and that consumers need to be aware of the potential side effects; hence the need to seek professional advice before any herbal treatment.

He noted that the misuse of herbs can result in allergic reactions because many patients may be allergic to certain herbs which can cause symptoms, such as itching, hives and swelling.

"When using herbs for treatment, it is important to follow the recommended dosage and only use herbs that have been certified as safe and effective. It is also important to consult a healthcare provider before starting any herbal treatment, especially if you have a medical condition or taking prescriptive medications," he advised.

Head of Forensic Science Department, Dr. Lydia Quansah, also stressed the need for consumers to always check for the FDA approval for any herbal product that they use.

She further urged the FDA to be proactive to help clean all fake herbal products off the market to protect consumers.

This story was based on the work done by Mr. Julius Dongsogo, presented at the Bioscience Discourse 15

### Reference

B&FT Newspaper published on March 31 2023

<https://thebftonline.com/2023/03/31/rising-kidney-liver-diseases-attributed-to-herbal-medicine-misuse/>



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### Specialty/Research Interest

Phytomedical safety & clinical microbiology





Senior Members at Tamale SHS, during NABSS Outreach. L-R: Ms. F.F. Amponsah, Mr. S. Oware, Mr. E. Okoampah, Dr. E.D. Abarike, and Dr. J.S. Davids

*Photo Credit: S. Oware*



A cross-section of Tamale SHS students in participation at the National Association of Bioscience Students (NABSS) – SHS outreach

*Photo Credit: Detach photography*





FoB-NABSS Executives and Senior Members Group photograph with some students from Tamale SHS.

*Photo Credit: Detach photography*



A cross-section of Northern School of Business (NOBISCO) in participation at the National Association of Bioscience Students (NABSS) – SHS outreach.

*Photo Credit: Detach photography*





Interatcive section with Northern School of Business students during NABSS Outreach Program.

*Photo Credit: Detach photography*



NABSS freshers Orientation ongoing

*Photo Credit: Detach photography*





**NABSS Executives**

L-R: Mr. Sulemanu Yakubu (Vice President), Ms. Rose Korang (Organizer), Mr. Bernard Ndabe Nsimbela (PRO), Ms. Rachael Agyemang (PPC), Mr. Pius Afari Gyan (President), Ms. Hairat Sumaila (WOCOM), Mr. Stephen Adzido Atsu (Deputy Secretary), Ms. Veronica Ampong (Secretary)



Students audience at the Biotechnology Students Association of Ghana (BIOSSAG)–UDS Chapter quiz competition

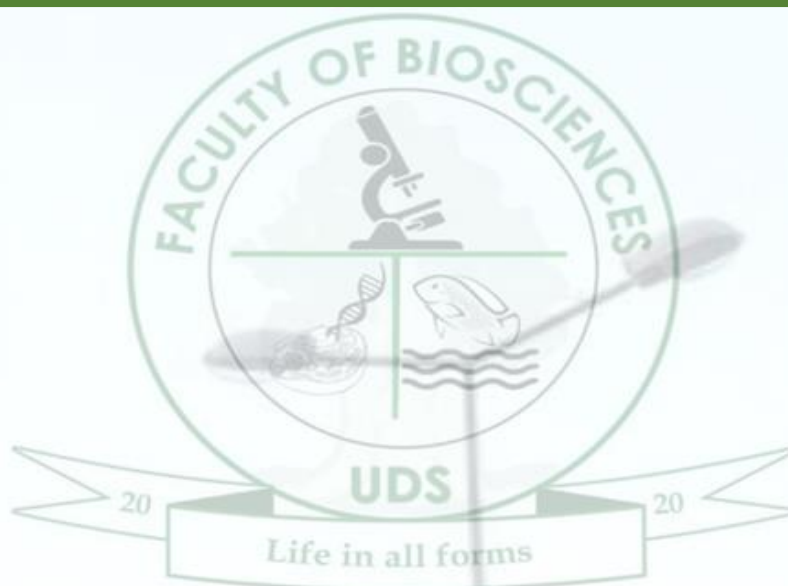
*Photo Credit: BIOSAG Media*



Winners of the BIOSSAG–UDS 2023 Quiz Competition. L-R: Mr. Ramadan Zakaria Danaa and Francis Dzamefe

*Photo Credit: BIOSSAG Media*





## Official Newsletter of the UDS Faculty of Biosciences

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