CALL FOR APPLICATION
Noguchi Memorial Institute for Medical Research
College of Health Sciences
University of Ghana
P.O. Box LG 581, Legon
Accra, Ghana

Post-Doctoral Training Fellowship in Infectious Diseases

The Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana, Legon, Ghana with funding support from the Bill and Melinda Gates Foundation has instituted a Postdoctoral Fellowship Program, to train future research leaders who would contribute to infectious diseases control efforts. The program seeks to train young African scientists towards building a critical mass for control of poverty-related diseases, equip them to compete effectively for international funding for research work in Africa, offer them international exposure, and facilitate their networking and collaboration with other institutions. Applicants are invited to either submit proposals to carry out studies in any of the following thematic areas or apply to work on already identified projects:

1. Research Areas
   1.1. Malaria

Malaria places an unacceptable burden on the populations of sub Saharan African countries and impacts negatively on the socio-economic development of the area. In recent times, there has been recognition of this burden worldwide with attendant increases in resources available to implement control strategies. Within the past 5 years, the Bill and Melinda Gates Foundation, with support from the World Health Organization, the Roll Back Malaria (RBM) Partnership and other organizations, has emphasized that elimination and eradication must be the ultimate goal for malaria control programs whilst recognizing that in many countries much still needs to be done to bring malaria under effective control. Successful control programs should lead to substantial changes in the epidemiology of the disease such that interruption in transmission becomes possible. Thus, novel control strategies complementing current ones targeted at reductions in morbidity and mortality are needed. The research to underpin these strategies is largely wanting. The Noguchi Memorial
Institute for Medical Research has a long-standing Malaria research programme in several areas including immunology, molecular biology, entomology and epidemiology. To complement the ongoing research in the Institute, we are seeking for young and talented African scientists to apply for Post-Doctoral Fellowships in the following areas:

Current methods for measuring transmission in endemic areas where majority of infections are asymptomatic, are insensitive, time consuming and expensive. As global efforts to control/eliminate malaria succeed and drive the rates of infections in endemic populations to very low levels, the development of novel and highly sensitive methods are required for monitoring transmission and for determining when elimination/eradication has been achieved, and hence when to stop control activities.

Elucidating the complex interactions between parasite, human-host and vector in the epidemiology of malaria, especially in the era of increasing application of control strategies, will be critical to inform on appropriate strategies and interventions. Recent anecdotal reports of reduced incidence of malaria in several parts of Africa have not been adequately explained. Also, despite years of intensive research on host responses to infection, there is still no consensus on immune correlates of protection.

We seek talented individuals to submit proposals in any of the following areas;

- Studies that will lead to the development of highly sensitive and robust measures for monitoring transmission both at the population and individual levels
- Studies that will lead to a deeper and clearer understanding of host responses to infection. Such studies should lead to improvement in our ability to evaluate current interventions and also to the development of new interventions.
- Studies leading to a deeper understanding of the epidemiology of disease and host-parasite-vector interactions in the face of intensified application of control strategies.
- Understanding the molecular mechanism of gametocyte production, prevalence and their role in the development of malaria transmission blocking immunity in Ghana. Information on this project can be found here.
- Phagocytic function, associated host genetic polymorphisms and the risk of clinical malaria. Information on this project can be found here.
- Endothelial Cells and platelets in microvascular damage and repair in cerebral
malaria. Information on this project can be found here.

1.2. Mycobacterial Infections (TB & BU)

a) Rapid Diagnostic Tests of Mycobacterial Infections

Buruli ulcer (BU), caused by Mycobacterium ulcerans is diagnosed mainly on clinical grounds, due to limited access to laboratory facilities. The disease is very difficult to diagnose in the early stages but diagnosis is more certain in the latter stages with typical indolent, painless ulcers with undermined edges and necrotic sloughs. Early diagnosis of clinical cases is well recognized to lead to favorable treatment outcomes and can prevent unnecessary surgical excision. Furthermore, this will allow for epidemiologic surveillance. Currently, the most useful procedure for confirming cases is by PCR as microscopy is very insensitive and culture is time demanding. This has made it impossible for confirmation at peripheral centres where the disease is prevalent. An attractive diagnostic option will be a simplified immunodiagnostic procedure, which will avoid invasive procedures for sample collection and would not require highly trained personnel or a complex technological infrastructure. We seek interested young African scientists to

• Develop and validate a point-of-care diagnostic test for BU. The ideal test format would involve taking either a small amount of body fluids (blood, saliva, urine or material from the site of the infection) for a simple and rapid dipstick or line-test assay

We seek a motivated and talented young African scientist to participate in a programme to:

Host-pathogen interaction in Tuberculosis: functional implication of pathogen genomic diversity. Information on this project can be found here.
1.3. HIV/AIDS

The Noguchi Memorial Institute for Medical Research has had a long standing research focus in HIV research with established collaborations in country and with outside research groups. It led in the initial laboratory diagnosis and identification programme for the country and currently serves as the referral centre for ambiguous cases from the field. Through the long-standing collaboration with the National Aids Control Programme, the Institute has been addressing issues of drug resistance and changes in the virus. Some of the emerging problems that need to be addressed include understanding of cellular and viral mechanisms underlying HIV cure. We are seeking for young and ambitious African scientists interested in the HIV research to develop proposals for studies in one or more of the following issues:

- **Cellular and viral mechanisms underlying HIV maintenance and persistence**
- **Persistence of HIV in patients on long term ART treatment**
- **Host immune mechanisms in the control of infection and viral persistence**
- **Host immune activation and inflammation in patients on ART treatment**

1.4. Neglected tropical diseases (NTD’s)

Neglected tropical diseases (NTDs) impose a heavy socio-economic burden on the poor living in sub-Saharan Africa (and other regions), and aggravate poverty and social stigma in endemic communities. Many individuals suffer simultaneously from multiple NTDs. The goal of current control strategies is to bring these diseases to the point where they are no longer public health problems. Indeed in some cases such as lymphatic filariasis and onchocerciasis, there is a paradigm shift from disease control to elimination of infection. This requires the development of new and innovative drug therapies, novel epidemiological approaches, more sensitive tools for diagnosis, monitoring and evaluation, and surveillance, especially as these diseases reach the endgame, and recrudescence or reintroduction of infection needs to be minimized. The main NTDs of our interest include helminth diseases of humans, namely, lymphatic filariasis (LF), onchocerciasis, schistosomiasis and soil-transmitted helminthiasis (STHs). In some cases the anthelmintics used to combat them are common to more than one such infection; for instance, ivermectin is used against LF,
onchocerciasis and also can affect ascariasis. This poses questions as to the joint implementation of interventions, and the fate of remaining infections after the local elimination of others has been reached.

1.4.1. Onchocerciasis

Elimination and sub-optimal response to ivermectin

The success of the former Onchocerciasis Control Programme in West Africa (OCP) and the current efforts by the African Programme for Onchocerciasis Control (APOC) has resulted in drastic reductions in the prevalence, intensity and pathology associated with the disease. There is now a paradigm shift from morbidity control to elimination of onchocerciasis in Africa, and a strategy of semi-annual ivermectin (IVM) treatment has been implemented in some meso- and hyperendemic communities in the expectation that this will make the endgame of elimination achievable. However, recent reports of sub-optimal response to the drug by individuals infected with *Onchocerca volvulus* have raised some concerns about the role that sub-optimal response could in putting in jeopardy the elimination of onchocerciasis, were this phenomenon due to decreased drug efficacy with a parasite genetic component.

Diagnosis of onchocerciasis traditionally relies on detection of microfilariae in skin snips. Although this method is still widely used for point-of-care diagnosis, its acceptability in endemic communities is becoming increasingly difficult because of the pain and discomfort associated with its use. Also it is less sensitive at low levels of infection; therefore, the possible elimination of the infection will require alternative approaches for endpoint decision and surveillance criteria. Some efforts have been made to develop alternative and non-invasive diagnostic tools, but these have not yet been realised into well standardized diagnostics. We seek talented individuals to submit proposals for:

- *Studies to investigate the status of sub-optimal response of O. volvulus to IVM treatment in the savannah regions of Ghana, and to elucidate the potential impact of sub-optimal response on onchocerciasis elimination*

- *Longitudinal studies into the transmission, morbidity and feasibility of onchocerciasis elimination in the presence of sub-optimal response to ivermectin treatment under annual and biannual regime*
• Studies leading to standardizing and validating methodologies and cost-effective protocols for diagnosis in monitoring and evaluation of onchocerciasis to support criteria for onchocerciasis elimination.

1.4.2. Soil-Transmitted Helminth infections

Soil-transmitted helminth (STH) infections are mainly caused by *Ascaris lumbricoides* (roundworm), *Trichuris trichiura* (whipworm), and *Necator americanus* and/or *Ancylostoma duodenale* (hookworms). Infection with these nematode parasites poses a public health problem in sub-Saharan African and remains a great burden particularly in children in poverty-stricken areas where sanitation and hygiene are poor, leading to impaired nutritional status and intellectual disability in school-age children. Though there has been regular annual mass drug administration (MDA) of albendazole (ABZ) or mebendazole (MBZ) to bring down infection levels, there is a general lack of investment in STH research which is hindering the development of new generations of more effective interventions against these diseases. New diagnostic biomarkers as well as optimization and combination of existing diagnostic tools for detection and management of these diseases are needed. Lack of adequate sanitation, hygiene and education play an important role in the establishment of these infections; a deeper understanding and modulation of the environmental and social ecology of these infections will enhance the health outcomes of the control strategies. STHs are known to occur in poverty-stricken communities; however, the prevalence and intensity of these infections have not been documented nationwide to inform on the development of appropriate strategies and interventions. The focus of MDA programmes for STHs is to achieve long-term reduction in infection prevalence and intensity, and consequently of the associated morbidity. However, the efficacy (measured in terms of cure rates and egg reduction rates) of albendazole or mebendazole (used as monotherapy) against STHs ranges from lower levels of efficacy observed in hookworms and whipworms, to relatively higher levels recorded for *A. lumbricoides*. In some communities however, sub-optimal response of hookworms to ABZ has been reported.

We seek talented young scientists to submit proposals in the following areas:

• Studies to develop geospatial maps for the prevalence and the intensity of STHs nationwide using model-based geostatistics
• Studies to carry out well-designed dose-finding studies to optimize the dose regimes and combinations of current drugs used for the treatment of STHs

• Studies to identify diagnostic biomarkers as well as optimizing and combining existing diagnostic tools for detection and management of STHs

• Studies to develop assays that can be used to detect promptly changes in drug efficacy and to investigate the association of such changes with parasite genetic and non-genetic factors

• Studies that will increase the understanding of the effects of host genetics and parasite population structure on the transmission dynamics and control of soil-transmitted helminth infections.

1.4.3. Schistosomiasis

Infections with *Schistosoma haematobium* and *S. mansoni* are mainly responsible for schistosomiasis disease burden in Africa. Schistosomiasis causes anaemia, and poor nutritional status. It reduces cognitive ability in children, decreases work capacity and fitness in adults, poses reproductive health risks including infertility and increased risk of acquiring sexually transmitted infections. The disease has the capacity to limit growth in the agriculture, tourism, water, and health sectors with the potential of undermining the attainment of Millennium Development Goals (MDGs) in endemic countries. Studies have demonstrated the disease in infants a few months old and significant morbidity in adults through the use of ultrasound and bio-markers for early detection of bladder cancer. Although diagnostic tests based on demonstration of circulatory and urinary parasite antigens in infected individuals have been developed microscopy, with all its attendant challenges, continues to play a major role in routine diagnosis of infections. There is the need for the development, adoption and commercialization of more robust, and highly sensitive diagnostic tools. Interestingly, studies on schistosomiasis host snail and parasite interactions have shown the existence of two strains of *S. haematobium* characterized by changes in compatibility of the parasite to the snail hosts (*Bulinus globosus* and *B. truncatus*). Such differences in the biology of the parasite may generate new parasite hybrids with implications for
transmission, infectivity, pathogenesis/morbidity, treatment failure and sustainable control of the disease that is yet to be explored.

We seek talented young scientists to submit proposals in the following areas:

- **Studies to explore novel technologies to develop accurate, non-invasive and field-applicable tests for the detection of *S. haematobium* and/or *S. mansoni* infections in humans.**
- **Development of assays for monitoring changes in the efficacy of praziquantel, (the current drug of choice for the reatment of schistosomiasis) and to investigate the association of such changes with parasite genetic and phenotypic factors.**
- **Studies to elucidate the effects of schistosome parasite/snail/human host interactions on the genotypic and phenotypic characteristics of the parasite, and parasite population structure on the transmission dynamics and control of schistosomiasis.**
- **Development of a dynamic GIS-based database system with information sharing interface that promotes easy accessibility of appropriately packaged information/data. The ultimate goal is to achieve enhanced schistosomiasis management and control through the provision of evidence-based decisions.**
- **Determination of the extent of hybrid *S.*haematobin/S. bovis distribution and impact of this on disease epidemiology, morbidity and response to drug treatment and control strategies.**

**Lymphatic Filariasis**

- **Development of studies to elucidate on targets for the xenomonitoring of the impact of lymphatic filariasis MDA.**

**Noncommunicable Diseases**

- **Development of studies to determine risk factors associated with the increase in allergy and other noncommunicable diseases such reduction in helminth infections and changes in diet.**
3 Requirements
Applicants must be Africans and should have Ph.D., MD/Ph.D. or equivalent degree with strong background in relevant biomedical sciences.
Individuals who have submitted their Ph.D. dissertations are also eligible to apply but must submit proof of this submission (e.g. a letter attesting to the submission from the Registrar of the University).
Applicants must be highly motivated, exhibit strong research and conceptual skills and be interested in developing novel research directions.
Individuals should have proven abilities to organize and execute research project with minimal supervision and to perform independent work and document the results to a high standard.
Applicants must have strong written and oral communication skills in English. Experience and oversight and training of junior staff Desirable. Ability to work in an inter-disciplinary manner involving collaboration with other staff.
This application is open to nationals of any African country (member of the AU). Working knowledge of English would be an advantage.
Successful candidates will be engaged at the Research Fellow grade in the Institute on a year’s contract, renewable up to a maximum of 2 years based on satisfactory performance. Individuals will be responsible for developing their research protocols, obtaining the necessary regulatory approvals and carrying out all the required experiments at the Noguchi Memorial Institute for Medical Research.

4 Remuneration
The salary attached to this position is at a gross amount of GH¢84,000.00 per annum, all inclusive (under review).

5. How to Apply
The complete application package should include the following:
(i) the applicant’s CV,
(ii) one page vision statement,
(iii) one page description of the applicant’s research career objectives,
(iv) Letters of recommendation with contact information from three (3) referees,
(v) The applicant’s proposed research in one of the thematic research areas described above using the Application and Proposal Development Form attached.

Applications for vacancies under section 2 should complete the application form in line with the information attached to the proposal topics.

The supporting statement should set out how the applicant’s qualifications, experience and training meet the selection criteria. This is an essential part of the application and a failure to provide this information will disqualify the application. Statements such as see attached CV will not be considered an adequate response.

Electronic copies of the application package should be sent to postdoc@noguchi.ug.edu.gh

Mail hardcopies to:

The Coordinator
Post-Doctoral Office
Noguchi Memorial Institute for Medical Research
University of Ghana
P.O. Box LG 581 Legon
Accra, Ghana

Successful applicants will be notified by 20th January, 2016 and would be expected to commence the fellowship soon after, but not later than 30th March, 2016.

**Deadline of Application Submission:**

Applicants should send both electronic and hardcopies of their applications to

The Coordinator, of the Post-Doctoral Office by 30th November, 2015 (18.00hr GMT) [Download the application form](#)