



UNIVERSITY OF GHANA



**West African Centre for Cell Biology of Infectious Pathogens (WACCBIP),
University of Ghana**

Second Annual Report (July 2016-June 2017)

Submitted to:

The WACCBIP International Advisory Board



July 2017

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1. INTRODUCTION

This is the second meeting of the WACCBIP International Advisory Board (WIAB) and the report serves as an update on the progress made in implementing the vision of the Centre covering the period July 2016 to June 2017.

2. IMPLEMENTATION STATUS— GOVERNANCE

2.1 First Advisory Board Meeting

The first WACCBIP Advisory Board meeting was held on Sunday, July 17, 2016 from 10:00 am to 1:30 pm at the Mövenpick Ambassador Hotel in Accra, Ghana. There were 19 attendees, comprising Advisory Board members, the WACCBIP Director some Unit heads, and WACCBIP Secretariat Staff. The meeting was chaired by Prof. Keith Gull, Chairman of the Advisory Board. The Director gave updates on both the World Bank ACE and Wellcome Trust DELTAS programmes. The updates included the recruitment of graduate students and postdoctoral fellows, programme finances and the challenges faced by the Centre. The Director outlined his plan of action for 2016/2017, which included employment of a substantive project manager, commencement of construction on the WACCBIP building (Biochemistry annex) and engagement of corporate organizations to sponsor students or purchase equipment.

2.2 Quarterly Management Meetings

WACCBIP Management Committee meetings were held on the following dates: July 12, 2016, September 28, 2016, January 12, 2017, March 16, 2017 and June 22, 2017. These meetings presented an avenue for the Unit heads to give updates to the team on programme administration and management, training and research, monitoring and evaluation, logistics, financial management and procurement.

2.3 African Centres of Excellence (ACE) project workshops

The Sixth African Centres of Excellence (ACE) workshop was held at the Radisson Blu Hotel in Abidjan, Cote d'Ivoire from November 14-17, 2016 and the Seventh ACE workshop at Intercontinental Hotel in Lagos, Nigeria, from May 15-19, 2017. Present at the workshops were representatives from the World Bank, Association of African Universities (AAU), National Council for Tertiary Education (NCTE) and the 22 ACEs in West and Central Africa. Progress reports on the status of the ACE projects and an update on disbursement of funds were presented by the AAU and World Bank representatives. During parallel presentations by the 22 ACEs in three breakout sessions (STEM, Health and Agriculture), each ACE presented a brief status update and their awards and achievement were outlined. Other issues on Procurement, Financial Management and Monitoring & Evaluation were discussed.



The WACCBIP team at the 6th ACE workshop



The WACCBIP team at the 7th ACE workshop

2.4 Staffing

A. New Recruitments

Based on approval from the Advisory Board, management hired a project manager in October 2016 to assist the Director in the day-to-day management of the Centre's projects. He will also lead the secretariat team and draft all communications for the Director including project reports, letters, and presentations. He will assist the Director in planning and executing project activities, and should be comfortable with representing the Director at meetings and presenting the work of the Centre. Additionally, a Public Engagement Specialist was hired to assist with the planning and execution of public engagement activities. However, the person quit the job after only three months.

The Centre also recruited eleven (11) research assistants to work with faculty and postdoctoral research fellows at the Centre. In addition, after repeated appeals to the University for permanent security at the Biochemistry building, the Centre decided to employ three (3) security guards to help secure the building and the valuable equipment in it.

The Centre has officially appointed Prof. Dorothy Yeboah-Manu as Postdoctoral Programme Coordinator. Mr. Vincent Appiah, who was initially employed as a research assistant, has been reassigned as ICT Officer, following the resignation of Mr. Solomon Sunu from the position.

B. Resignations

The following staff tendered in their resignations during this period; Mr. Solomon Sunu (ICT Officer), Mr. Pius Klevor (Research Assistant at Korle Bu Teaching Hospital). Two of our Reserch Assistants, Mr. Majeed Bakari and Mr. Richard Kofi Oyagbenro left the Centre to begin their PhD studies at the University of Wurzburg, Germany the Ohio State University, respectively.

2.5 Construction of the WACCBIP building (Biochemistry annex)

The Vice Chancellor of the University of Ghana, Prof. Ebenezer Oduro Owusu, broke ground for the construction of the WACCBIP building, at the Department of Biochemistry, Cell and Molecular Biology. The construction of this building will contribute to attaining a key objective of the project, which is to improve the teaching and learning environment. This 1.7 million Ghana Cedi facility will comprise a large seminar room, lecture rooms, offices, a Bioinformatics lab, a student resource center, and a cold room.



Dignitaries at the ground-breaking ceremony



Progress of work on the WACCBIP building

3. IMPLEMENTATION UPDATES-ACADEMIC

A. 2016 Annual research conference

WACCBIP successfully launched its annual research conference as part of its quest to become the leading research-training Centre in West Africa. The maiden research conference which took place on July 14-15, 2016, at the Noguchi Memorial Institute Conference Hall, served as the official grand opening of the Centre since its inception in 2013. The maiden research conference, which was dubbed “Improving Health through Advanced Research and Training”, also served as a milestone in the development of WACCBIP as a Centre of excellence for biomedical research with completion of the first MPhil cohort. The two-day event showcased the immense talent and quality of the centre’s young African scientists. The maiden launch attracted over three hundred and fifty delegates and participants from top research institutions, and invited guest speakers from Africa, Europe and the USA, as well as the general public. The research conference created an avenue for WACCBIP fellows to interact and share ideas with the broader faculty from across the world.



A group photograph of invited guests and conference participants

B. International Accreditation

WACCBIP received the full 5-year International Advanced Degree Accreditation from the Royal Society of Biology UK (RSoB) for the MPhil and PhD in Molecular Cell Biology of Infectious Diseases programmes at the Centre. Graduates from the accredited programmes will receive one year’s free membership of the Royal Society of Biology at Associate level, which will open up networks for applying for jobs or fellowships for further studies or research. In addition, associate level members can become Members of the Royal Society of Biology (MRSB) after two further years of work or professional practice, rather than the usual three.



Some students of WACCBIP with visiting team from RSB



Dr. Arthur receiving the award on behalf of the Centre

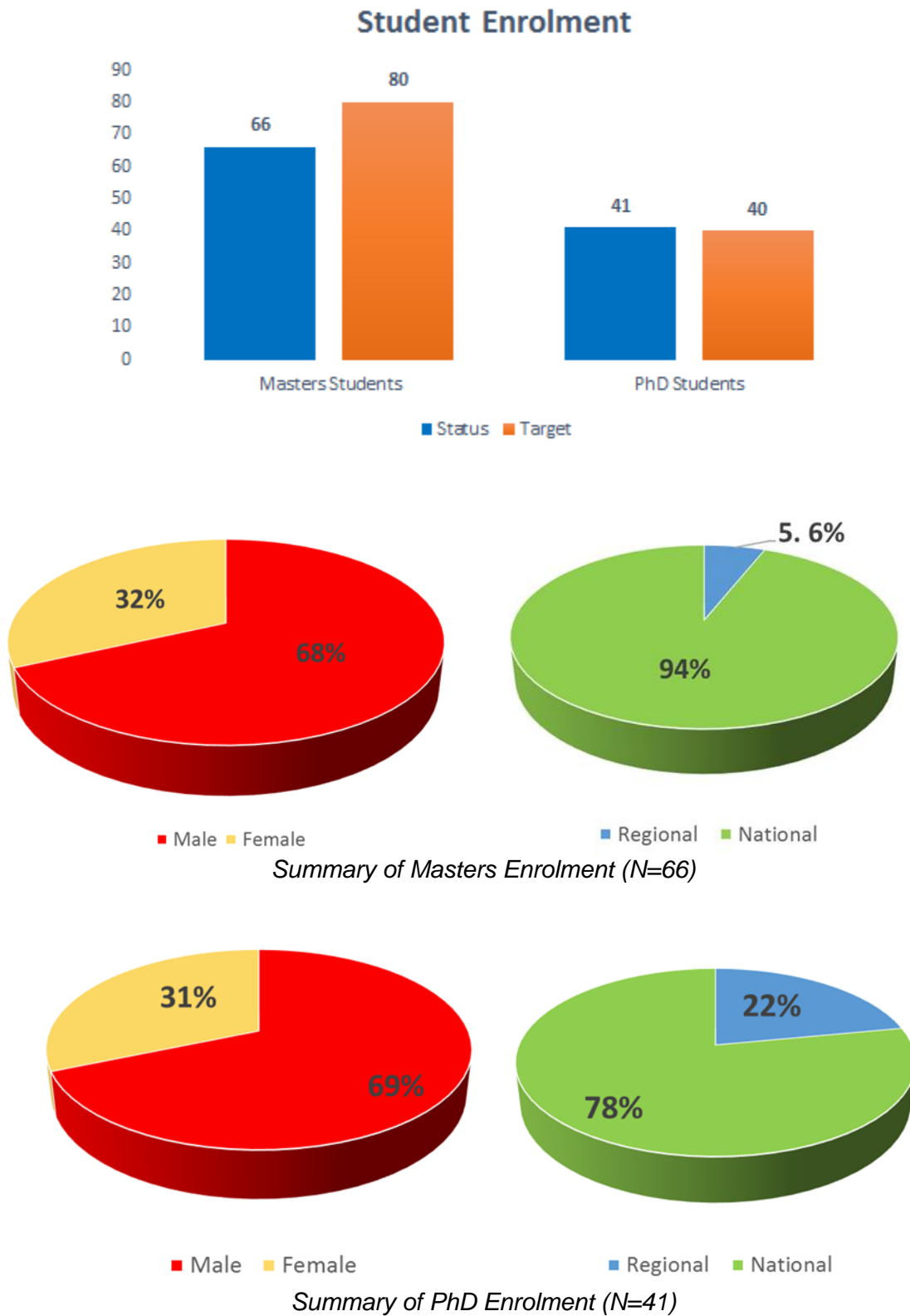
C. Student enrolment

The numbers of students who were enrolled into the various WACCBIP programmes under the ACE and DELTAS projects for the 2016/2017 academic year are shown below in Table 1. A breakdown of enrolment by gender of students under the ACE project are shown in Figure 1. In addition, one Masters student, Erasmus Kotey, was upgraded to the PhD MCBI programme.

Table 1 – Numbers of fellows enrolled in programmes in 2016/2017

LEVEL	COURSE	MALE	FEMALE	TOTAL
MPhil	Molecular Cell Biology of Infectious Diseases	9	6	15
PhD	Molecular Cell Biology of Infectious Diseases	7	6	13
	Biochemistry	2	0	2
Postdoctoral		8	4	12

Figure1: Breakdown of enrolment and gender of students under the ACE project



D. Current status of enrolled students

MPhil Cohort 1: All students except Deladem Amekudzi, have submitted their theses, and about twenty of them have passed and are set to graduate on July 21, 2017. However, the theses of Christiana Onwona, Victor Letsa and Sandra Adelaide King have not yet been graded and as such they will not graduate this July.

MPhil Cohort 2: Fourteen out of eighteen students defended their theses on June 20-22, 2017. The other four have been delayed by difficulties in obtaining reagents and will need an extension to submit by December 2017.

MPhil Cohort 3: Students are due to submit their research project proposals by June 30, 2017, however they get an additional 2 weeks grace period since their proposal defense is at the end of July 2017.

PhD Cohort 1: Eight out of ten students were able to present their second progress reports during the immediate past semester. Two students, William Vanderpuije and Emmanuel Tagoie have not yet presented their second progress reports because they traveled to Denmark and the USA, respectively.

PhD Cohort 2: All 13 PhD students took their Comprehensive/PhD qualifying exams in August 2016 with the full results of the comprehensive exams presented in Table 2. Eleven out of thirteen students have presented their experiential learning reports.

PhD Cohort 3: All sixteen students have submitted their proposals. All proposals were deemed satisfactory based on internal reviews by faculty.

Table 2- PhD MCBI (Cohort 2) – PhD Qualifying examination

INDEX NUMBER	CANDIDATE NAME	RESULTS (%)			FINAL OUTCOME
		Written Examination	Written Proposal	Oral Examination	
10105616	Harriet Nunoo	57 (Fail)	60 (Pass)	55 (Fail)	FAIL
10250691	Prince Asare	71 (Pass)	65 (Pass)	67 (Pass)	PASS
10357501	Abdul-Rahma Mubarak	71(Pass)	65 (Pass)	61 (Pass)	PASS
10357504	Arnold Togiwe Luuse	60 (Pass)	66 (Pass)	62 (Pass)	PASS
10357510	Bernice Mawuli Anane	63 (Pass)	69 (Pass)	68 (Pass)	PASS
10363287	Samuel Yao Ahorhorlu	61 (Pass)	62 (Pass)	75 (Pass)	PASS

10363861	Francis Krampa	61 (Pass)	70 (Pass)	62 (Pass)	PASS
10551338	Belinda N. L. Lartey	60 (Pass)	68 (Pass)	65 (Pass)	PASS
10552806	Cecelia Smith	68 (Pass)	65 (Pass)	60 (Pass)	PASS
10552818	Oheneba Hagan	76 (Pass)	62 (Pass)	78 (Pass)	PASS
10552983	Abiola Isawumi	68 (Pass)	75 (Pass)	70 (Pass)	PASS
10554766	Wilhelmia Mensah	64 (Pass)	67 (Pass)	83 (Pass)	PASS
10556633	Laty Gaye Thiam	60 (Pass)	74 (Pass)	76 (Pass)	PASS



3rd Cohort of MPhil students



3rd Cohort of PhD fellows

E. Recruitment of DELTAS fellows

Postdoctoral fellowships: The call for applications was advertised on October 24, 2016 with 22 applications submitted by the deadline on November 30, 2016. Nine candidates were shortlisted after initial screening by the postdoctoral committee. Furthermore, detailed reviews by internal and external faculty recommended six applicants for interview. However, one applicant opted out of the interview. Interviews were conducted at WACCBIP on February 9, 2017. The panel recommended Dr. Lily Paemka and Dr. Saikou Y. Bah for the full 3-year fellowship. However, Dr. Ali Azeko Salifu was awarded an initial 6-month temporary fellowship, to allow him to develop his research project idea further and obtain preliminary data. A final decision will then be made after this period, on whether to offer him the fellowship for the additional two and half years. The results of the interview are summarized in Table 3.

The Centre has now fulfilled its mandate of recruiting 12 Postdoctoral Fellows under the DELTAS programme. Table 4 shows the complete list of the Postdocs and Figure 2 shows the nationalities and gender ratio of the applicants.

Table 3 – DELTAS postdoctoral Interview Scores

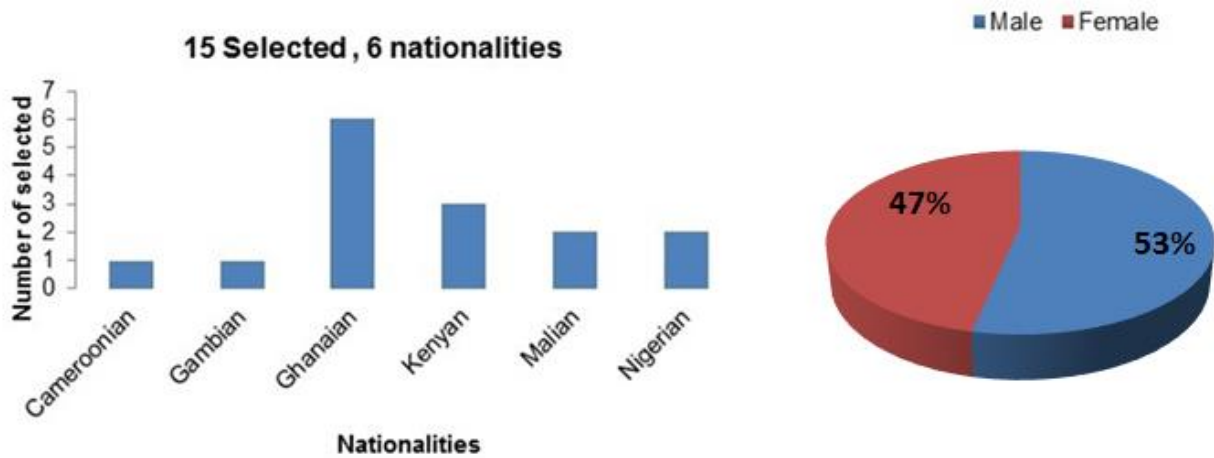
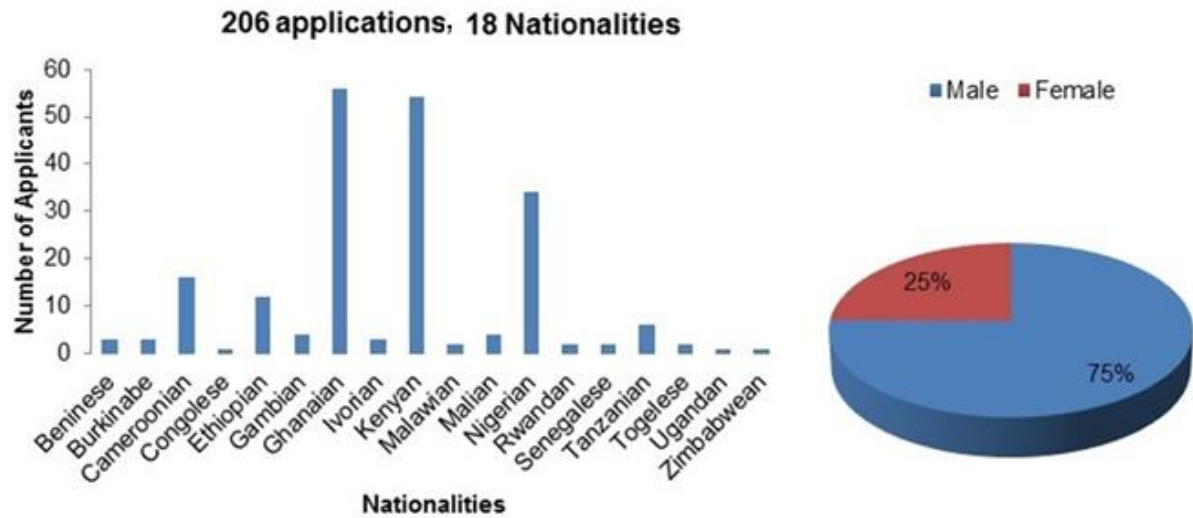
NO	CANDIDATE	GENDER	NATIONALITY	AVERAGE SCORE	INTERVIEW OUTCOME
1	Lily Paemka	F	Ghanaian	78.12	Selected
2	Saikou Y. Bah	M	Gambian	74.18	Selected
3	Ali Azeko Salifu	M	Ghanaian	71.00	Selected
4	Patrick Williams Narkwa	M	Ghanaian	58.86	Not selected
5	Moses Ocan	M	Ugandan	55.91	Not selected

Table 4 – Complete List of WACCBIP Postdocs selected

NAME OF FELLOW	NATIONALITY	GENDER	TRAINING INSTITUTION	DATE OF ENTRY TO PROGRAMME	TITLE OF PROPOSED STUDY
Dr. Yaw Aniweh	Ghanaian	M	WACCBIP-BCMB, University of Ghana	April 1, 2016	Unravelling the molecular players during <i>Plasmodium falciparum</i> invasion of erythrocytes
Dr. Jewelna Akorli	Ghanaian	F	WACCBIP-BCMB/NMIM R, University of Ghana	April 1, 2016	The role of dominant midgut bacteria isolated from Anopheles mosquitoes in larval development and susceptibility to <i>Plasmodium</i> infection
Dr. Adwoa Asante-Poku Wiredu	Ghanaian	F	WACCBIP-BCMB/NMIM R, University of Ghana	April 1, 2016	Host susceptibility to Tuberculosis (TB) in Ghana
Dr. Kolapo Oyebola	Nigeria	M	Medical Research Unit, Fajara, the Gambia	April 1, 2016	Genetic variations and differential immunological response to malaria chemotherapy in variably exposed West African populations
Dr. Modibo Sangare	Mali	M	Malaria Research and Training Center at the University of Science, Techniques, and Technology, Bamako, Mali	April 1, 2016	Epidemiology, clinical neurophysiology, and molecular genetic studies of Autism Spectrum Disorders in Mali.
Dr. Seidina A. S. Diakite	Mali	M	Malaria Research and Training Center at the University of Science, Techniques, and Technology, Bamako, Mali	April 1, 2016	Genomic variation in <i>P. falciparum</i> and pharmacogenomics of antimalarial drugs in Mali
Dr. Valentina Josiane Ngo Bitoungui	Cameroon	F	University of Cape Town, South Africa	April 1, 2016	Genetic factors associated with cardiovascular diseases in Cameroonian sickle cell disease patients

Dr. Daniel Muthui Kiboi	Kenya	M	Kenya Medical Research Institute, Kilifi, Kenya	May 1, 2016	Validation of candidate mutations in <i>Plasmodium</i> for resistance to the antimalarial drugs Piperazine and Lumefantrine
Dr. Emmanuel Amlabu	Nigeria	M	WACCBIP-BCMB, University of Ghana	November 1, 2016	New Generation Malaria Vaccine Development
Dr. Lily Paemka	Ghanaian	F	WACCBIP-BCMB, University of Ghana	July 1, 2017	Characterizing Genetic Breast Cancer Risk Factors in Ghanaian Women
Dr. Saiko Y. Bah	Gambian	M	WACCBIP-BCMB, University of Ghana	June 1, 2017	Using bioinformatics tools to validate biosignature for diagnosis of childhood tuberculosis
Dr. Ali Azeko Salifu	Ghanaian	M	WACCBIP-BCMB, University of Ghana	July 1, 2017	Controlled Release of a Natural Anticancer Agent from Nanoparticles for Cancer Therapeutics

Figure 2: Breakdown of nationalities and gender of DELTAS postdoctoral applicants



PhD Applications: The call for applications was advertised on January 27, 2017 with 104 applications (17 nationalities) submitted by the deadline on March 6, 2017. A strict selection process with the following criteria was used to shortlist candidates: year of Masters completion,

age of applicant, relevance of Master’s degree, publications in PubMed, and research experience. Eighteen international applicants were chosen after the shortlisting process, and interviewed via Skype on March 30-31, 2017 after which 4 students were shortlisted.

An entrance examination was organized on April 21, 2017 for all applicants resident in Ghana. Applicants who passed the examination were invited for face-to-face interviews on May 9, 2017. After the interviews and deliberation by the interview panel, the candidates who were offered the WACCBIP DELTAS PhD fellowship can be seen in Table 5. The Centre has now fulfilled its mandate of recruiting 15 PhD Fellows under the DELTAS programme. The complete list of all PhD fellows is shown in Table 6, and Figure 3 shows the nationalities and gender ratio of the applicants.

Table 5 – Selected DELTAS PhD Applicants for 2017/2018

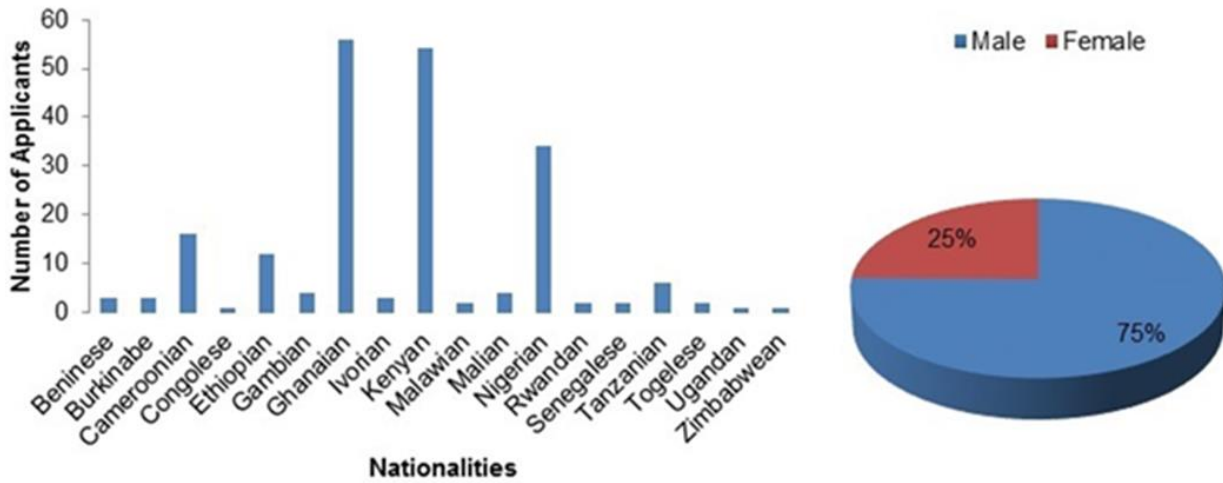
NO.	NAME	GENDER	NATIONALITY	AVERAGE SCORE
1	Collins Moranga	M	Kenyan	84.75
2	Domfeh Seth Agyei	M	Ghanaian	82.73
3	Chirawurah Jersley	M	Ghanaian	81.01
4	Kuleape Joshua Agbemefa	M	Ghanaian	80.89
5	Owusu Irene Amoakoh	M	Ghanaian	74.80
6	Pearl Osrike	F	Nigerian	66.07
7	Agnes Guindo	F	Malian	61.71

Table 6 – Complete list of all DELTAS PhD fellows

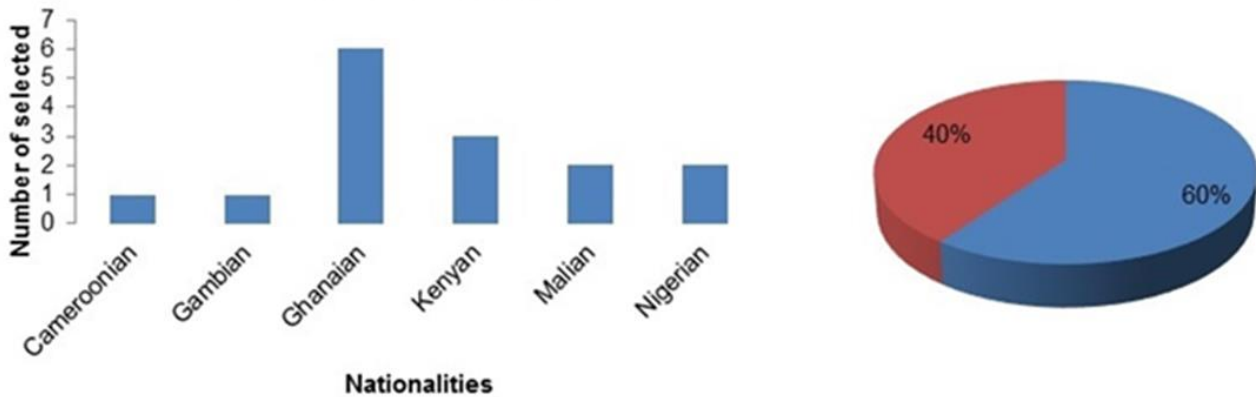
NO.	NAME	GENDER	NATIONALITY	HOST INSTITUTION
1	Mbye Haddijatou	F	Gambian	MRC, Gambia
2	Majidah Hamid- Bukola Adiamoh	F	Nigerian	MRC, Gambia
3	Samuel Mawuli Adadey	M	Ghanaian	UCT, South Africa
4	Dominic Selorm Yao Amuzu	M	Ghanaian	WACCBIP, Ghana
5	Arnaud Jonas Kengne-Ouafo	M	Cameroonian	WACCBIP, Ghana
6	Nancy Kemuma Nyakoe	F	Kenyan	WACCBIP, Ghana
7	Beatrice Mukami Muriuki	F	Kenyan	KEMRI, Kisumu-Kenya
8	Karamoko Niaré	M	Malian	KEMRI, Killifi-Kenya
9	Collins Moranga	M	Kenyan	WACCBIP, Ghana
10	Domfeh Seth Agyei	M	Ghanaian	WACCBIP, Ghana
11	Chirawurah Jersley	M	Ghanaian	WACCBIP, Ghana
12	Kuleape Joshua Agbemefa	M	Ghanaian	WACCBIP, Ghana
13	Owusu Irene Amoakoh	F	Ghanaian	WACCBIP, Ghana
14	Pearl Osrike	F	Nigerian	WACCBIP, Ghana
15	Agnes Guindo	F	Malian	MRTC, Mali

Figure 3: Breakdown of nationalities and gender of all DELTAS PhD applicants

206 applications, 18 Nationalities



15 Selected, 6 nationalities



Graduate Internship Applications: The call for applications was advertised on January 30, 2017 with 324 applications submitted by the deadline on February 28, 2017. Eighteen applicants were selected after the review process as seen in Table 7.

Table 7 – List of selected Graduate Interns

NAMES	GENDER	UNIVERSITY	DEGREE
Winifred Ruby Korang Amakye	F	UG	Administration (Accounting)
Georgia Naa Korkoi Gharthey	F	UG	Animal Biology and Conservation Science
Millicenta Kukua Mbeaba Ampiah	F	KNUST	Biochemistry
Suurbaar Jonathan	M	UDS	Biochemistry
Mary Doamekpor	F	UG	Biochemistry, Cell & Molecular Biology
Emmanuel Kofi Quaye	M	UG	Biochemistry, Cell & Molecular Biology
Fuseini Mohammed – Sherrif Napari	M	UG	Biochemistry, Cell & Molecular Biology
Appah Anna	F	UG	Biochemistry, Cell & Molecular Biology
Joanna Afokai Quaye	F	UG	Biochemistry, Cell and Molecular Biology
Salu Philip	M	UG	Biochemistry, Cell and Molecular Biology
Mensah Isaiah Kofi Deladem	M	UG	Biochemistry, Cell and Molecular Biology
Ebenezer Nii Adama Aryee	M	UG	Biochemistry, Cell and Molecular Biology
Adams Adjoa Otubea	F	UG	Biochemistry, Cell and Molecular Biology
Godfred Osei Kwame	M	UG	Biomedical Engineering
Amaniampong Kyei Bismarck	M	UG	Chemistry
Etwi Barimah Appiah	M	UG	Information Technology
Akamati Diana Precious	F	UG	Linguistics and French
Frederickt Tei-Maya	M	UG	Biochemistry, Cell and Molecular Biology

F. 3rd Workshop on Molecular Biology, Pathogenesis, and Diagnostics of Neglected Diseases

WACCBIP in collaboration with the Department of Biochemistry, Cell and Molecular Biology and the University of Cambridge organized the third workshop on Molecular Biology, Pathogenesis and Diagnostics of Neglected Diseases from July 11-22, 2016 . This workshop was aimed at training graduate, post graduate and healthcare professionals from various institutions in sub-Saharan Africa. Trainees participated in presentations, journal club discussions of selected research papers, hands-on laboratory sessions and informal interactions with faculty. The full list of participants and faculty members who contributed to the workshop is shown in Table 8.



A group photograph of participants and faculty members

Table 8 – Students and Faculty of the 3rd Workshop on Molecular Biology, Pathogenesis, and Diagnostics of Neglected Diseases

Student	Affiliation
Getso Muhammad Ibrahim	Bayero University Kano, Nigeria
Anning Alberta Serwah	University of Cape Coast, Ghana
Salifu Elliasu Yakubu	University for Development Studies, Ghana
Dapuliga Christiana Cudjoe	Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
Pambu Aaron Lelo	University of Kinshasa, Congo
Quagraine Ewurabena	Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
Kotey Fleischer Charles	University of Ghana, Legon, Ghana
Quarchie Majorie Ntiwaa	University of Ghana, Department of Medical Microbiology, Ghana
Botchie Senyo K.	Noguchi Memorial Institute For Medical Research, Ghana

Narwortey Deborah Korkor	University for Development Studies
Abey Nosarieme	University of Lagos, Lagos State, Nigeria
Danwonno Harry	Kintampo Health Research Centre, Kintampo, Ghana
Azerigyik Faustus Akankperiwen	Noguchi Memorial Institute For Medical Research, Ghana
Michael Bright Yakass	University of Ghana, Legon, Ghana

Faculty	Affiliation
Theresa Manful Gwira	BCMB-Univ. of Ghana
Lydia Mosi	BCMB-Univ. of Ghana
Gordon A. Awandare	BCMB-Univ. of Ghana
Nana Yaw Asare Yeboah	BCMB-Univ. of Ghana
Patrick Arthur	BCMB-Univ. of Ghana
Osbourne Quaye	BCMB-Univ. of Ghana
Neils Quashie	BCMB-Univ. of Ghana
Samuel Duodu	BCMB-Univ. of Ghana
Mark Carrington	University of Cambridge
Jack Sunter	University of Oxford
Paula McGregor	University of Cambridge

G. Bioethics Workshop

WACCBIP held a week-long Bioethics training workshop from November 28-December 2, 2016, for postdoctoral fellows and stakeholders from some universities in Ghana. This workshop was aimed at building the capacity of participants on responsible conduct of scientific research, with emphasis on key ethical issues related to genomics research in Africa. Some topics discussed included the introduction of research ethics, ethical issues in genomic research, community engagement, data sharing, sample export and shipping requirements, and privacy and confidentiality. The full list of participants and faculty members who contributed to the WACCBIP-ASCB workshop is shown in Table 9.



Participants and faculty discussing topics at the workshop

Table 9: Students and Faculty of the Bioethics Workshop from 28/11/2016-02/12/2016

Participant	Affiliation
Akorli Jewelna Efua Birago	WACCBIP-BCMB/NMIMR, University of Ghana
Asante-Poku Wiredu Adwoa	WACCBIP-BCMB/NMIMR, University of Ghana
Diakite Seidina Aboubacar Samba	Malaria Research and Training Center at the University of Science, Techniques, and Technology, Bamako, Mali
Mawusi Dickson	University of Health and Allied Sciences, Ho, Ghana
Acquaah Ezekiel Kojo	College of Basic and Applied Sciences, University of Ghana
Mbengue Alassane	Notre Dame University, USA
Ngo Bitoungui Epse Essomba Valentina Josiane	University of Cape Town, South Africa
Oyebola Kolapo Muiyiwa	Medical Research Unit, Fajara, the Gambia
Aniweh Yaw	WACCBIP-BCMB, University of Ghana
Sangare Modibo	Malaria Research and Training Center at the University of Science, Techniques, and Technology, Bamako, Mali
Kiboi Daniel	Kenya Medical Research Institute, Kilifi, Kenya
Amlabu Emmanuel	WACCBIP-BCMB, University of Ghana

Faculty	Affiliation
Mahamadou Diakite	Malaria Research and Training Centre, Mali
Paulina Tindana	Navrongo Health Research Centre
Angeliki Kerasidou	Oxford University.

H. WACCBIP-ASCB-Oxford Workshop on Molecular Cell Biology of Protozoan Parasites

WACCBIP and the American Society for Cell Biology (ASCB) held the seventh workshop on Molecular Cell Biology of Protozoan Parasites from January 16-27, 2017. This workshop was supported by the University of Oxford, UK. The two-week long workshop was aimed at teaching first year graduate students at the Centre about strategies for modern biomedical research, focusing on the cell biology, immunology and genetic manipulation of protozoan parasites. Faculty were drawn from the University of Oxford, Cornell University, Wellcome Trust Sanger Institute, University of Copenhagen and University of Heidelberg, assisted by colleagues from BCMB and NNIMR as seen in Table 10.



Participants undergoing hands – on laboratory sessions

Table 10: Faculty of the Workshop on Molecular Cell Biology of Protozoan Parasites

Faculty	Affiliation
Jack Sunter	University of Oxford
Friedrich Frischknecht	University of Heidelberg, Germany
Lars Hviid	University of Copenhagen and Rigshospitalet, Denmark
Oliver Billker	Wellcome Trust Sanger Institute
Samuel Dean	University of Oxford
Richard Wheeler	University of Oxford
Sue Vaughan	University of Oxford
Keith Gull	University of Oxford
Kirk William Deitsch	Cornell University
Patrick K. Arthur	BCMB-Univ. of Ghana
Osbourne Quaye	BCMB-Univ. of Ghana
Lydia Mosi	BCMB-Univ. of Ghana
Theresa Manful Gwira	BCMB-Univ. of Ghana
Jonathan Adjimani	BCMB-Univ. of Ghana
Samuel Duodu	BCMB-Univ. of Ghana
Neils Ben Quashie	College of Health Sciences, Univ. of Ghana

I. Sanger Malaria Experimental Genetics Course

The five (5) day African regional course on Malaria Experimental Genetics was organized by the Wellcome Trust Sanger Institute in collaboration with WACCBIP from April 30-May 5, 2017.

The aim of this workshop was to give participants a working knowledge in cutting edge laboratory-based *Plasmodium* experimental genetics techniques, from designing gene targeting vectors and creating transgenic parasites, to phenotyping the strains produced. Faculty were drawn from Wellcome Trust Sanger Institute, UK, Harvard Malaria Initiative, University Cheikh Anta Diop, Senegal, Medical Research Council, The Gambia, WACCBIP, and Kenya Medical Research Institute (KEMRI), Kenya. The list of faculty and students are listed in Table 11.



A group photograph of participants and faculty members

Table 11: Faculty and Participants of the Malaria Experimental Genetics Course

Faculty	Affiliation
Darren Hughes	Wellcome Trust Sanger Institute, UK
Julie Ormond	Wellcome Trust Sanger Institute, UK
Sigrid Ellen Bushell	Wellcome Trust Sanger Institute, UK
Theo Sanderson	Wellcome Trust Sanger Institute, UK
Julian Rayner	Wellcome Trust Sanger Institute, UK
Oliver Billker	Wellcome Trust Sanger Institute, UK
Mehdi Ghorbal	Wellcome Trust Sanger Institute, UK
Rachael Coyle	Wellcome Trust Sanger Institute, UK
Amy Bei	Harvard Malaria Initiative, University Cheikh Anta Diop, Senegal
Alfred Ngwa	Medical Research Council, The Gambia
Daniel Kiboi	WACCBIP, Kenya Medical Research Institute (KEMRI), Kenya
Marcus Lee	Wellcome Trust Sanger Institute, UK

Participants	Affiliation
Muzamil Abdel Hamid	University of Khartoum, Sudan
Jerome Nyhalah Dinga	University of Buea, Cameroon
Bismarck Dinko	University of Health and Allied Sciences, Ghana
Karl-Romeo Imboumy	CIRMF, Gabon
Shadrack Kimani	Karatina University, Kenya
Eliud Odhiambo	KEMRI, Kenya
Sekou Sissoko	Malaria Research and Training Center, Mali
Jimmy Vareta	Blantyre Malaria Project, Malawi
Funmilayo Afolayan	University of Ibadan, Nigeria
Lorna Chebon	US Army Medical Research Unit, Kenya
Aminatou Kone	Malaria Research and Training Center, Mali
Theresia Njuabe Metoh	University of Buea, Cameroon
Loise Ndung'u	KEMRI, Kenya
Isatou Sarr	Medical Research Council, The Gambia
Marie Louise Tshibola Mbuyi	Université des Sciences de la Santé, Gabon
Emmanuel Amlabu	WACCBIP, Ghana
Oheneba Hagan	WACCBIP, Ghana
Karamoko Niare	WACCBIP, Ghana

J. WACCBIP-University of Oxford Microscopy Bootcamp

WACCBIP in collaboration with University of Oxford organized a two-day bootcamp on microscopy for students from different laboratories within the Centre from May 11-12, 2017. The aim of the bootcamp was to train students on various microscopy techniques, especially focusing on the use of the fluorescence microscope. The bootcamp covered the use and maintenance of microscopes as well as immunofluorescence assays, imaging and processing images for publication. The course instructors were Richard Wheeler and Jack Sunter. The list of faculty and students are listed in Table 12.



Facilitators of the microscopy bootcamp

Table 12: Faculty and Participants of the WACCBIP-University of Oxford Microscopy Bootcamp

Faculty	Affiliation
Jack Sunter	University of Oxford
Richard Wheeler	University of Oxford

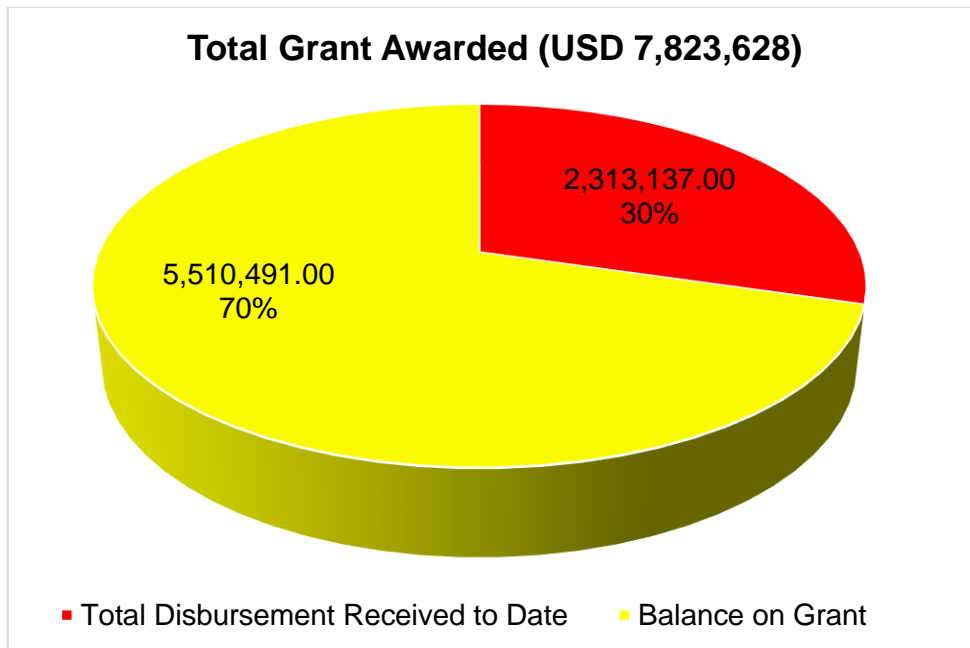
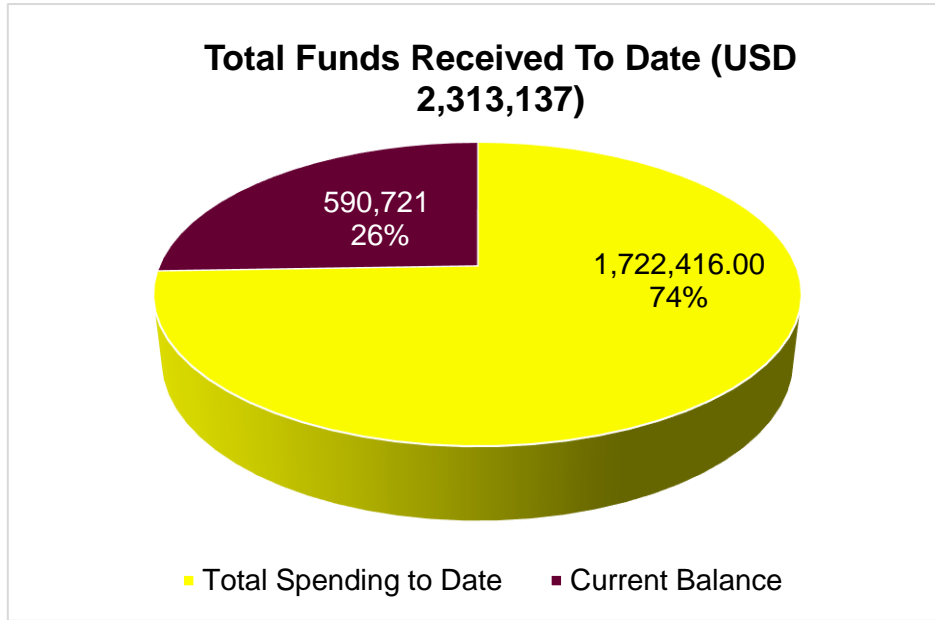
Participants	Affiliation
William Ekloh	WACCBIP – Molecular biology lab
Richmond Ayee	WACCBIP – Virology lab
Ethel Blessie	WACCBIP – Chemical systems lab
Henrietta E. Mensah-Brown	WACCBIP – Infectious diseases research lab
Abiola Isawumi	WACCBIP – Molecular biology lab
Mawuli Adadey	WACCBIP – Virology lab

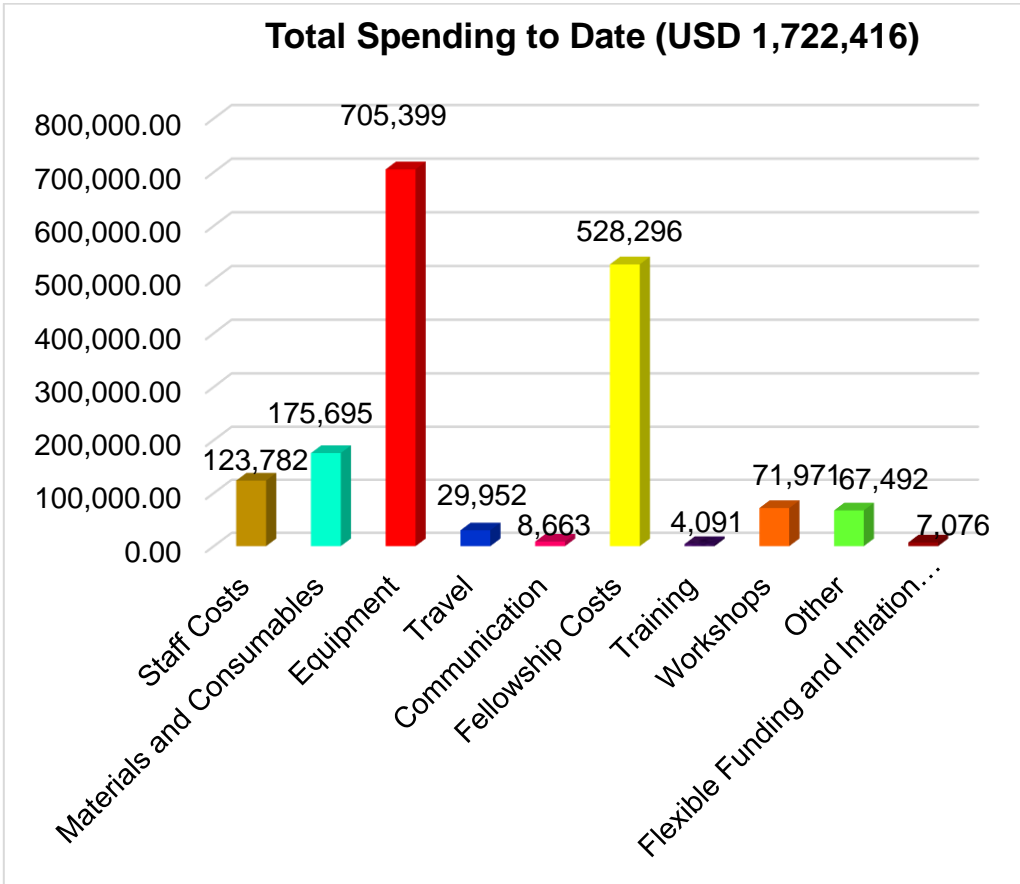
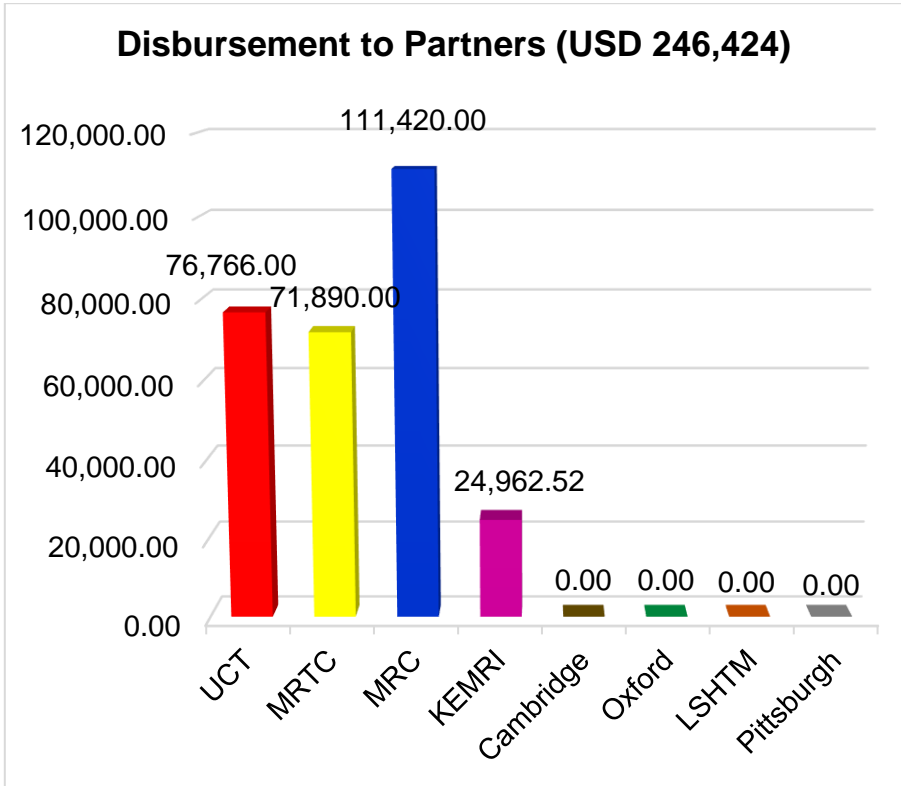
4. DISBURSEMENTS RECEIVED AND EXPENDITURE

DELTA Project funds

A summary of the disbursements received and the corresponding expenditure incurred so far under the DELTA project are presented in figure 4.

Figure 4: WACCBIP-DELTA project disbursement details

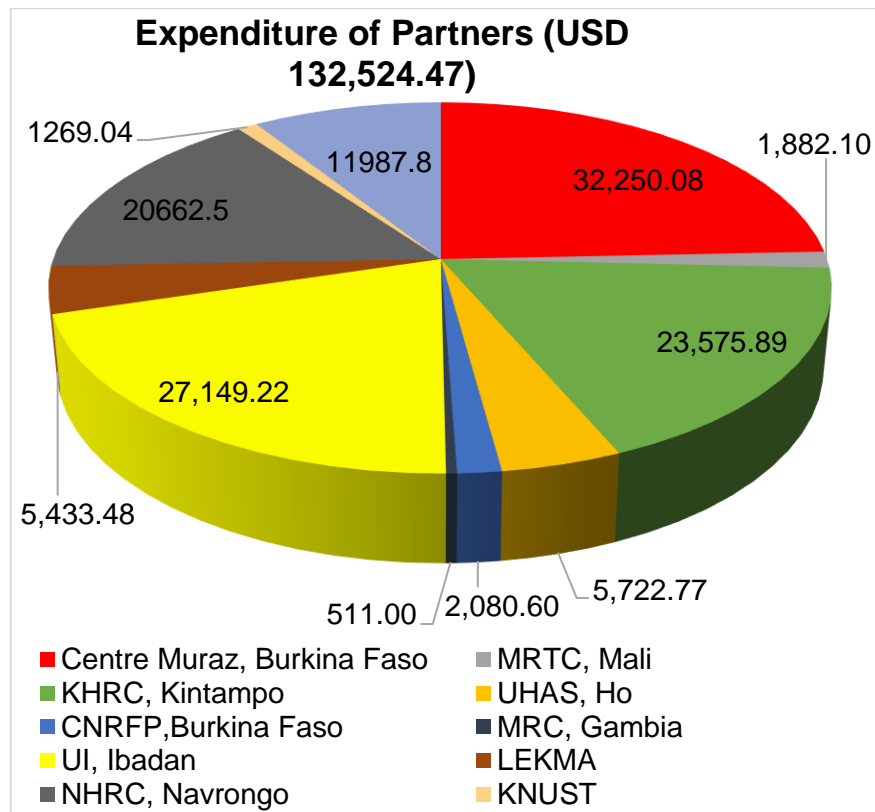
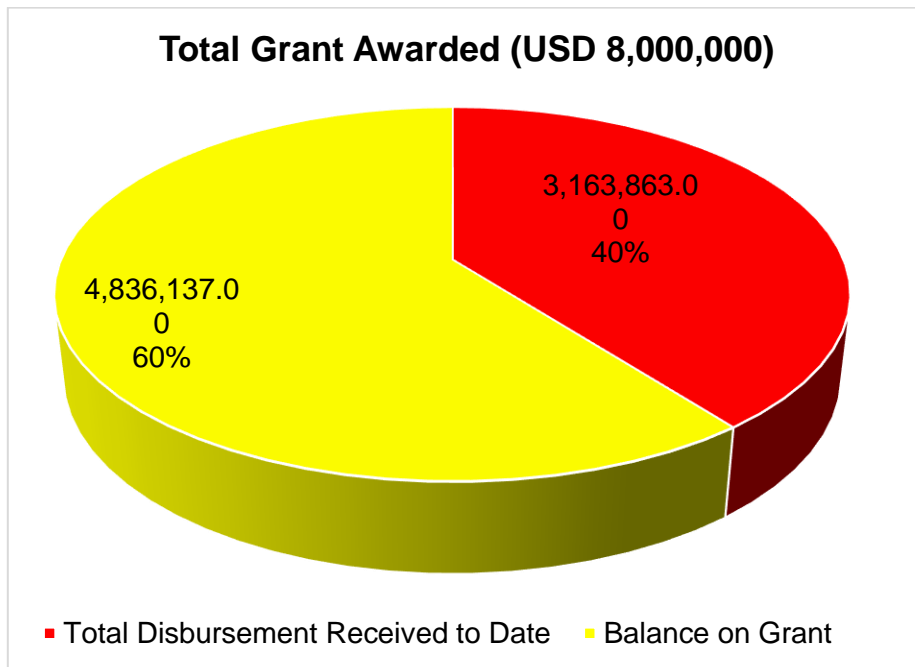




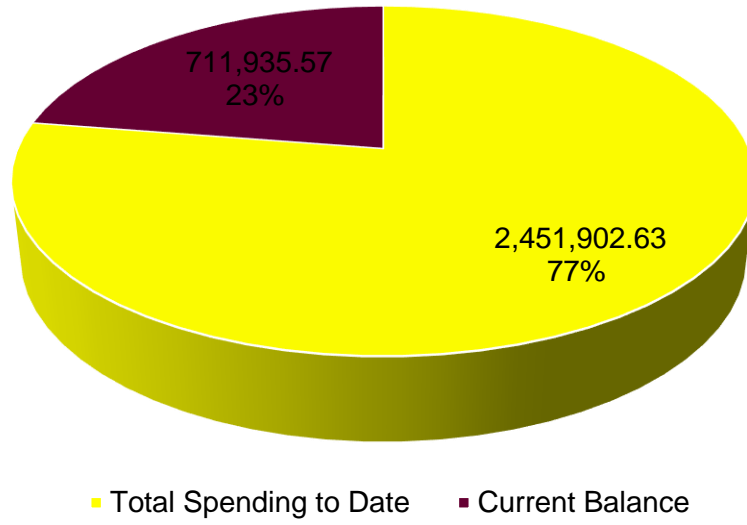
ACE Project funds

A summary of the disbursements received and the corresponding expenditure incurred so far under the ACE project are presented in Figure 5. The details of the amount earned based on verified results can be found in appendix I.

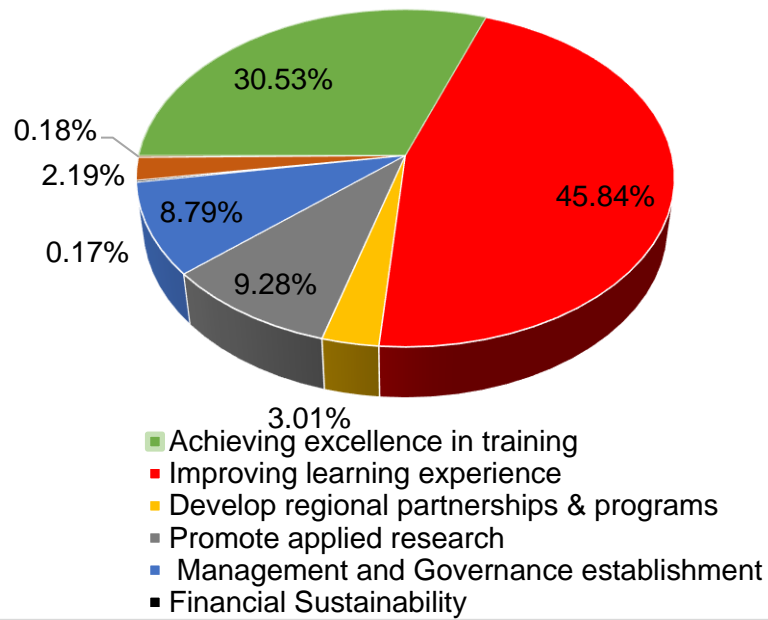
Figure 5: WACCBIP-ACE project disbursement details



Total Funds Received To Date (USD 3,163,838.20)



Total Spending To Date (USD 2,451,902.63)



4.2 External Audit Report

The external audit reports for both DELTAS and ACE projects for the period ending December 31, 2015 have been attached as appendix II and III. In the auditors' opinion, the financial statements, in all material respects, were in accordance with the financial reporting provisions of the projects.

5. IMPROVING THE TEACHING AND RESEARCH ENVIRONMENT

To improve the teaching and learning experience and increase the quality of research at the Centre, some equipment and infrastructure were procured during the reporting period. The list of procured items is in Table 13.

Table 13: Equipment purchased during reporting period

#	DESCRIPTION	QTY	AMOUNT (USD)
1	Centrifuge 5804, 230V/50-60Hz, incl. rotor A-4-44 and 15/50ml adapters	1	10,236.91
2	Biofuge Stratos 230V (Bench top centrifuges) and accessories	2	39,637.59
3	Gel Documentation System (Amersham imager 600 and accessories) and AI600 upgrade to UV	1	56,503.80
4	Nano drop spectrophotometer with accessories	1	22,181.97
5	Quant studio 5 real time PCR system	1	74,625.22
6	Eppendorf thermo mixer C with smartblock 1.5ml for 24 tubes	1	4,207.75
7	Eppendorf electroporator	1	4,893.91
8	Protein purification system (AKTA pure 25L and accessories)	1	50,899.16
9	OHAUS PH meter - ST2100-F	2	1,132.50
10	Magpix xponent 4.2 system and accessories	1	30,856.45
11	Inverted microscope with axiocam camera and accessories	1	22,826.33
12	Mini protean electrophoresis and Mini trans blot module	1	6,508.39
13	Metrohm autolab - PGSTAT204 PGSTAT204 with FRA32M module	1	26,436.55
14	Rotary evaporator with vacuum pump and Seal, and recirculation cooler / other accessories	1	12,463.72
15	CO2 Incubator shaker (New Bruns Wick S4Li) and Accessories	1	15,124.33
16	Thermo Fisher lab storage refrigerators 659L	2	15,936.35
17	Protein analysis system (Blitz system)	1	32,482.25
18	Thermo Fisher Heracell2401SS240LT CO2 Incubator SS 230 VAC	1	17,899.43
19	Thermo Fisher Varioskan LUX, top & bot F, Abs, L, T Micro Plate Reader	1	58,268.36
20	Thermo Fisher-Ultra Low Temperature Upright Freezer	1	23,583.81
21	New Bruns Wick S4Li 230V 50HZ CO2 Incubator shaker and Accessories	1	18,179.51
22	Heraeus Fresco 21 micro centrifuge including 24*1.5/2.0ml rotor with click seal bio-containment LID 230V 50/60 Hz	1	9,571.23

#	DESCRIPTION	QTY	AMOUNT (USD)
23	Thermo Scientific Heraeus microcentrifuge including 24*1.5/2.0ml rotor with click seal bio-containment LID (PICO17)	1	9,571.23
24	Proflex thermocycler with 96 well PCR system	1	14,261.67
25	UV sterilization cabinet with timer, four UV lights and white lights, and tray.	2	4,889.60
26	Ohuas Pioneer PA 323 top loading balance 32080.001kg weight scale	1	1,569.85
27	BD LSRFortessa X-20 and accessories (2 monitors, 1 CPU, 1 Keyboard, 1 HP Printer, 1 stepdown transformer)	1	337,662.24
28	Safefast Elite Class II Micro Biological Safety Cabinets	2	26,021.33
29	Table Top refrigerator	2	356.69
30	2.0 Split Airconditioner	2	1,077.71
31	Dell Optiplex 9020 Desktop Computers	10	11,464.97
32	Sony VPL DX102/140 LCD Data Projector	1	987.9
33	HP Enterprise MFP25F Laser Jet Photocopier	1	7,006.37
34	700VA APC UPS	10	1,019.11
35	Toshiba external hard drive(2.5" High speed USB 3.0 port)	1	90.15
36	2.5 HP Split Airconditioner	8	5,029.54
37	HP probook laptop 450 intel core i5	2	1,264.82
38	Dell Optiplex 9020 RAM desktop (core i5/4GB/500GB) with UPS	1	1,363.06
39	Dell Optiplex 9020 desktop (core i7/8GB/1TB) with UPS	2	2,140.13
40	UPS (maxima 3000VA and SVS 15-22)	2	1,811.59
41	Dell XPS 13, Window 10 Pro, 64-bit, English laptop and accessories	1	2,973.26
42	Cisco WS-2960X-24PSQ-L (Internet switches)	1	4,725.89
43	Dell optiplex 9020 desktop (Intel core i7/3.6GB processor / 2TB / 200GB/8GB memory / RJ45 ethernet port / USB HDMI ports / windows 10 / 24" LED flat screen) with mecury elite 1500VA pro UPS and tenda wireless adaptor	1	1,818.81
44	Projector Sony VPL-DX127	1	710.66
45	Front load dryer washing machine	1	2,630.16
46	WS-C2960+24PC-S CISCO catalyst 2960 switch 10/100 PoE		1,443.49
47	Apple Macbook 15" i7 16GB RAM 256GB HDD retina display touch bar	1	2,704.39
48	External hard drive 2TB Toshiba	2	227.76
49	Gravity ladder	1	129.67
50	Ultima UPS 2000VA	1	287.39
51	Table top fridges	2	395.26
52	Dell desktop (core i7/32GB/6TB) with UPS	1	1,910.41
53	Dell Optiplex 9020 RAM desktop (core i5/4GB/500GB) with UPS	1	1,409.75
54	Dell XPS 13 RAM 12G 256SSD laptop intel core i7	1	1,582.90
55	Dell Inspiron 13 7000 series 1 terabyte i5 laptop	4	2,736.66
56	Dell Optilex 9020 Desktop Computers- - intel core i5 pro - 500GB/4GB RAM - 19" Dell flat screen monitor	4	5,606.60

#	DESCRIPTION	QTY	AMOUNT (USD)
57	Dell optiplex 9020 desktop (Intel core i7/3.6GB processor / 2TB / 200GB/8GB memory / RJ45 ethernet port / USB HDMI ports / windows 10 / 24" LED flat screen) with mercury elite 1500VA pro UPS and tenda wireless adaptor	2	3,637.61
58	Logik 20L manual microwave	1	63.74
		TOTAL	1,017,037.89

6. VISITING FACULTY AND KEYNOTE SEMINARS

Several faculty were engaged to teach the newly introduced 3-credit BCMB 711: Molecular mechanisms of human genetic diseases course. The faculty were:

1. Prof. Solomon Ofori-Acquah, University of Pittsburgh, USA
2. Dr. Mohamed Mutocheluh, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana
3. Prof. Ambroise Wonkam, University of Cape Town, South Africa

Dr. Emmanuel Asante, of the Medical Research Council (MRC) Prion Unit, UK, also gave a lecture to the PhD students on prions. Prof. David Conway of the London School of Hygiene and Tropical Medicine, was also engaged to teach the MPhil and PhD students on Population Genetics, as part of the Host and Pathogen Genomics (MCBI 604) course.



Dr. Emmanuel Asante delivering a lecture to the PhD students

During the bi-weekly graduate seminar presentations, some keynote seminars were delivered by visiting scientists during the reporting period as shown in Table 14.

Table 14: List of Keynote Seminar Presenters

NAMES	INSTITUTION	TOPIC	DATE
Dr. Yaw Bediako	Crick Institute, UK	Protected or not? - The fate of naturally-acquired T cell immunity as Malaria transmission declines	May 8, 2017
Dr. Kwabena A. N. Sarpong	Washington University School of Medicine, St. Louis, USA	Unstructural Studies of the ErbB C-terminals; Probing Disorder in the Epidermal Growth Factor Receptor	April 27, 2017
Isaac Fianu	University of Göttingen, Germany	Towards structural and biochemical understanding of ssDNA deamination by AID	April 6, 2017
Dr. Prosper Kanyong	Ulster University, UK	3D Functional Cardiac Tissue Models for Regenerative Medicine	March 13, 2017
Dr. Prosper Kanyong	Ulster University, UK	Sensing and Biosensing for point-of-care biomedical applications	March 2, 2017
Dr. Lily Paemka	University of Iowa, USA	Seizures Are Regulated by Ubiquitin-specific Peptidase 9 X-linked (USP9X)	February 13, 2017
Dr. Alassane Mbengue	University of Notre Dame, USA	The ER-PI3P vesicle pathway a crucial mechanism of artemisinin resistance in Plasmodium falciparum malaria	December 1, 2016

7. SCHOLARSHIPS AWARDED

Under the World Bank African Centres of Excellence (ACE) project, scholarships were awarded to 24 second-year Masters students, and 6 PhD students based on merit and need. Four (4) needy but brilliant first-year Masters students were also awarded scholarships. All students accepted the awarded fellowships with the exception of Akua Kyerewaa Botwe, who opted for another scholarship offer elsewhere. A breakdown of the scholarships for PhD and Masters Fellowships can be found in Tables 15 and 16 respectively.

Table 15: PhD fellowships

	NAME	PROGRAMME	SCHOLARSHIP AWARD (\$)			
			TUITION FEES	RESEARCH COST	STIPEND	TOTAL AWARD
1	Michael Bright Yakass	PhD MCBI	10,000.00	25,000.00	12,000.00	47,000.00
2	Akua Kyerewaa Botwe	PhD MCBI	10,000.00	25,000.00	12,000.00	47,000.00
3	Diana Ahu Prah	PhD MCBI	10,000.00	25,000.00	12,000.00	47,000.00
4	Elizabeth Gyamfi	PhD MCBI	10,000.00	25,000.00	12,000.00	47,000.00
5	Willian Ekloh	PhD MCBI	-	25,000.00	12,000.00	37,000.00
6	Festus Kojo Acquah	PhD MCBI	10,000.00	25,000.00	-	35,000.00
TOTAL (USD)						260,000.00

Table 16: Masters Fellowships

	NAME	PROGRAMME	SCHOLARSHIP AWARD (\$)			
			TUITION FEES	RESEARCH COST	STIPEND	TOTAL AWARD
1	Yeboah Rebecca	MPhil MCBI	2,000.00*	-	1,800.00	3,800.00
2	Ansah Felix	MPhil MCBI	2,000.00*	-	1,800.00	3,800.00
3	Kwadwo Awudu Daniel Aquah	MPhil MCBI	2,000.00*	-	1,800.00	3,800.00
4	Isaac Carilo	MPhil MCBI	2,000.00*	-	1,800.00	3,800.00
5	Raphael Lartey Abban	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
6	Justice Adzigbe	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
7	Ranee Aflakpui	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
8	Sedem Agbemafle	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
9	Caroline Boatemaa Agyare	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
10	Priscilla Abena Akyaw	MPhil Molecular Biology	1,500.00	5,000.00	-	6,500.00
11	Selassie Louis Ameke	MPhil MCBI	1,500.00	-	-	1,500.00
12	Nsoh Godwin Anabire	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
13	Emmanuel Opoku Antwi	Mphil Molecular Biology	1,500.00	5,000.00	-	6,500.00
14	Asema Diana Asandem	MPhil MCBI	1,500.00	-	1,800.00	3,300.00
15	Felix Alexander Ayelazuno	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
16	Pheonah Badu	MPhil MCBI	1,500.00	-	1,800.00	3,300.00
17	Charles Chess Essel	MPhil MCBI	1,500.00	5,000.00	-	6,500.00
18	Erasmus Nikoi Kotey	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00

19	Ernestine Kubi	MPhil Molecular Biology	1,500.00	5,000.00	-	6,500.00
20	Sylvester Languon	MSc Biochemistry	300.00	1,250.00	-	1,550.00
21	Elizabeth Laryea-Akrong	MPhil MCBI	1,500.00	5,000.00	1,800.00	8,300.00
22	Musah Osei	MPhil MCBI	1,500.00	5,000.00	-	6,500.00
23	Shirley Victoria Simpson	MPhil MCBI	1,500.00	-	-	1,500.00
24	Isaac Tuffour	MPhil Biochemistry	1,500.00	5,000.00	-	6,500.00
25	Kwasi Oduro Yeboah	MSc Biochemistry	300.00	1,250.00	-	1,550.00
TOTAL (USD)						141,600.00

Including accommodation costs*

8. NEW GRANTS WON BY WACCBIP FACULTY AND STUDENTS

Some faculty received grants and fellowships during the 2016/2017 reporting year. Some of these grants will help cover student costs, such as tuition fees, stipend, and research costs. A list of the grants won by faculty that during the last year is shown in Table 17.

Table 17: Grants won by Faculty

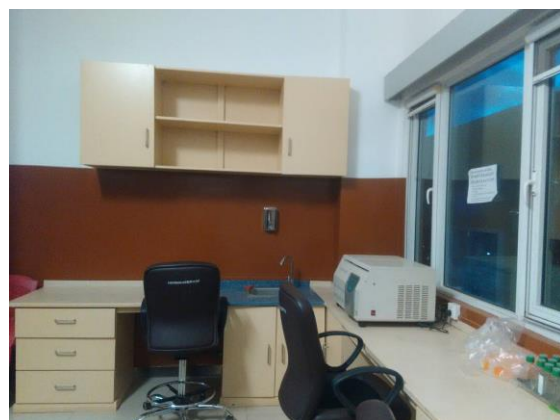
Title	Brief Description of the Award	WACCBIP faculty awarded	Grant PI	Amount and Period
Identification of specific metabolites in mycolactone producing bacteria and Buruli ulcer infection: diagnostic biomarkers through metabolomic	A Medical Research Council (MRC) grant as part of the Global Challenge Research Fund (GCRF) awarded to researchers in the UK in collaboration with researchers in developing countries to address a global problem	Dr Lydia Mosi	Prof. Julian Griffin (Cambridge) Dr. Lydia Mosi	\$220,603.51 2017-2019
The Dynamics of Filovirus infections in bats in Ghana	A Medical Research Council (MRC) grant as part of the Global Challenge Research Fund (GCRF) awarded to researchers in the UK in collaboration with researchers in developing countries to address a global problem	Dr Osbourne Quaye	Prof. James Wood (Cambridge)	\$742,297.62 2017-2019
Transcriptomics of African Fruit Bats in response to Ebola virus antigens	A Royal Society Challenge grant as part of the Global Challenge Research Fund (GCRF) awarded to researchers in the UK in collaboration with researchers in developing countries to address a global problem	Dr Osbourne Quaye	Dr. Olivier Restif (Cambridge)	\$123,000.00 2017
Pocket-i-nucleic acid diagnostic (pi-NAD)	The Royal Society has awarded a grant entitled "pocket-i-nucleic acid diagnostic (pi-NAD)" under the International Collaboration Award for Research.	Prof. Gordon Awandare	Prof. Elizabeth Hall (Cambridge) Prof. Gordon Awandare	£319,385.00 2016-2021
Tackling Infections to Benefit Africa	The Global Health Research-Units has awarded a grant to create a new multidisciplinary Centre for Tackling Infections to Benefit Africa (the TIBA Centre).	Prof. Gordon Awandare	Prof Mark Woodhouse (Edinburgh)	£6,886,852.00 2017-2021

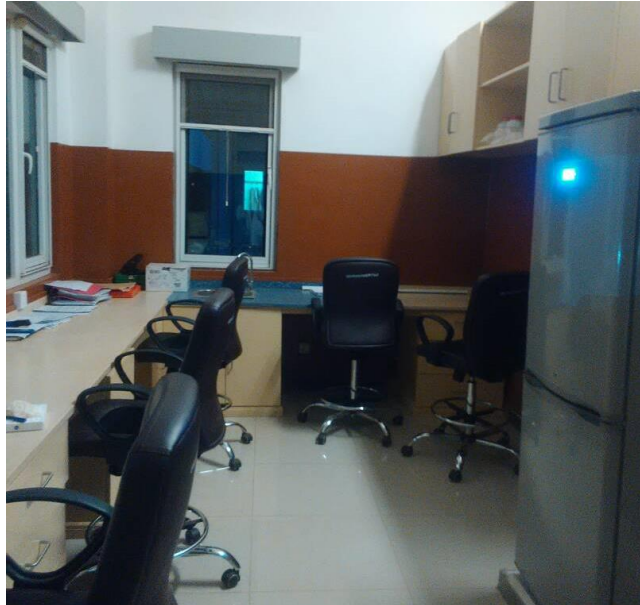
GCRF-Crick African Network	The Global Challenges Research Fund (GCRF) has awarded a collaborative grant to establish the Crick African Network (CAN), a UK-Africa collaboration, to advance high-level capacity for research in poverty-related infectious disease.	Prof. Gordon Awandare	Prof Robert Wilkinson (Crick)	£6,258,293.00 2017-2021
SickleGenAfrica: Sickle Cell Disease Genomics Network of Africa	The NIH has awarded a U54 H3Africa grant to support the establishment of a Centre of Excellence for Sickle Cell research at the University of Ghana	Prof. Solomon Ofori-Acquah Prof. Gordon A. Awandare	Prof. Solomon Ofori-Acquah Prof. Gordon A. Awandare Prof. Julie Makani (Muhimbili University, Tanzania)	\$5,249,292.00 2017-2022

9. NEW PARTNERSHIP AGREEMENTS

WACCBIP/KNUST- WACCBIP has signed a partnership agreement with the Department of Clinical Microbiology at the Kwame Nkrumah University of Science and Technology, Kumasi. Under this agreement WACCBIP has committed \$27,000.00 for the training and research of Masters and PhDs students as well as travel costs for faculty and students who move between the two institutions.

WACCBIP/LEKMA- WACCBIP has also signed a partnership agreement with the Ledzokuku Krowor Municipal Assembly (LEKMA) Hospital at Teshie. Under this agreement, WACCBIP has committed \$30,000.00 for laboratory upgrade, collaborative research and training of laboratory personnel. The lab has been set up with benches, swivel chairs, air conditioners and some laboratory equipment as seen in the pictures below:





New research lab at LEKMA

WACCBIP/UDS- WACCBIP signed a MoU with the Department of Biochemistry and Molecular Medicine, University of Development Studies. Under this arrangement, WACCBIP has committed USD 30,000 for laboratory upgrades and joint research activities.

WACCBIP/ARA-W – WACCBIP has signed a MoU with the African Research Academies for Women. Under this agreement, the 2 institutions will undertake the following:

- Exchange of undergraduate and postgraduate students
- Exchange of staff, sabbaticals
- Joint research projects and grant applications
- Mutual assistance in the establishment of new programmes
- Exchange of information and publications
- Organization of conferences and workshops
- Access to scientific and analytical facilities

10. WACCBIP STUDENT PUBLICATIONS

1. **Ademolue, T.**, Amodu, O., & Awandare, G. A. (2017). Sickle cell trait is associated with controlled levels of heme and mild pro-inflammatory response during acute malaria infection. *Clinical & Experimental Immunology*, DOI: 10.1111/cei.12936
2. **Mensah-Brown, H. E.**, Abugri, J., Asante, K. P., Dwomoh, D., Dosoo, D., Atuguba, F., Conway, D. J., & Awandare, G. A. (2017). Assessing the impact of differences in malaria transmission intensity on clinical and haematological indices in children with malaria. *Malaria Journal*, 16:96, DOI 10.1186/s12936-017-1745-8, 1 March 2017
3. **Ademolue, T.W.**, Aniweh, Y., Kusi, K. A. & Awandare, G.A. (2017). Patterns of inflammatory responses and parasite tolerance vary with malaria transmission intensity. *Malaria Journal*, 16:145
4. **Bakari, S. M.**, Ofori, J. A., Kusi, K. A., Aning, G. K., Awandare, G. A., Carrington, M. & Gwira, T. M. Serum biochemical parameters and cytokine profiles associated with natural African trypanosome infections in cattle. *Parasites & Vectors* 2017 10:312

Table 18 shows manuscripts which are in preparation or have been submitted to various journals by WACCBIP students from the first cohort who received the ACE Masters fellowships.

Table 18 – Manuscripts in preparation or submitted by WACCBIP students

Authors	Title of paper	Journal
Victor Letsa , Osbourne Quaye, Susan Damanka, Francis Dennis, George E. Armah, Naga Betrapally, Rashi Gautam, Mathew Esona, Michael Bowen	Distribution of rotavirus genotypes in the post-vaccine introduction era in an insanitary setting of the Greater Accra Region of Ghana	Virology journal
Kennedy Kwasi Addo, Samuel Ofori Addo , Gloria Ivy Mensah, Lydia Mosi, Frank Addae Bonsu	Genotyping and Drug Susceptibility Testing of Mycobacterial Isolates from Population-based Tuberculosis Prevalence Survey in Ghana	BMC Infectious Diseases
Arnold T. Luuse , Ewurama D. A. Owusu, Benjamin Arko-Boham, Martin Adjuik, Laty G. Thiam , Huseini Alidu, George O. Adjei	Sulphadoxine-pyrimethamine use during pregnancy may not prevent placental malaria: a Systematic review and meta-analysis	Malaria research and treatment
Arnold T. Luuse , Ewurama D. A. Owusu, Benjamin Arko-Boham, Huseini W. Alidu. Gideon Kye-Duodu, George O. Adjei	Promoting adherence to malaria treatment regimen through mobile phone text messaging: Systematic review and meta-analysis	Yet to be submitted
Arnold T. Luuse , Kwadwo A. Kusi, Sylvester Dassah, Bawa Tijani, John Nsoh , Huseini Alidu, Patrick Owiafi, Emmanuel Allotey , Bernice Berko	Asymptomatic Malaria and Anaemia among School Children in Ho Municipality, Ghana	Yet to be submitted
Adiza Abass , W.S.K Gbewonyo, Regina Appiah-Opong, Elizabeth Gyamfi, Phyllis Addo, Lydia Mosi	Evaluation of the antimycobacteria and antimycolactone efficacy of Kombucha tea	BMC, Environmental and applied microbiology
Sandra A. King , Bibian Onayifeke, Jewelna Akorli, Isaie Sibomana, Joseph Chabi, Theresa Manful-Gwira, Samuel Dadzie, Takashi Suzuki, Michael	The role of detoxification enzymes in the adaptation of the major malaria vector Anopheles gambiae to polluted water.	The Journal of Medical and Veterinary Entomology

D. Wilson, Daniel A. Boakye, Dziedzom K. de Souza		
Joshua Kuleape, Emmanuel A. Tagoe , Evelyn Y. Bonney, Gordon Awandare, Osbourne Quaye	Homozygous deletion in both GSTM1 and GSTT1 is associated with higher CD4 T cell counts in Ghanaian HIV patients	PlosOne
Selase D. Deletsu , Edward K. Maina, Osbourne Quaye, William K. Ampofo, Gordon A. Awandare, Evelyn Y. Bonney	High resistance to Nevirapine and Efavirenz in CRF02_AG and dual CRF02_AG/G subtype HIV-1 infection in Ghanaian patients	Journal of International AIDS Society (JIAS)
Joshua Kuleape, Emmanuel A. Tagoe , Evelyn Y. Bonney, Gordon Awandare, Osbourne Quaye	Oxidative stress and antioxidant enzymes activities in Ghanaian HIV patients	Journal of Free Radicals and Antioxidants
Stephen Osei-Wusu , Michael Amo Omari, Adwoa Asante-Poku, Isaac Darko Otchere, Prince Asare , Audrey Forson and Dorothy Yeboah-Manu	Evaluation of Genotype MTBDRsl version 2.0 for rapid detection of second-line anti-tuberculosis drug resistance in Ghana	Journal of Antimicrobial Chemotherapy
Kwadwo A. Kusi, Emmanuel A. Manu , Theresa Manful Gwira, Eric Kyei-Baafour, Emmanuel K. Dickson, Jones A. Amponsah, Edmond J. Remarque, Bart W. Faber, Clemens H.M. Kocken, Daniel Dodoo, Ben A. Gyan, Gordon A. Awandare, Frank Atuguba, Abraham R. Oduro, Kwadwo A. Koram	Variations in the quality of malaria-specific antibodies with transmission intensity in a seasonal malaria transmission area of Northern Ghana	Yet to be submitted
Daniel Addo-Gyan , Michael Fokuo Ofori, Gordon Awandare, Michael David Wilson	The effects of serotonin, and demonstration of cAMP and cGMP involvement in gametocytogenesis of Plasmodium falciparum in-vitro	Yet to be submitted

Other student publications published during this period are shown below:

1. Yeboah-Manu, D., **Asare, P.**, Asante-Poku, A., Otchere, I.D., **Osei-Wusu, S.**, Danso, E., Forson, A., Koram, K.A. & Gagneux, S. (2016). Spatio-temporal distribution of *Mycobacterium tuberculosis* complex strains in Ghana. *PLoS ONE*; Volume 11, Issue 8, August 2016, Article number e0161892
2. Tsouh Fokou, P.V., Appiah-Opong, R., Yeboah-Manu, D., **Kissi-Twum, A.A.**, Yamthe, L.R.T., Mokale Kognou, A.L., Addo, P., Boyom, F.F. & Nyarko, A.K. (2016). Antimycobacterial potency and cytotoxicity study of three medicinal plants. *International Journal of Mycobacteriology*; Volume 5, 1 December 2016, Pages S206-S207
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11. WACCBIP PUBLIC ENGAGEMENT

GTV INTERVIEW: As part of the Centre's outreach drive, Prof Gordon Awandare was granted an interview on GCB on March 13, 2017 on the Moomen Tonight Show. The topic for discussion was "Challenges facing Science Research and Training". Prof. Awandare called for more commitment to funding science and research, if Africa is to make up the deficient in numbers of researchers per million population, relative to the developed countries. He also highlighted some of the challenges in procurement of laboratory equipment and reagents due to the bureaucratic procurement process in the country. He advised that a parallel procurement process should be introduced for ease of procurement of equipment and reagents as these delays hamper research work since research is time-bound. He took the opportunity to talk about the activities of WACCBIP and some of the accomplishments of faculty, fellows, and students of the Centre. He also made a call to corporate organizations to support students of the Centre through award of scholarships. Generally, the interview was a success and GTV agreed to visit the Centre to grant a special feature on activities at the Centre.

WACCBIP OUTREACH PROGRAMME TO SENIOR HIGH SCHOOLS: The first cohort of Graduate Interns at the Centre successfully organized a Senior High School outreach programme. The first outreach event took place at Ada Senior High School in the Ada East District on February 17, 2017 and the second event was at Ningo Senior High School in the Dangme East District on February 22, 2017, both in the Greater Accra Region. The main purpose of the outreach was to increase general awareness about the activities, programmes and facilities at WACCBIP to both students and teachers of Ada and Ningo Senior High Schools. Additionally, to motivate and inspire students, especially females to enjoy, understand and pursue science, technology, engineering and mathematics, by connecting them with outstanding role models and mentors from WACCBIP.

CORPORATE OUTREACH: The project manager consulted Mr Alex Asiedu and Mrs Mawusi Agyemfra on how to push the corporate partnership agenda. Ideas coming out of the meeting included a list of interested companies, developing a power point to make presentations to these organizations and developing a brochure to highlight the successes of the project so far. Upon approval from management, the in-house team has developed the brochure and power point and have already distributed them to companies including Ecobank Ghana, Nestle, Guinness Ghana, MTN Ghana etc.

12. CHALLENGES AND RISKS

The procurement of reagents and equipment continuous to be the major challenge that is slowing down the Centre's research activities. National procurement procedures are cumbersome and mostly unsuitable for purchasing scientific supplies and reagents. The process is characterized by long delays and higher prices, bringing into question the whole essence of the regulations. These procurement challenges have been significantly aggravated by a new government policy that requires all importers, including educational institutions, to pay the full Customs duties before items could be cleared from the ports. Institutions which qualify for exemption could then apply for a refund from government. Hitherto, we were exempted from the duties at the port, and did not have to pre-finance it. The Director of the Noguchi Memorial Institute for Medical Research has been engaging the Ministry of Finance, with the goal of negotiating a system for the safe passage of reagents through the ports. In the meantime, we are relying heavily on the kindness of Prof Mark Carrington at Cambridge, and other UK colleagues, to buy reagents for us.

WACCBIP ANNUAL REPORT TO ADVISOR BOARD -2017- APPENDICES

Appendix I: Verification of Results and Approval of Disbursements for ACE project

Appendix II: DELTAS Financial and Management Letter December 31, 2015

Appendix III: ACE Financial and Management Letter December 31, 2015