



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative

## USAID/UCC FISHERIES AND COASTAL MANAGEMENT CAPACITY BUILDING SUPPORT PROJECT

### DFAS POSTGRADUATE

# RESEARCH

## AT A GLANCE

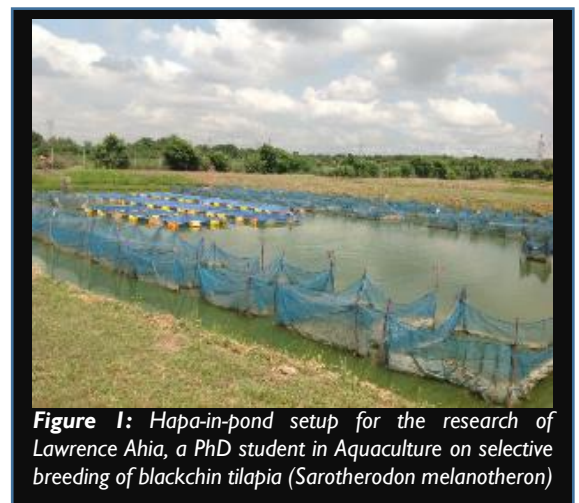
**29 JAN. 2018 – Inside this brief**

- Reports on some postgraduate research activities at the Department of Fisheries and Aquatic Science, DFAS – UCC
  - Presentations by DFAS students at CFCE 2017
    - Read about success stories from DFAS
  - Program details of DFAS full scholarship students

### **1. Selective breeding of the Blackchin tilapia**

As marine fish production continues to decline, aquaculture is currently being promoted in Ghana as one of the ways of addressing this challenge. However, there is inadequate scientific knowledge on the biology and culture potential of many fish species, which is also a challenge that must be addressed if aquaculture is to be promoted as a viable business. The project is carrying out scientific studies on the biology and culture of brackishwater fish resources, mainly tilapia and oysters to generate data and information needed to increase fish production from aquaculture.

Lawrence Ahia, a PhD student in Aquaculture is investigating the potential of selective breeding in the propagation of a common coastal tilapia species, blackchin tilapia. This will promote the use of the species on fish farms, especially in coastal Ghana, by improving culture performance.



**Figure 1:** Hapa-in-pond setup for the research of Lawrence Ahia, a PhD student in Aquaculture on selective breeding of blackchin tilapia (*Sarotherodon melanotheron*)

### **2. Feed formulation using local fish feed ingredients**

Prince Dela Tseku has graduated successfully with an MPhil (Aquaculture) Degree with full scholarship support from the project. His research focused on the use of locally available natural ingredients for the formulation of tilapia feed, which has contribute to existing knowledge on tilapia aquaculture in Ghana. His fish feed will help small scale tilapia farmers cut down on production cost by using on-farm prepared fish feed.

### **3. The fishery and farming potential of Mangrove Oysters in Ghana**



**Figure 2:** Tilapia feed preparation; pelleting by DFAS MPhil (Aquaculture) student



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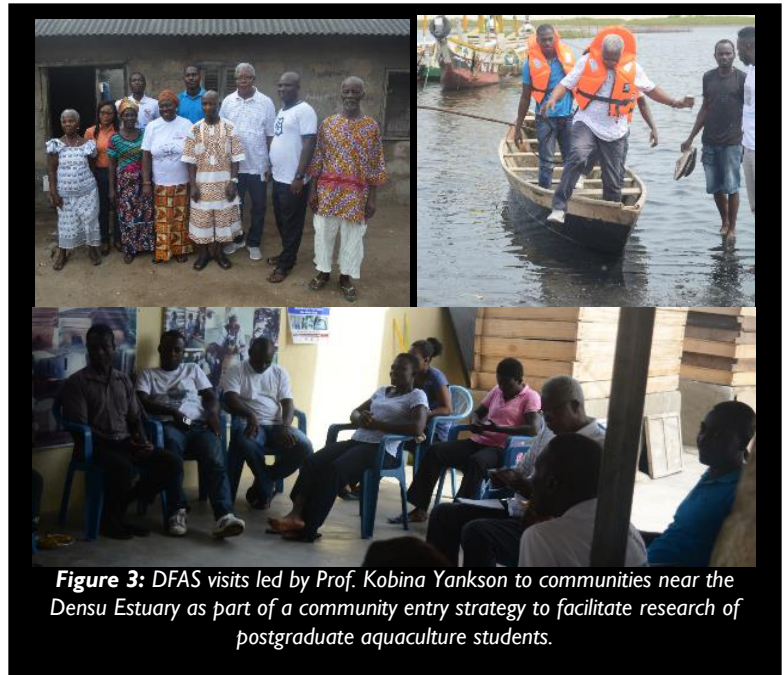
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Isaac Osei, a second year PhD (Aquaculture) student is conducting research on the fishery, aspects of the biology and culture of the mangrove oyster *Crassostrea tulipa* population at Densu Estuary in Ghana. To facilitate the research, a community entry strategy was employed by paying an initial visit to the communities near the Densu Estuary to declare their intent to community leaders and seek their consent. They also had a brief discussion with the oyster fishers association within the communities. Findings from research of this kind will inform the decision by project management to promote the aquaculture of finfish and shellfish species as an additional supplementary livelihood activity in coastal communities.

On the Departmental level, DFAS is also conducting field experiments in four coastal communities to test strategies for collecting oyster spat from water bodies that have thriving natural populations in order to determine spatial and temporal distribution of spat as well as the most efficient of five materials for their collection. These include the Whin Estuary, Benya Lagoon, Narkwa and the estuarine areas of the Densu River Delta.



**Figure 3:** DFAS visits led by Prof. Kobina Yankson to communities near the Densu Estuary as part of a community entry strategy to facilitate research of postgraduate aquaculture students.



**Figure 4:** (Left) Bamboo racks used to support spat collectors (right) oyster spat set on tile collector after one month.

## SPOTLIGHT: STUDENT EXCHANGE PROGRAMME AT UNIVERSITY OF RHODE ISLAND



Four PhD students from DFAS spent up to four months at the University of Rhode Island where they took various courses relating to their respective programmes. They were engaged in a number of activities, which some of them describe as life-time experiences that have exposed them to the “world out there”. One of them (Margaret Dzapkasu; see red arrow), in a biological oceanography class, had the opportunity to participate in measuring jelly fish during a study cruise on the Narragansett Bay.



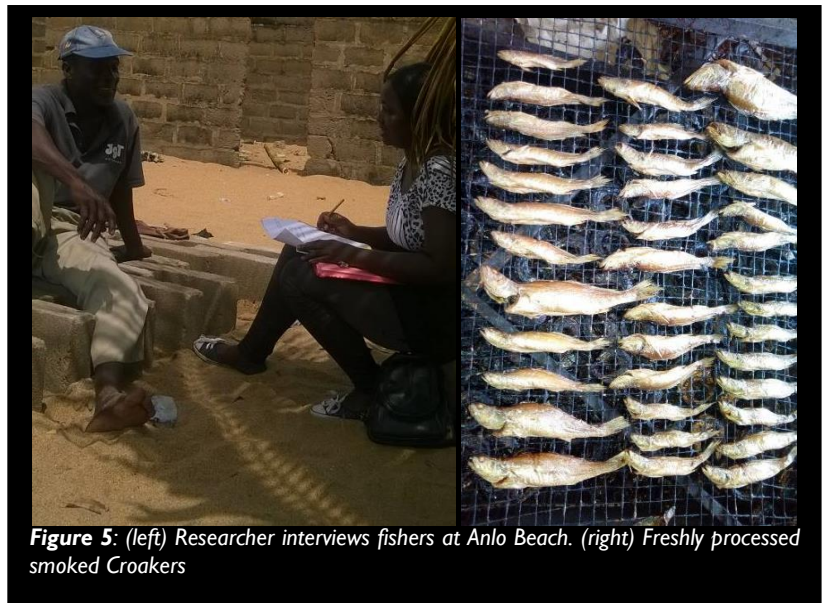
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*Mercy Johnson is investigating the effect of some spices such as ginger and garlic in fish diets on the immunity of the lagoon (blackchin) tilapia for disease resistance and enhanced growth*

#### 4. Analysis of value chain in “Cassava fish” (Croaker)

Lesley Ntim, a female DFAS PhD student who was admitted in Year 3 is currently working on the topic “Value chain analysis of *Pseudotolithus* species towards food security in Ghana”.

The information she generates from her research will serve as a baseline for management and decision making on the fishery for the fish. The study is expected to produce data on the value chain analysis of the sciaenids of which *Pseudotolithus* species is part to serve as a baseline on the issues of production (harvesting), processing, marketing, export and consumption. Profit margins and revenue generated from the export of this fish will also be established by this research. The study will identify and address challenges along each step of the value chain, provide information to inform policy making and create opportunities for the actors and other stakeholders involved in the fishery. This research has the potential to generate useful information and knowledge on value chains of fish trade.



**Figure 5:** (left) Researcher interviews fishers at Anlo Beach. (right) Freshly processed smoked Croakers

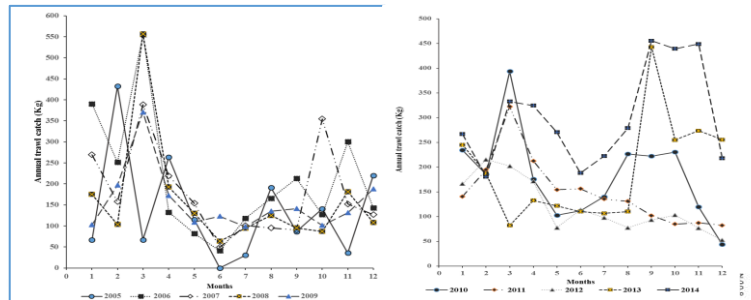


Fredrick Jonah is tracking the dynamics of nutrients in coastal wetlands as an important tool in determining the health of coastal ecosystems.

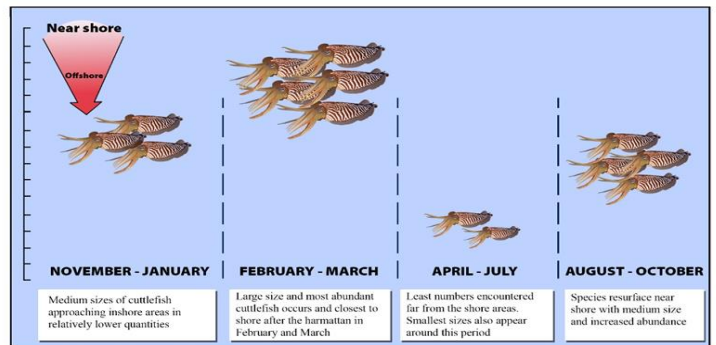
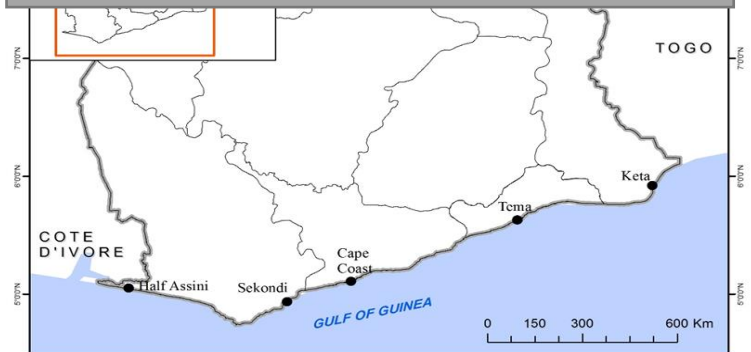
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### 5. Research on habitat distribution and seasonal abundance of Cuttlefish in Ghana's marine waters

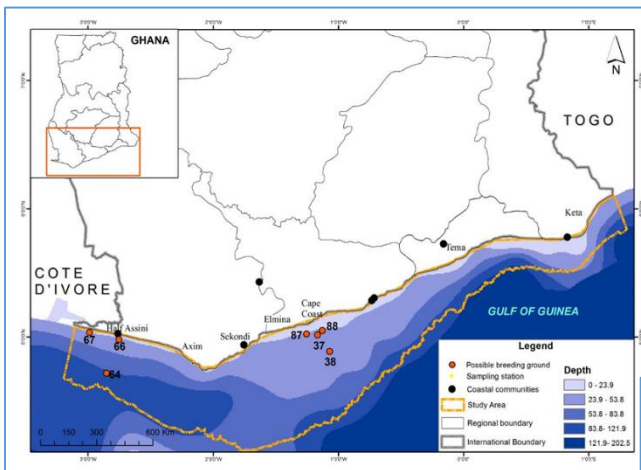
Pearl Sakyi-Djan has completed her MPhil (Fisheries Science) study at DFAS with full scholarship support from the USAID/UCC Fisheries Project. She made interesting findings about the popular bottom dwelling fish, which is a delicacy in Ghanaian diets and of high value. The study identified two out of the three species of cuttlefish known to occur in Ghanaian waters during the 2016 Ghana survey with RV Dr. F. Nansen and that *S. officinalis* does not inhabit Ghanaian waters. The study identified the seasonal abundance and the migratory behaviour of the cuttlefish. Two peak seasons of cuttlefish were observed to occur between January and April being the major and August to December, the minor (FSSD catch data). Pear is working to publish her research findings in high impact factor



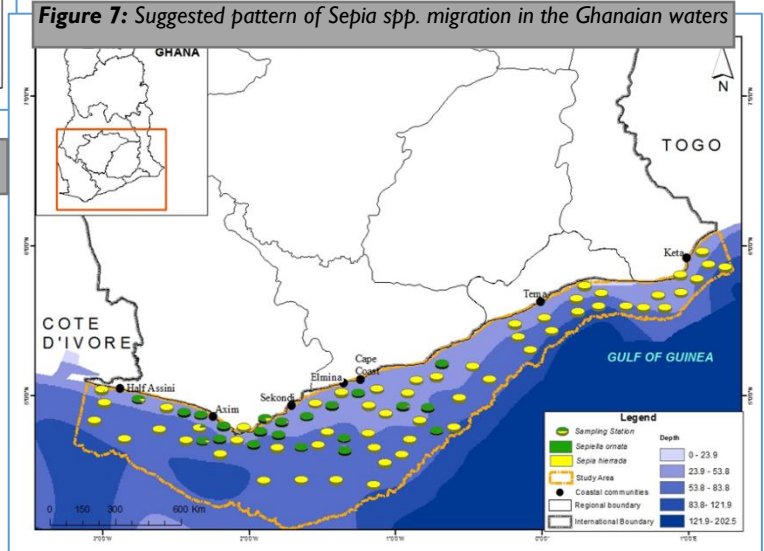
**Figure 6: Annual cuttlefish catch from 2005-2014**



**Figure 7: Suggested pattern of *Sepia* spp. migration in the Ghanaian waters**



**Figure 8: Possible cuttlefish breeding grounds in Ghanaian waters**



**Figure 9: Distribution of *Sepia* spp. in Ghanaian waters**



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## **Presentations made by DFAS students at the Conference on Fisheries and Coastal Environment (CFCE), September 2017**

- ✓ **A New Tool to Improve Fisheries Monitoring, Surveillance and Control Capabilities in Ghana**  
Agyei, D., Aheto, D. W., Wiafe, G. and Adu-Agyekum, K.
- ✓ **An Alternative Livelihood for Rural Coastal Communities in Ghana: A Focus on the Culture of Mangrove Oyster**  
Asare, B., Obodai, E. A. and Acheampong, E.
- ✓ **Assessment of the Ecological Conditions of the Ankrobra Estuary and its Implications for Livelihoods**  
Effah, E. and Aheto, D. W.
- ✓ **Assessment and Characterization of the Lobster (Palinuridea) Fishery in Ghana**  
Fynn-Korsah, S., Aggrey-Fynn, J. and Okyere, I.
- ✓ **Assessment of the Ecological Health of the Kakum and Pra Estuaries' Mangrove Forests in Ghana**  
Dali, G. L. A., Aheto, D. W. and Blay, J.
- ✓ **Coastline Dynamics: Implication for Environmental Sustenance and Biodiversity Conservation in the Songor Ramsar Site and UNESCO Biosphere Reserve, Ada, Ghana**  
Agyeman, D. Y.
- ✓ **Development of PCR-Based Methods for Diagnosis of Fungal Infections in Cultured Fish (*Oreochromis niloticus*) in Ghana**  
Sakyi, R. L., Yankson, K., Aheto, D. W. and Osei-Atweneboana, M. Y.
- ✓ **Distribution and Eco-Toxicological Effects of PAHs in Selected Coastal Lagoons in Ghana**  
Duker, R. Q., Asare, N. K. and Obodai, E. A.
- ✓ **Hydrodynamic Influence on the Utilization of a Tropical Estuarine System by Fish Fauna**  
Sam, N. C. and Asare, N. K.
- ✓ **Mapping Potential Fishing Zones in Support of Inshore Fisheries Management in Ghana**  
Debrah, E. A., Wiafe, G., Agyekum, K. A. and Aheto, D.
- ✓ **Minimizing Losses in Cultch Construction Materials towards a Profitable Oyster (*Crassostrea tulipa*) Farming Business in Coastal Ghana**  
Chuku, E. O. and Osei, I. K.
- ✓ **Role of Sediment Transport in Organic Matter Dynamics of the Kakum River Estuarine System, Ghana**  
Asante, F. and Asare, N. K.
- ✓ **Reinforcing What We Know About Beach Evolution: Lessons from Ten Years of Beach Monitoring in Ghana**  
Jonah, F. E.
- ✓ **Review of Existing Marine Protected Areas (MPA) Around the Globe towards the Establishment of Ghana's MPAs.**  
Jonah, A., Aheto, D. W. and Okyere, I.
- ✓ **Sediment-Water Nutrient Dynamics and Biogeochemical Models in Selected Coastal Ecosystems in Ghana.**  
Jonah, F. E., Asare, N. K. and Acheampong, E.



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# SUCCESS STORY



DFAS undergraduate students on their graduation day for the 2015/16 academic year; September, 2016.

## Improved Enrolment and Excellence in Performance at the Undergraduate Level

The enrolment of students into the undergraduate BSc. Program in Fisheries and Aquatic Sciences has generally seen marked improvement since the beginning of the USAID support to DFAS. Hitherto, DFAS suffered setbacks in student enrolment due to misconceptions concerning the name of the Department. The increase in enrolment since 2004/2005 academic year has come along with improved academic performance of the students. DFAS now has recorded successes of First and Second Class (Upper Division) students. This is as a result of the better quality of incoming students that are attracted to the Department in view of the improved infrastructure, logistical support and provision of small grants in support of undergraduate work. Improved communication through the project's activities and the involvement of students in some aspects of the project including their involvement in project seminars has exposed them to the opportunities in the fisheries sector of Ghana.



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# SUCCESS STORY



**Left:** RV Dr. Fridtjof Nansen. **Right:** Pearl analyses cuttlebone of *Sepia sp.* in a laboratory on board RV Nansen

PEARL SAKYI-DJAN, an MPhil Candidate in Fisheries Science and funded through the USAID grant has been involved in some life changing experiences first through her nomination to participate in this year's Ghana Fisheries Survey organized by the Ministry of Fisheries and Aquaculture Development (MoFAD) in conjunction with the Food and Agriculture Organization (FAO) and a Norwegian research vessel Dr. Fridtjof Nansen. In April, 2016, the vessel conducted exploratory surveys of Ghanaian waters to update the data and information base of Ghanaian marine fisheries resources. The Ecosystem Approach to Fisheries (EAF)-Nansen project is intended to strengthen fisheries knowledge for the implementation of an Ecosystem Approach to Marine Fisheries in Developing Countries. This was a first time experience for a student on the USAID funded program within DFAS to participate in this voyage on the famous RV Dr. Fridtjof Nansen vessel. There was technical skills that was gained working with other fisheries and oceanographic experts from Norway, Italy among others and the sharing ideas and networking opportunities. This survey exposed her to relevant fisheries protocols and software such as Nansis (used on board the vessel), electronic systems and capabilities and the use of manta trawl for micro plastics sampling. From this experience gained, another opportunity for her to attend a training course on taxonomy and fish species identification organized under the EAF-NANSEN project also emerged. In September 2016, FAO organized a training program for ten Eastern Central Atlantic countries at the University of Ghana in Accra. The course further built her expertise on species on-sight identification and knowledge in the use of taxonomic keys to distinguish between species that are identical morphologically. Pearl is very grateful for these opportunities extended towards her future career prospect and development of the fisheries industry in Ghana that is based on science for decision-making. This opportunity for her to participate in this event would not have been possible without the support she received from the USAID/UCC Support Project.



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# SUCCESS STORY



**Left: Elsie and Daniel (6<sup>th</sup> and 7<sup>th</sup> from left) in a group photograph after the training session. Right: Elsie receiving a certificate upon completion of training**

Being a beneficiary of the USAID/UCC Fisheries Coastal Management Capacity Building Support Project has created opportunities for two students – Elsie Debrah and Daniel Adjei to learn and impact their academic training at the University of Cape Coast. USAID support and the Department’s collaboration with the ECOWAS Coastal and Marine Resources Management Centre at the University of Ghana allowed the two students to work in the Monitoring for Environment and Security in Africa (MESA) Project.

The MESA Project created the opportunity for them to be introduced to an innovative inshore fisheries monitoring technology called Advanced Class B Satellite Enabled AIS (ABSEA) for monitoring fishing vessels entering and exiting Ghana’s Exclusive Economic Zone (EEZ). Their project collaborated with the USAID/UCC Project to build case studies using Elmina and Sekondi to develop protocols that could improve the quality of fisheries stock assessment research, monitoring of illegal activities at sea, documenting fishing vessel trajectories, ocean governance including the delineation of marine protected areas. Their research outcomes has the potential to translate into effective fisheries management practices and the development of fisheries policies on small scale inshore vessel monitoring in Ghana and the control of illegal fishing activities and transshipment.





**List of Current USAID funded Postgraduate Students at the Department of Fisheries and Aquatic Sciences of the University of Cape Coast**

No	Name of Student	Programme of Study	Level	Status	Start Date	Completion Date	Funding	Principal Supervisor	Co-Supervisor(s)
1	Pearl Sakyi Djan	Fisheries Science	MPhil	Compl	2014/15	Nov. 2017	Full	Prof. Joseph Aggrey-Fynn	Dr. Najhi Lazar
2	Elsie Akusika Debrah	ICZM	MPhil	Compl	2014/15	Jun. 2017	Full	Prof. Denis. W. Aheto	Prof. George Wiafe
3	Prince Dela Tseku	Aquaculture	MPhil	Compl	2014/15	Dec. 2016	Full	Prof. Kobina Yankson	Dr. Emmanuel Acheampong Mr. Jacob Ainoo Asah
4	Bright Asare	Aquaculture	MPhil	Compl	2014/15	Jun. 2017	Full	Prof. Edward A. Obodai	Dr. Emmanuel Acheampong
5	Daniel Agyei	ICZM	MPhil	Compl	2014/15	Jun. 2017	Full	Prof. Denis. W. Aheto	Prof. George Wiafe
6	Divine Worlanyo HOTOR	Fisheries Science	MPhil	3rd Year	2015/2016	Sep 2017	Full	Prof. Joseph Aggrey-Fynn	Prof. John Blay
7	Jennifer ESHILLEY	ICZM	MPhil	3rd Year	2015/2016	Sep 2017	Full	Prof. Denis. W. Aheto	Dr. Noble K. Asare
8	Kezia BAIDOO	Fisheries Science	MPhil	3rd Year	2015/2016	Sep 2017	Full	Prof. John Blay	Dr. Noble K. Asare
9	Mercy JOHNSOM-ESHUN	Aquaculture	MPhil	3rd Year	2015/2016	Sep 2017	Full	Prof. Kobina Yankson	Dr. Emmanuel Acheampong
10	Simon Kyei GYIMAH	Aquaculture	MPhil	3rd Year	2015/2016	Sep 2017	Full	Prof. Edward A. Obodai	Dr. Emmanuel Acheampong
11	Lawrence Armah AHIAH	Aquaculture	PhD	3rd Year	2015/2016	Sep 2018	Full	Prof. John Blay	Prof. Kobina Yankson
12	Michelle N. Kordei CLOTTEY	Fisheries Science	PhD	3rd Year	2015/2016	Sep 2018	Full	Prof. Joseph Aggrey-Fynn	Prof. John Blay
13	Jemimah Etonam KASSAH	Fisheries Science	PhD	3rd Year	2015/2016	Sep 2018	Full	Prof. John Blay	Dr. Najih Lazar
14	Rebecca K ESSAMUAH	ICZM	PhD	3rd Year	2015/2016	Sep 2018	Full	Dr. Denis. W. Aheto	Dr. Emmanuel Acheampong
15	Margaret F. A. DZAKPASU	Oceanogr. & Limnol.	PhD	3rd Year	2015/2016	Sep 2018	Full	Prof. Kobina Yankson	Dr. Emmanuel Lamptey
16	Success Adjeley SOWAH	Oceanogr. & Limnol.	MPhil	2nd Year	2016/2017	Sep 2018	Full	Prof. Kobina Yankson	Dr. Noble K. Asare

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17	Paulina OKEH	Fisheries Science	MPhil	2nd Year	2016/2017	Sep 2018	Full	Prof. Joseph Aggrey-Fynn	Dr. Isaac Okyere
18	William DOGAH	Aquaculture	MPhil	2nd Year	2016/2017	Sep 2018	Full	Prof. Edward A. Obodai	Dr. George Darpaah
19	Nunana AGBEMEBISE	ICZM	MPhil	2nd Year	2016/2017	Sep 2018	Full	Dr. Denis W. Aheto	Prof. John Blay
20	Justina Ekuwa ANNAN	ICZM	MPhil	2nd Year	2016/2017	Sep 2018	Full	Dr. Denis W. Aheto	Prof. Edward A. Obodai
21	Fredrick Ekow JONAH	Oceanogr. & Limnol.	PhD	2nd Year	2016/2017	Sep 2019	Full	Dr. Noble K. Asare	Dr. Emmanuel Acheampong
22	Miriam Y. AMEWORWOR	Fisheries Science	PhD	2nd Year	2016/2017	Sep 2019	Full	Prof. John Blay	Prof. Joseph Aggrey-Fynn
23	Rhoda Lims Osae SAKYI	Aquaculture	PhD	2nd Year	2016/2017	Sep 2019	Full	Prof. Kobina Yankson	Dr. Mike Osei-Tweneboa
24	Gertrude Lucky Aku DALI	ICZM	PhD	2nd Year	2016/2017	Sep 2019	Full	Dr. Denis W. Aheto	Prof. John Blay
25	Lesley NTIM	ICZM	PhD	2nd Year	2016/2017	Sep 2019	Full	Prof. John Blay	Dr. Denis W. Aheto
26	Elizabeth EFFAH	ICZM	PhD	2nd Year	2016/2017	Sep 2019	Part	Dr. Denis Aheto	Dr. Emmanuel Acheampong
27	Sheila FYNN-KORSAH	Fisheries Science	PhD	2nd Year	2016/2017	Sep 2019	Part	Prof. Joseph Aggrey-Fynn	Dr. Najih Lazar
28	Ebenezer Delali KPELLEY	Fisheries Science	PhD	2nd Year	2016/2017	Sep 2019	Part	Prof. John Blay	Prof. Joseph Aggrey-Fynn
29	Ramat Quaigrane DUKER	Oceanogr. & Limnol.	PhD	2nd Year	2016/2017	Sep 2019	Part	Dr. Noble K. Asare	Prof. Edward A. Obodai
30	Isaac Kofi OSEI	Fisheries Science	PhD	2nd Year	2016/2017	Sep 2019	Part	Prof. Kobina Yankson	Prof. Edward A. Obodai
31	Alberta JONAH	ICZM	PhD	1st Year	2016/2017	Sep 2019	Part	Dr. Denis W. Aheto	Dr. Isaac Okyere
32	Gabriel Gator	Fisheries Science	MPhil	1st Year	2017/2018	-	Full	-	-



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33	Bernard Assiam	ICZM	MPhil	Ist Year	2017/2018	-	Full	-	-
34	Delove Asiedu Abraham	Oceanogr. & Limnol.	MPhil	Ist Year	2017/2018	-	Full	-	-
35	Grace	Aquaculture	MPhil	Ist Year	2017/2018	-	Full	-	-
36	Eugenia	Fisheries Science	MPhil	Ist Year	2017/2018	-	Full	-	-