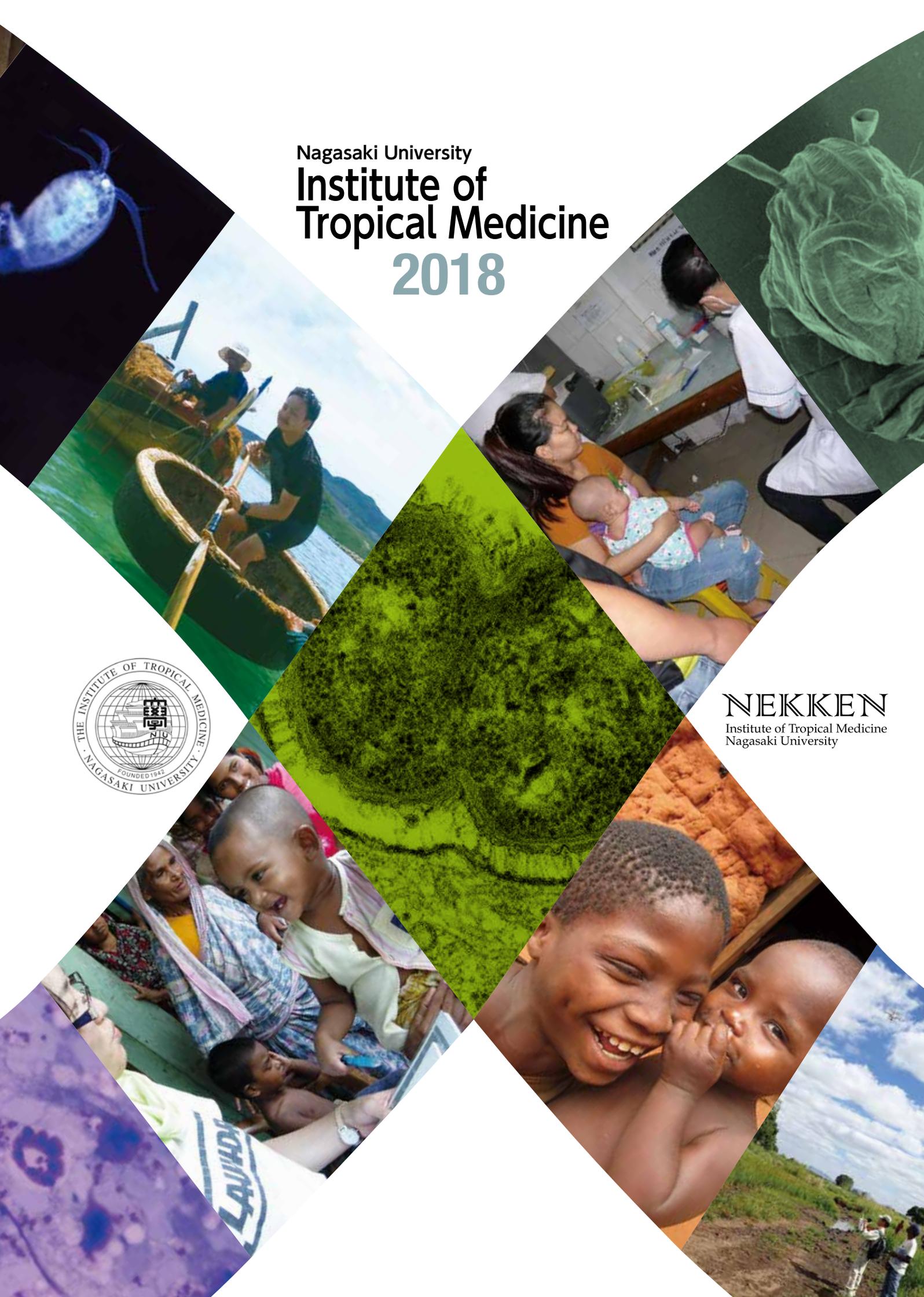


Nagasaki University  
**Institute of  
Tropical Medicine**  
2018



**NEKKIEN**  
Institute of Tropical Medicine  
Nagasaki University

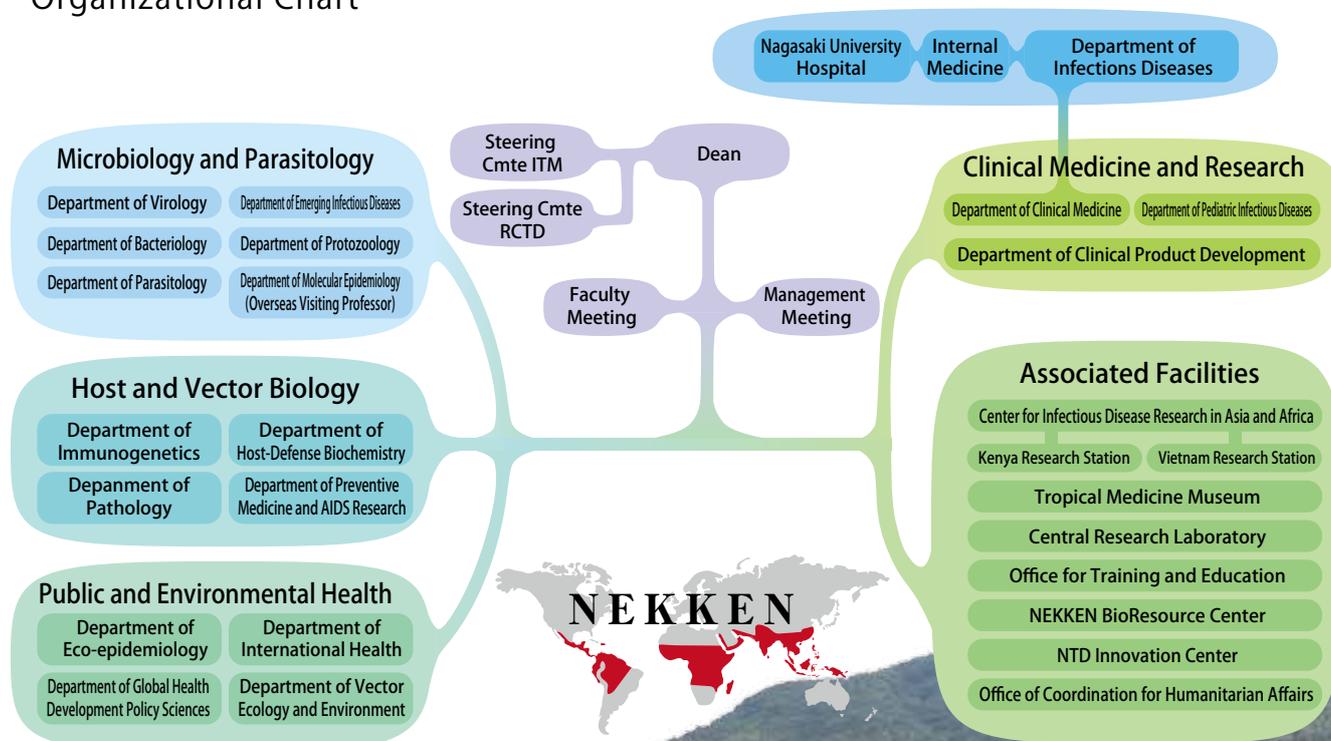
## Mission Statement

The tropics, the most ecologically diverse region on the Earth, presents an ongoing complexity of tropical diseases and other health problems. In view of the remarkable advances made in the field of international exchange in recent years, it is imperative that these problems be addressed from a global perspective.

Based on this understanding, the Institute of Tropical Medicine, Nagasaki University, aims to overcome tropical diseases, particularly infectious diseases, and the various health problems associated with them, in cooperation with related institutions, to strive for excellence in the following areas:

1. Spear-head research in tropical medicine and international health
2. Global contribution through disease control and health promotion in the tropics by applying the fruits of the research
3. Cultivation of the researchers and specialists in the above fields

## Organizational Chart



# Towards Eradication of Tropical Infectious Diseases

Institute of Tropical Medicine (NEKKEN), Nagasaki University is a unique governmental institution for research on tropical medicine. The Ministry of Education, Culture, Sports, Science and Technology (MEXT) designated NEKKEN as a "Joint usage / Research Center on Tropical Disease" in 2009. This recognition underlines the importance of NEKKEN as an open institute whose resources are freely available to the whole research community in Japan. Since 1993, the World Health Organization has been designating NEKKEN a WHO Collaborating Centre for Reference and Research on Tropical Viral Diseases. The current organization of the institute involves four major research fields (15 departments), two facilities, and one clinical unit at University hospital.

Many developing countries are located in the tropics, and are affected by a diverse group of tropical diseases, and emerging infectious diseases. In view of the remarkable advances made in the field of international transportation and communication in recent years, the industrialized countries of the temperate zones are also threatened by the same pathogens and it is imperative that they are addressed from a global perspective. Based on this paradigm, NEKKEN aims to overcome tropical and emerging infectious diseases, and the various related health problems in the tropics, in cooperation with related institutions, and to strive for excellence in the following areas:

1. Spear-head research in tropical medicine and global health
2. International contribution through disease control and health promotion in the tropics
3. Cultivation of the researchers and specialists in the above fields

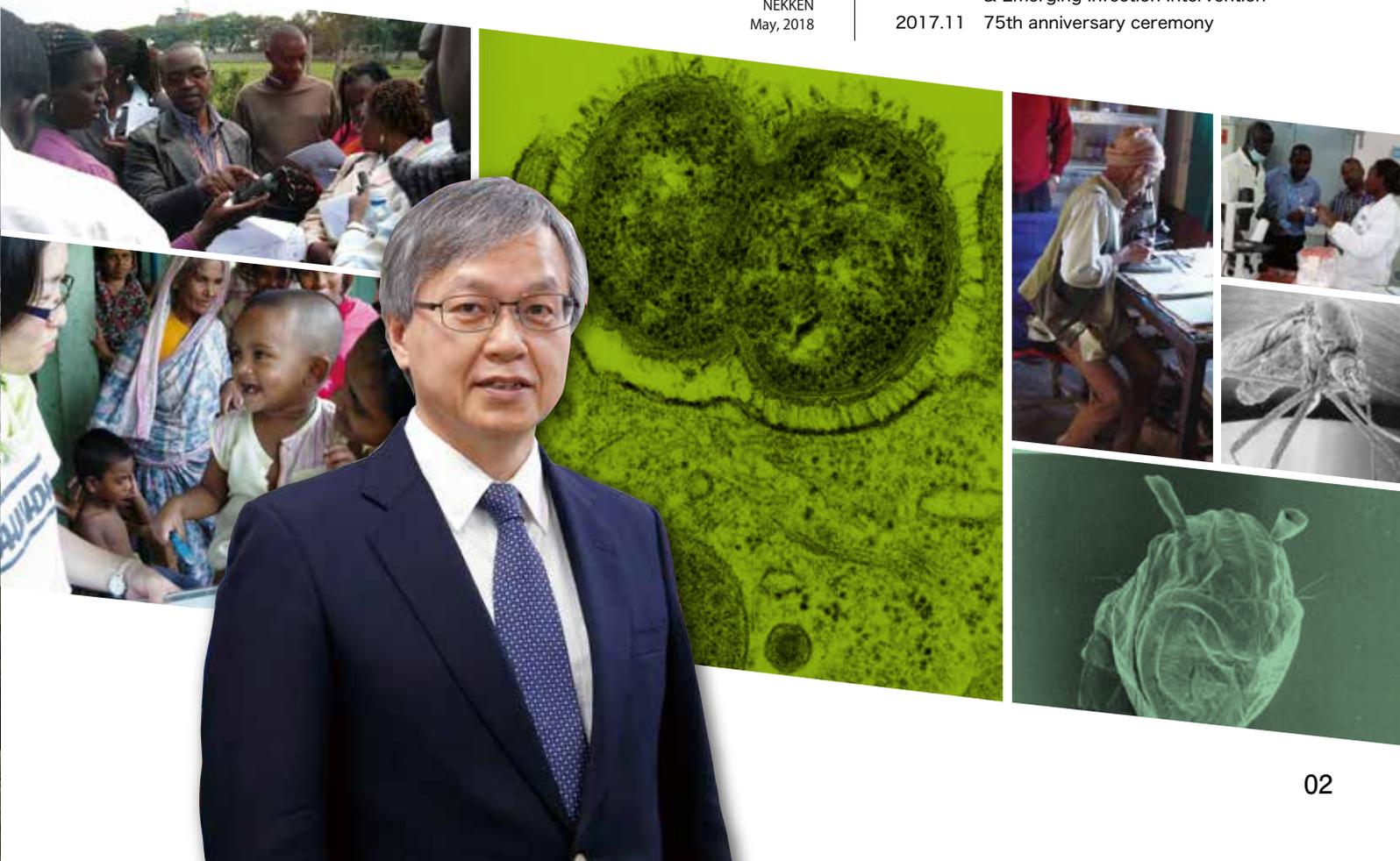
This pamphlet offers a brief but hopefully intelligible explanation of our organization and its activities. As you will see, our research activities address major tropical diseases such as malaria, schistosomiasis, dengue fever, and yellow fever, and emerging and re-emerging infections such as HIV/AIDS, SARS, Ebola and Tuberculosis. We conduct basic medical sciences, epidemiology and clinical research for disease prevention and control. We also investigate Entomology, Ecology and Social sciences. NEKKEN is also contributing education of students in PhD and Master as part of the Graduate School of Biomedical Sciences and the Graduate School of Tropical Medicine and Global Health of Nagasaki University. In addition, NEKKEN provides a three-month training course on tropical medicine. You will also find information about our research facilities in Kenya and in Vietnam.

Hopefully you can understand our intention of research and education and will support us in future.

Kenji Hirayama  
Dean and Professor  
NEKKEN  
May, 2018

## History

- 1942.3 East Asia Institute of Endemics as Nagasaki Medical College affiliate
- 1946.4 Institute of Endemics, N.M.C
- 1949.5 Institute of Endemics, Nagasaki University, under postwar scheme
- 1967.6 Institute of Tropical Medicine, N.U.
- 1967.6 Added the Ward Tropical Internal Medicine, to University Hospital
- 1978.4 Diploma course, Kensyu-katei
- 1983.4 JICA Researcher Group-Course
- 1989.5 Certified as Joint Usage Research Center
- 1993.11 WHO Collaboration Center
- 1995.4 Certified as Center of Excellence, COE
- 1997.4 Added a branch Tropical Infection Research Center
- 2003.4 COE program 21st Century Global Strategy against Tropical & Emerging Infection
- 2006.4 Tropical Medicine Master's Course
- 2008.4 Added Museum and Asia / Africa Facilities
- 2008.6 COE program Comprehensive Global Strategy against Tropical & Emerging Infection
- 2009.6 Certified as Tropical-medicine Joint Usage / Research Center
- 2011.4 Added two clinical-field departments
- 2012.4 Global Leader Course for Tropical & Emerging Infection Intervention
- 2017.11 75th anniversary ceremony



# Joint Usage / Research Center on Tropical Disease

Our institute is the one and only public sector supported by MEXT (Ministry of Education, Culture, Sports, Science and Technology, Japan) that aims to do the research on tropical diseases, and identified as the Joint usage / Research Center on Tropical Disease.

field where infectious diseases are prevailing, making use of the facilities like Asia and Africa Research Stations and cohorts maintained by the institute. It also serves as a resource center for information and biological samples related to infectious diseases spreading globally.

## 1. The Goal of the Center

The infectious diseases are caused by the collapse of symbiosis with other creatures, which cannot be avoided if we, human being, live in the nature. Although the ultimate aim of this center is to eradicate infectious diseases, it is needed rather to establish reciprocal relationship with other creatures than to eliminate them. Such establishment of reciprocal relationship requires the collective knowledge, which can be achieved only by combining a broad aspect of disciplines.

The Tropical Infectious Diseases have been spreading in the tropical area, which is the reflection of environment and socio-economic situation existed there. It is considered to be a big challenge related to health. As a matter of fact, emerging and re-emerging infectious diseases have been spreading globally with tropical area being its epicenter. The tropical area is not only the battle field where we, human being, fight against them but also the experimental ground where we newly create and develop our knowledge and technology alike in order to control infectious diseases.

The Joint usage / Research Center on Tropical Disease is to accomplish with the members in the diverse scientific communities collaborative researches rooted upon the

## 2. Outline of the Center Activity

The Joint usage / Research Center on Tropical Medicine supports collaborative research, which is either basic or applied research based upon epidemiological, clinical or public health framework and also supports research meeting, which promotes and facilitates the research of infectious diseases through exchanging information or technologies necessary. The Center serves as a bio-resource center to deliver infectious agents, information, and etc. collected and stored here.

## 3. Operational Organization of the Center

As for administration of this research center, the dean of the Institute of Tropical Medicine established the Steering Committee for the Center, which is composed of 11 members, out of whom more than half should be outside the university concerned. The Steering Committee is responsible for adoption of the applications and monitoring and evaluation of the activities.

In order to support activities above mentioned, the specific administrative office supporting the Center is allocated in the institute and a professor was designated to be a section chief.

## Concept Diagram

### Steering Committee for the Institute of Tropical Medicine (Committee Member outside the university)

Shigeyuki Kano (National Center for Global Health and Medicine)

Norio Ohmagari (National Center for Global Health and Medicine), Gakunan Gen (Obihiro University of Agriculture and Veterinary Medicine)

Tiho Watanabe (National Institute for Environmental Studies), Hitoshi Oshitani (Tohoku University)

Hiroyoshi Endo (St.Luke's International University)

### Steering Committee for the joint usage / Research Center on Tropical Disease (Committee Member outside the university)

Shinichiro Kawazu (Obihiro University of Agriculture and Veterinary Medicine)

Sohkichi Matsumoto (Niigata University), Akira Nishizono (Oita University), Takayuki Miyazawa (Kyoto University)

Manabu Ato (National Institute of Infectious Diseases), Satoshi Sasaki (The University of Tokyo)

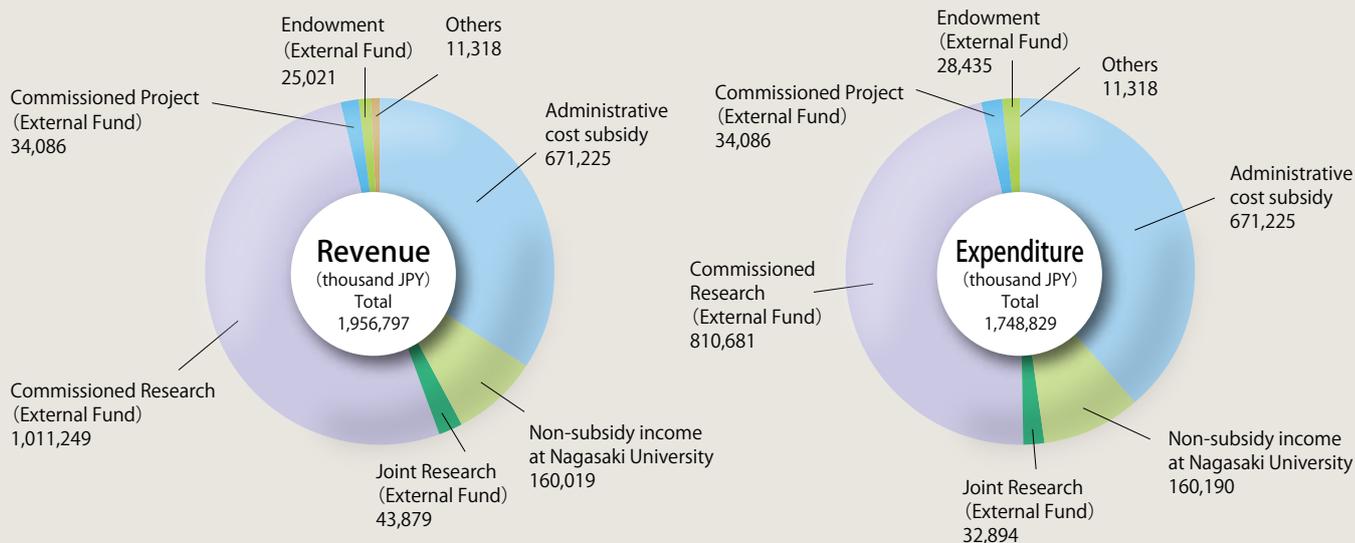
Rintaro Mori (National Center for Child Health and Development), Kyoko Sawabe (National Institute of Infectious Diseases)

### The Institute of Tropical Medicine

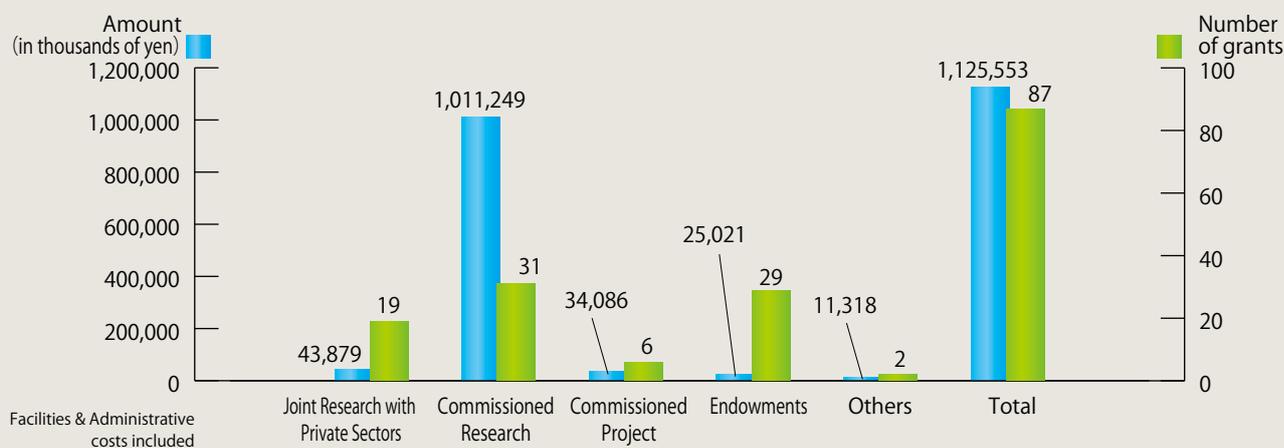


## Accounting (FY2017)

Amount (in thousands of yen)



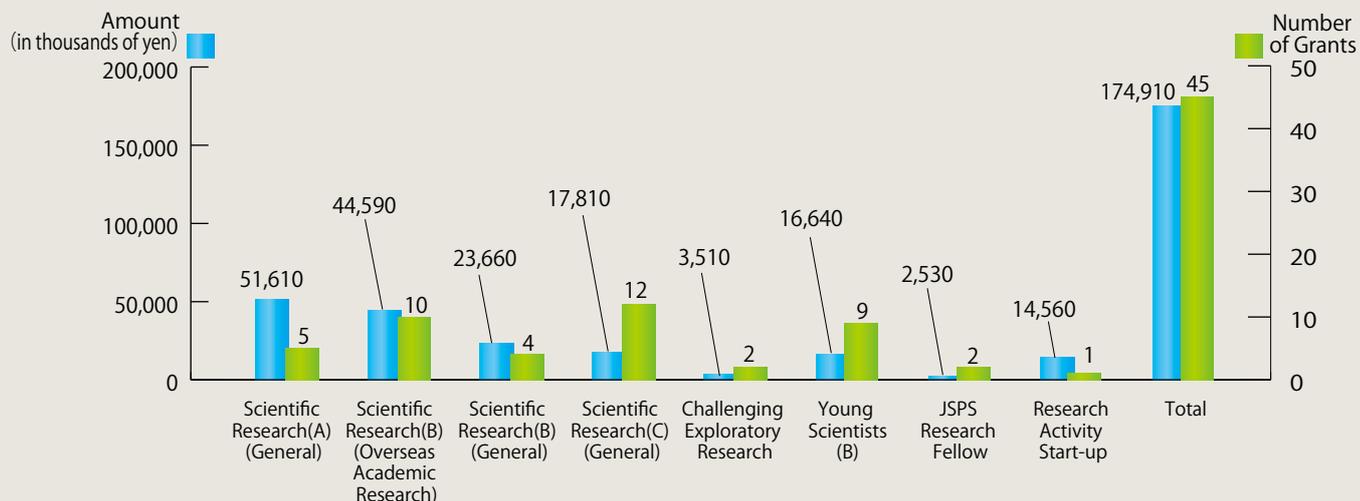
## External Fund (FY2017)



## Number of Staff (as of May 1, 2018)

Professor	Associate Professor	Senior Assistant Professor	Assistant Professor	Sub total	Others	Total
13	7	3	31	54	15	69

## Grants-in-aid for Scientific Research (KAKENHI) (MEXT) (FY2017)



Microbiology  
and Parasitology  
**Department of  
Virology**



Professor  
**Kouichi Morita**  
Associate Professor  
**Moi Meng Ling**  
Associate Professor  
**Shingo Inoue**  
Associate Professor  
**Daisuke Hayasaka**  
Assistant Professor  
**Takeshi Nabeshima**  
Assistant Professor  
**Mya Myat Ngwe Tun**

This Department has been conducting basic and applied research on arthropod-borne viruses (arboviruses) such as Japanese encephalitis virus (JEV), dengue virus (DENV), Zika virus, Chikungunya virus (CHIKV) and severe fever with thrombocytopenia syndrome virus (SFTSV).

**Molecular epidemiology of arboviruses**

We isolate DENV, JEV and CHIKV in Asia and African regions and conduct molecular epidemiological analysis to determine international and inter-continental movement of these viruses. We also analyze unique genome sequences that are relevant to pathogenicity.

**Research on vaccine development using reverse genetics**

We have developed DENV infectious clones and identified viral determinants by modifying various parts of the genes. We are currently developing genetically engineered viruses as candidates for live attenuated DENV vaccines by financial support of GHIT.



**Research on the pathogenicity of arboviruses and evaluation of therapeutic compounds using animal model.**

We elucidate the mechanism of pathogenicity and infectivity of arboviruses, such as DENV and SFTSV by using a mouse model.

**Development of rapid diagnostic assay for infectious diseases**

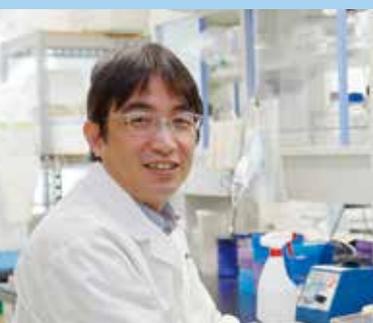
Various rapid diagnostics are being developed for arboviruses using PCR, LAMP, LC/MS and Immuno-chromatographic technologies for the detection of viral genome, protein and specific antibodies.

**Activities as a WHO Collaborating Center**

The department is designated as a WHO Collaborating Center for Reference and Research on Tropical Viral Diseases since 1993 and currently our department has been re-designated as a center for Tropical and Emerging Virus Diseases. The center has been collaborating with WHO in training WHO fellows from many developing countries and has deployed experts as WHO short-term consultants.

1. Urakami et al., J Virol., 91:e01181-17, 2017.
2. Toda et al., PLoS One., 19:12(6):e0179408, 2017.
3. Moi et al., Lancet Infect. Dis. 17:805-806, 2017.
4. Kyaw et al., Epidemiol Infect., Vol.145:1886-1897, 2017.
5. Mya et al., JIID., 70:357-361, 2017.

Microbiology  
and Parasitology  
**Department of Emerging  
Infectious Diseases**



Professor  
**Jiro Yasuda**  
Assistant Professor  
**Yohei Kurosaki**  
Assistant Professor  
**Shuzo Urata**  
Assistant Professor  
**Haruka Abe**  
Assistant Professor  
**Rokusuke Yoshikawa**

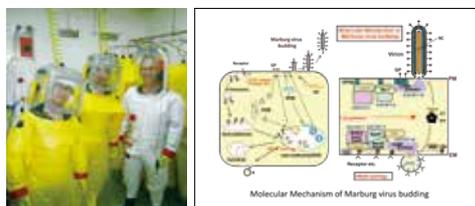
We are working on the basic and applied research to develop the countermeasures against emerging infectious diseases, especially viral hemorrhagic fevers and influenza.

**Research subjects:  
Analyses of replication mechanisms of highly pathogenic viruses**

In infected cells, the viruses replicate using various cellular machinery and release a large number of progeny virions. Our interests are to clarify the molecular mechanisms of virus replication in host cells. We are currently analyzing the molecular interactions between viral proteins and cellular factors in infected cells. Especially, we are focusing on highly pathogenic viruses, such as Ebola, Marburg, Lassa and Influenza viruses.

**Development of novel antiviral strategies**

To establish novel antiviral strategies against viral hemorrhagic fevers and influenza, we are identifying the cellular factors which have antiviral activity and analyzing the molecular mechanisms of their antiviral action. We are also doing high-throughput screening of organic and chemical compound libraries for antiviral drug discovery against viral hemorrhagic fevers.



**Development of detection methods for highly pathogenic viruses**

In case of outbreak of emerging infectious diseases, rapid and accurate diagnoses are essential to control infection and to prevent further transmission. We have developed novel diagnostic assays for emerging viral diseases.

**Research studies on viral diseases in Gabon republic**

The followings are aims of this project; 1) to investigate prevalence of known and unidentified viral diseases in Gabon through genetical and serological assays, 2) to determine characteristics including genetic information and pathogenicity of viruses which are regarded as public health concern and those newly identified in Gabon, and 3) to develop rapid diagnostic methods for viral diseases of public health concern and/or those newly identified;

**Research studies on Lassa fever in Nigeria**

Lassa fever is a viral hemorrhagic fever and now endemic in West African countries. Annually 300,000 -500,000 peoples are infected with Lassa virus and 5,000 patients have died in Lassa fever every year. We are carrying on the epidemiological studies, the development of novel diagnostic methods and the pathological studies on Lassa fever in collaboration with a Nigerian group.

1. Kurosaki et al., Sci Rep, 2017.
2. Oloniniyi et al., J Virol Meth, 2017.
3. Kurosaki et al., J Infect Dis, 2016.
4. Kurosaki et al., PLOS NTDs, 2016.
5. Urata et al., J Virol, 2016.

Microbiology  
and Parasitology  
Department of  
Bacteriology

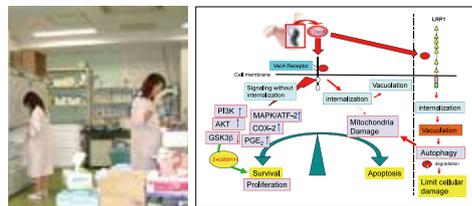


Senior Assistant Professor  
Akihiro Wada  
Assistant Professor  
Masayuki Nakano

Our major research interest is to elucidate the etiologic agents isolated from pathogenic bacteria related to the worldwide emerging and reemerging diseases and to know the virulence mechanisms of bacterial pathogens.

*Helicobacter pylori* is a bacterial pathogen found in the stomach mucosa of more than 50% of the world population and more common (over 80%) in developing and tropical countries. Infection with *H. pylori* plays a major role in the development of chronic gastritis and peptic ulcer, and is a risk factor for gastric cancer. Pathogenic strains of *H. pylori* secrete a potent protein toxin, a vacuolating cytotoxin, termed VacA, which causes progressive vacuolation of epithelial cells and gastric injury. We found that VacA induces multiple effects on epithelial cells, including mitochondrial damage [1] and apoptosis [2]. These actions of VacA appear to result from activation of cellular pathways, independent of those leading to vacuolation. Similarly, VacA-induced phosphorylation of G protein-coupled receptor kinase-interactor 1 (Git 1), which may be responsible for epithelial cell detachment caused by VacA, leading to peptic ulceration [3], and VacA-induced activation of p38/ATF-2-mediated signal pathway [4] are independent of VacA effects on cellular vacuolation.

Analysis of VacA receptors provided new insights into the molecular basis of VacA function. We reported that two VacA proteins, termed m1 VacA and m2 VacA,



Laboratory

Virulence mechanism of *Helicobacter pylori* vacuolating cytotoxin, VacA

which were defined by sequence differences in the middle of the molecules, interacted with target cells by binding to two types of receptor-like protein tyrosine phosphatases (RPTPs), i. e., RPTP $\alpha$  and RPTP $\beta$ , resulting in toxin internalization and vacuolation of the human gastric adeno-carcinoma cell lines AZ-521 and G 401 [5]. By analysis of the pathological responses of wild type and RPTP $\beta$ -deficient mice to oral administration of VacA, we found that RPTP $\beta$  functions as a receptor for VacA and produces the disease associated with VacA toxicity including gastritis and gastric ulcer [3].

More recently, we purified from AZ-521 cells, a human gastric epithelial cell line, a surface membrane protein, p500, which binds VacA, and identified it as low-density lipoprotein receptor-related protein-1 (LRP1). LRP1 binding of VacA was shown to be specifically responsible for VacA-induced autophagy and apoptosis, but not activation of the Wnt/ $\beta$ -catenin signaling pathway. Similar to RPTP $\alpha$  and RPTP $\beta$ , LRP1 mediates VacA internalization in AZ-521 cells, but in contrast to RPTP $\alpha$  and RPTP $\beta$ , LRP1 targeted downstream pathways leading to autophagy and apoptosis. VacA-induced autophagy via LRP1 binding precedes apoptosis suggesting that an excessive autophagic activity can also lead to cell death. This is the first study to provide evidence that LRP1 mediates autophagy [8]. Surprisingly, CagA, which is an oncogenic protein injected by its type IV secretion system into host cells, was degraded by autophagy induced by m1 VacA, but not m2 VacA, whereas CagA in CD44v9-expressing cancer stem-like cells escaped this autophagy system, resulting in accumulation of CagA in cells.

1. Microb. Pathog., 31:29-36, 2001.
2. J. Biol. Chem., 281:11250-11259, 2006.
3. Nat. Genet. 33:375-381,2003.
4. J. Biol. Chem., 279:7024-7028, 2004.
5. J. Biol. Chem. 278:19183-19189, 2003.

Microbiology  
and Parasitology  
Department of  
Protozoology



Professor  
Osamu Kaneko  
Senior Assistant Professor  
Haruki Uemura  
Assistant Professor  
Kazuhide Yahata  
Assistant Professor  
Masahito Asada

Malaria is responsible for a huge burden of death and disease in large areas of the tropical and sub-tropical world. Unfortunately, those countries hardest hit by the disease are often amongst the poorest. Despite continuing efforts, there is still no effective vaccine against the disease. In order to design and implement effective disease intervention strategies, we believe that one of the key priorities in malaria research should be the strengthening of our understanding of the basic biology of the parasite. We are currently investigating some fundamental aspects of

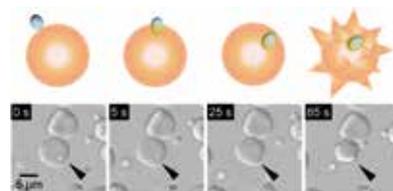


Fig.1 RBC invasion by *P. yoelii*. Merozoite-stage parasite (arrowhead) invades into RBC within 30 seconds (0-25 s) and deforms RBC to spike-like shape (85 s).



Fig.2 Colocalization of recombinant PkSBP1 protein (green) and Giemsa-stained 'Sinton and Mulligan' stipplings in monkey erythrocytes infected with PkSBP1-transgenic *P. knowlesi*.

the parasite's life cycle, such as the molecular interactions and signaling mechanisms behind red blood cell (RBC) invasion and the phenomenon of cytoadherence of parasite-infected RBCs. We utilize a variety of malaria parasites including human-infecting *Plasmodium falciparum*, the rodent malaria parasite *Plasmodium yoelii*, and *Plasmodium knowlesi* a causative agent of zoonotic human malaria. To expand a platform for basic and clinical malaria research, we are investigating the molecular epidemiology of malaria parasites in endemic countries, the biology of *Plasmodium vivax* hypnozoites, and the establishment of a novel malaria model using ungulate *Plasmodium*. In addition, we are also conducting research about the function and expression mechanism of trans-sialidase and the stage specific adaptation mechanisms of *Trypanosoma cruzi* that cause Chagas disease. Also we are investigating the molecular basis of host cell invasion and modification of *Babesia* parasites that cause Babesiosis in cattle and the development of genetic manipulation techniques for piroplasm parasites

1. Kegawa et al., Parasitol Int., 67: 706-14, 2018.
2. Asare et al., Parasitol Int., 67: 481-92, 2018.
3. Kaewthamasorn et al., Sci Rep., 8: 5827, 2018.
4. Asada et al., Int J Parasitol Parasites Wildl., 7: 44-7, 2018.
5. Gitaka et al., Malar J., 16: 98, 2017.

Microbiology  
and Parasitology  
**Department of  
Parasitology**



Professor  
Shinjiro Hamano  
Assistant Professor  
Yoshinori Mitsui  
Assistant Professor  
Risa Nakamura  
Technologist  
Megumi Hamasaki

Various kinds of parasites infect humans for long periods of time without killing them, giving rise to tremendous afflictions, social and/or economic loss. We would like to develop deep insight into parasitic diseases and the surrounding factors from various points of view through both field and laboratory studies. Our goal is to contribute to new knowledge and to provide an enthusiastic environment for the training of the future generation of investigators.

We have been researching parasitic diseases in Mbita Kenya, in cooperation with Kenya Medical Research Institute (KEMRI) and Maseno University. In 2017, we have just started a new project on schistosomiasis with the support from MEXT Grant-in-Aid for Scientific Research (A). We are trying to develop ideal diagnostic methods with the support from Global Health Innovative



Technology Fund (GHIT). In the laboratory, we maintain *Schistosoma mansoni*, its intermediate snail, *Brugia malayi*, *B. pahangi* and *Aedes aegypti*. In 2017, we have just started “DeWorm3” project in Japan which is supported by the Bill & Melinda Gates Foundation as a collaboration with the Natural History Museum, London.

We study host defense mechanisms against *Leishmania* spp, and in the process, have elucidated the function of the IL-12 cytokine family such as IL-27/WSX-1 during infection. We initiated developing the live attenuated vaccine to leishmaniasis by editing a gene using CRISPR-Cas9 system with the support from GHIT in 2015. In addition, we developed animal models of intestinal amoebiasis together with Prof. Houpt at University of Virginia, we elucidated the pathogenicity of *Entamoeba moshkovskii*, and now are devoting ourselves to the study on molecular basis of pathogenicity of *E. histolytica* and host defense mechanisms to it.

1. Moriyasu T et al., PLoS Negl. Trop. Dis., 12(1): e0006197, 2018.
2. Deloer S et al., Parasitol Int., 66(6): 817-823, 2017.
3. Chadeka E et al., PLoS Negl. Trop. Dis., 11(9): e0005872, 2017.
4. Mi-ichi F et al., PLoS Pathogens, 12(10): e1005845, 2016.
5. Kalenda YDJ et al., Parasitol Int., 64(6): 503-512, 2015.

Host and Vector Biology  
**Department of  
Immunogenetics**



Professor  
Kenji Hirayama  
Senior Assistant Professor  
Mihoko Kikuchi  
Assistant Professor  
Shusaku Mizukami  
Assistant Professor  
Dumre Shyam Prakash

This department primarily focuses on the fundamental insights of the pathogenic genetic factors of the host and the pathogens in relation to the most important tropical infectious diseases through the application of immunology and genetics. With the understanding of the dynamic host-pathogen relationship and available resources, we are further concerned with the development of new ways to fight against these diseases including novel therapeutics (drugs) or vaccine strategies.

**Research activities:**

To clarify the molecular mechanisms in the protective and/or pathogenic host response to selected human pathogens such as Dengue virus, *Plasmodium* spp and *Trypanosoma cruzi*, and to discover the ways to combat these tropical diseases, our department has the following ongoing research projects (major ones).

**1. Malaria**

- 1) Genetic analysis of malaria
- 2) Vaccine development  
\* *Plasmodium yoelii* Transamidase-related protein (PyTAM) based vaccine with nanoparticle delivery system
- 3) Anti-malarial drug development  
\* Anti-hemozoin activity and traditional herb based drug development

**2. Chagas disease**

- 1) Genetic susceptibility to different clinical forms of chronic Chagas disease, namely, indeterminate, cardiac, and digestive forms



- 2) Host and parasite factors influencing on the reactivity to the chemotherapy in the pediatric patients with chronic Chagas disease.
- 3) Exploring the essentiality of amastigote-stage specific metabolic pathways in *Trypanosoma cruzi* utilizing CPISPR/Cas9 system
- 4) Anti-trypanosomal drug development

**4. Dengue**

- 1) Identification and validation of early stage predictors for Dengue severity.  
\* Plasma level of cell-free DNA, Mast cell derived factors, Chymase, VEGF, Trypsin, ATIII, etc.
- 2) Genetic marker associated with sensitivity to Dengue infection.
- 3) Mechanism of cellular immunity on protection against Dengue virus.

**Collaborations:**

We strive to build a highly interactive and collaborative network for sustainable research activities, and hence, we have various well-arranged collaborative projects with the following overseas and domestic facilities.

1. **Malaria:** Research Institute for Tropical Medicine (RITM), Philippines. Tokyo Medical and Dental University, Toyama University
2. **Chagas Disease:** Center of Tropical Medicine, Sirani Clinic, and Hospital Japonese, UAGRM, Bolivia, IICS University of Asuncion, Paraguay.
4. **Dengue Fever:** Pasteur Institute in Ho Chi Minh City, and National Institute of Hygiene and Epidemiology (NIHE), Vietnam, Pasteur Paris, France, and National Institutes of Health (NIH), USA.

1. Mosaddeq F et al., Antimicrob Agents Chemother, 62 (5), 2018.
2. Helegbe GK et al., Malar J., 17(1):169, 2018.
3. Cherif MS et al., Am J Trop Med Hyg., 98(1):198-202, 2018.
4. Chérif MS et al., Eur J Pediatr., 176(6):791-796, 2017.
5. Mbanefo EC et al., Sci Rep., 7:45963, 2017.

## Host and Vector Biology

### Department of Pathology



Associate Professor  
Richard Culleton Leighton

We are a small, highly driven malariology group focusing on many different aspects of malaria. Established in 2011, we believe in a multi-disciplinary approach to studying malaria, as this enables a broad understanding of the subject, and therefore facilitates the development of novel solutions for fighting the disease. Such a holistic approach to disease research can succeed only on the foundation of a solid and detailed understanding of its multi-disciplinary constituents.

Our core belief is that all our research should produce results that are of potential practical use for fighting the disease. We also strive to engage young researchers in studies on malaria, and hope to encourage them to develop enthusiasm for useful scientific research. Research should be fun, and we



try to foster a freethinking and engaging research environment for students working with us.

We are interested in all aspects of malariology, and are currently actively engaged in research projects involving immunology, genetics, genomics, evolutionary theory, ecology, epidemiology, and molecular cell biology.

One particular ongoing project involves analysis of asymptomatic malaria carriage in Nigeria. Collaborative projects with malaria researchers based in Japan and internationally are of enormous importance to us, and make up the bulk of the work we are currently engaged in. At present we are actively working with researchers from the USA, the Republic of Congo, Vietnam, Sri Lanka, Australia, Tanzania, Kenya, Nigeria, Brazil, the UK and Saudi Arabia.

1. Alvarenga DA et al., *Sci Rep*, 2018.
2. Moriyasu T et al., *PLOS Negl Trop Dis*, 2018.
3. Lu F et al., *N Engl J Med*, 2017.
4. Abkhallo H et al., *PLOS Pathog*, 2017.
5. Brasil P et al., *Lancet Glob Health*, 2017.

## Public and Environmental Health

### Department of Eco-epidemiology



Professor  
Satoshi Kaneko  
Assistant Professor  
Kentaro Kato  
Assistant Professor  
Tomonori Hoshi

Our department is involved in various branches of public health research. With cutting edge IT and biotechnology, we intend: to create more accurate assessment methods in global health, to improve responses to the public health needs on a local level, and to open new directions in health sciences to the future generations. Our activities include the following:

1) Development of Microsphere-Based Simultaneous Multiple Assay System and Surveillance Systems for Multiple Infectious Diseases: Neglected tropical diseases (NTDs) are spreading across sub-Saharan Africa, but the current assessment on NTDs is still unclear. At the same time, simple and cost-effective methods for monitoring NTDs are needed. To fill in this gap, we are developing a simultaneous multiple antibody detection assay system, utilizing microsphere-based multiplex technology and sampling system for the survey using the satellite images to detect house structures with the University of Tokyo.



2) Civil Registration and Vital Statistics (CRVS) for the Epidemiological Research: In many developing countries, CRVS systems are still deficient, and this affects the statistical analysis of the population in a given region. For this, the resident registration system for the epidemiological research in a given location called Health and Demographic Surveillance System (HDSS) was developed. HDSS follows residents, and their dynamics over a long period. We are operating HDSS programs to develop future CRVS system integrating the cloud-based mother and child registration system in Kenya and Laos.

3) Epidemiological studies for the child health in Kenya: The Kwale district in Kenya is one of the poorest areas with high prevalence of stunted growth. We are conducting epidemiological studies to reveal the factors that could prevent stunted growth.

4) Research to clarify the molecular bases of parasitic diseases. Besides field work, basic research especially on schistosomiasis, amoebiasis and leishmaniasis are being conducted in our lab. We are dedicated to apply our achievements from the lab to the field.

1. Ndemwa M et al., *The PAMJ*, 28(265), 2017.
2. Kato K et al., *PLoS one*, 12(7):e0181864, 2017.
3. Nzou SM et al., *Parasitol Int*, 65:121-7, 2016.
4. Hoshi T et al., *PLoS one*, 11(2):e0148636, 2016.
5. Tanigawa C et al., *PLoS NTD*, 9(8):e0004021, 2015.

Public and Environmental Health  
**Department of International Health**



Professor  
 Taro Yamamoto  
 Associate Professor  
 Takayuki Wada

Department of International Health has started its activities since 2008.

Our research was composed of four units; 1) research on infectious diseases in ecosystem, 2) research on the environment health, 3) research on biological evolution of microorganisms from the adaptation or fitness viewpoint and 4) research on the epidemiology from the historical viewpoint. The umbrella concept linking above four research units is to reconstruct infectious diseases "temporally" and "spatially" alike. Infection is the biological phenomenon as an interaction between hosts and microorganisms. In other words, host behavior, social structure as well as culture per se affect microorganisms in fitness and adaptation whereas microorganism has impact on its hosts. Based on that perception, our department aims to get



more detailed understanding and insight on infectious diseases. We would like to pursue the ways of analysis by various approaches such as molecular-evolutional technique, molecular epidemiology, detection of trace DNA, genomics based on bioinformatics, mathematical model, and computer science.

Another pillar of our department is a social responsibility. Now that even profit oriented organizations are required to have its corporate social responsibility, no need to say for academia or university. Out of the name of our department, it must be nothing but contribution to international health or people's health in resource-limited settings. What we think of important is to make solidarity in order to contribute to sustainable development. It is our department's goal.

1. Koirala et al., J Physiol Anthropol., 37: 20, 2018.
2. Tu et al., Geriatr Gerontol Int., 2018 (In Press).
3. Yoshida et al., Infect Genet Evol., 62:122-129, 2018.
4. Ito H et al., Sci Rep., 7: 43377, 2017.
5. Takahashi S et al., PLoS One., 11:e0166817, 2016.

Public and Environmental Health  
**Department of Vector Ecology and Environment**



Professor  
 Noboru Minakawa  
 Associate Professor  
 Hitoshi Kawada  
 Assistant Professor  
 Toshihiko Sunahara  
 Assistant Professor  
 Kyoko Futami  
 Assistant Professor  
 Takashi Tsunoda  
 Assistant Professor  
 Ataru Tsuzuki  
 Assistant Professor  
 Hu Jinping  
 Technologist  
 Ikumi Fritz

Our research interests include anything from ecology to molecular biology of medically important arthropods, particularly mosquitoes that transmit pathogens such as Malaria parasites and dengue virus. We are also interested in their relationships with environmental variables and development of environmentally friendly vector control tools.

1. Dengue virus vectors

As dengue vectors are extending their geographic distribution, the spread of the disease is concerned. It has been suspected that the expansion of vector distribution is due to environmental factors such as climate change. We are currently mapping their geographical distributions in South East Asia and Africa, and examining the relationships with environmental factors.

2. Malaria parasite vectors

We are examining ecological and



physiological differences among the members within the *Anopheles gambiae* complex group and the *Anopheles funestus* group in Kenya and Malawi. We are also investigating their geographic distributions, and monitoring their abundance in Kenya. This extensive field survey was designed to understand the effects of climate and develop a climate base malaria prediction model.

3. Vector control measures

The coverage of insecticide treated bed nets (ITNs) has considerably increased in Africa. We are investigating whether local residents properly use and maintain ITNs, and how long ITNs last. We are also investigating the effects of bed nets on the species composition of vectors and their behavior, and monitoring their insecticide resistance in East Africa.

1. Kawada, Ann Community Med Pract, 3 (1), 1019, 2017.
2. Kawada, Acta Hort., 1169, 59-72, 2017.
3. Komagata et al., J. Med. Entomol., 54 (6), 1519-1524, 2017.
4. Oo SZM et al., Parasites & Vectors, 11 (16), 2017.
5. Ikeda et al., Scientific Reports, 7 (1) :2458, 2017.

Clinical Medicine  
and Research  
**Department of  
Clinical Medicine**



Professor  
Koya Ariyoshi  
Associate Professor  
Konosuke Morimoto  
Associate Professor  
Motoi Suzuki  
Assistant Professor  
Yoshiro Yamashita

This is the only clinical department in NEKKEN, which does clinical practices in Nagasaki University Hospital. We conduct a wide range of multi-disciplinary studies bridging our strength of clinical epidemiology to laboratory-based microbiology and immunology both in- and outside Japan. Our main research interests are respiratory infectious diseases, tropical infectious diseases, tuberculosis (TB) and HIV/AIDS. Specific research topics are as described below:

**1. Respiratory Infections Diseases**

We apply our in-house multiplex-PCR assays to identify 19 different viral and bacterial respiratory pathogens and a novel nano-fluidic real-time PCR-based assay to determine 50 pneumococcus serotypes for a multi-center adult pneumonia survey all over Japan and childhood acute respiratory infection study in central Vietnam. We published several papers demonstrating vaccine efficacy against pneumococcal pneumonia and influenza. Since 2009, we have run a birth cohort study of about 2,000 pairs of mothers and new-born babies, which facilitates studies of host-gene factors associating the severity of pediatric infectious diseases.



Bed-side clinical training in San Lazaro Hospital

**2. Tuberculosis**

For better-diagnosis of latent MTB infection and tuberculosis, we are analyzing cellular immune responses to various TB antigens using an intra-cellular cytokine staining assay to evaluate a range of cytokines profile in various stages of TB infection and their contact cases. Our goal is to clarify TB-specific cellular immune responses characteristic to a different clinical stage of TB infection. We also investigated pathogens causing bacterial pneumonia and its impact on the survival prognosis of TB patients admitted to the National Infectious Diseases Hospital (San Lazaro Hospital) in the Philippines.

**3. Fever management in the tropics**

We are conducting undiagnosed febrile illness study in the Department of Infectious Diseases, Bac Mai Hospital, Hanoi, Vietnam and the National Infectious Disease Hospital (San Lazaro Hospital), the Philippines, by applying diagnostic tests for leptospirosis and various rickettial diseases. We also coordinate a bed-side clinical training in tropical medicine.

**4. HIV/AIDS Studies**

In collaboration with National Institute of Health, Thailand, Bac Mai Hospital, Vietnam, Philippine General Hospital, and Nagoya Medical Center, we have investigated the pattern of opportunistic infections among HIV/AIDS patients and disclosed different clinical pictures in different geographical settings.

1. Saito et al., Clin Infect Dis, 67 : 897-904, 2018.
2. Kakiuchi et al., J Clin Microbiol, 56(5): e01874-17, 2018.
3. Sando et al., Emerg Infect Dis, 24(9):1633-1641, 2018.
4. Miyahara et al., Sci Rep., 7: 45481, 2017.
5. Suzuki et al., Lancet Infect Dis., 17(3):313-321, 2017.

Clinical Medicine  
and Research  
**Department of Clinical  
Product Development**



Professor  
Juntra Laothavorn  
Associate Professor  
Nguyen Tien Huy  
Assistant Professor  
Chisato Narahara

This is a newly established department in response to the Global Strategy on public health, innovation and intellectual property (resolution WHA61.21). The resolution calls for the enhancement of health-needs driven research and development to address diseases that disproportionately affect developing countries. The establishment of this department was supported by the Department of Academic and Research Promotion, Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan. MEXT continues to support the department until its full development.

**The department focuses on:**

1. Building capacity of individuals for innovation in health product
2. Strengthening capability of the local research institutions in providing an enabling environment, including infrastructure for product R&D
3. Strengthening research institutes network for knowledge sharing and exchange, and for R&D technology transfer activities. The emphasis will be on developing products for



public health needs to address the issues of inequity in health.

4. Filling the gap of health knowledge

**The activities:**

1. Training
  - 1) Two-week course on Product Research and Development for public health needs;
  - 2) Three-day course on Bioethics
  - 3) Responsible research
2. Research
  - 1) Identification and further development of Herbal Medicine and novel small compounds for Breast cancer, Cholangiocarcinoma and Malaria
  - 2) Validating the Enhance Informed Consent for clinical trials.
  - 3) Host pharmacogenomics and malaria virulence.
  - 4) Revolution of P.falciparum K13 in Thailand.
3. Network
  - 1) Coordination of Product Research and Development (PRD) Network
  - 2) Coordination of research ethics global network: Strategic Initiative for Developing Capacity in Ethical Review

1. Saeheng T et al., Eur J Clin Pharmacol, 2018.
2. Juntra K et al., BMC Medical Ethics, 2018.
3. Na-Bangchang K et al., Evid Based Complement Alternat Med., 2017.
4. Koonrungsomboon N et al., Eur J Clin Pharmacol., 2017.
5. Koonrungsomboon N et al., Phytomedicine, 2016.

Clinical Medicine  
and Research

Department of Pediatric  
Infectious Diseases

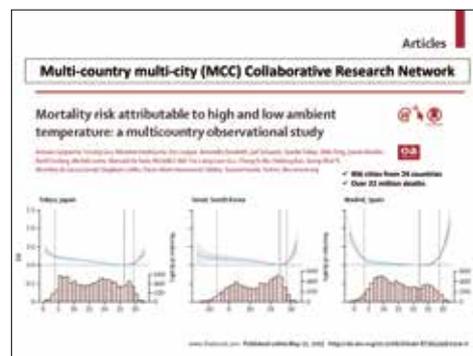
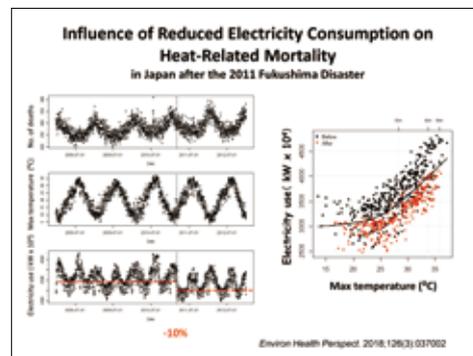


Professor  
Masahiro Hashizume  
Professor  
Lay Myint Yoshida  
Assistant Professor  
Michiko Toizumi  
Assistant Professor  
Noriko Kitamura  
Assistant Professor  
Chihiro Iwasaki  
Assistant Professor  
Mizuki Takegata  
Assistant Professor  
Keisuke Yoshihara

## Environmental epidemiology: health impacts of climate change

Our research interests extend over a range of issues in environmental epidemiology. The current research topics, which we work in collaboration with both the international and Japanese colleagues, focus mainly on the health impacts of atmospheric environmental changes including climate variability, global climate change and transboundary and local air pollution in high-, middle- and low-income countries. Ongoing projects include:

1. Short-term association between ambient temperature (heat, heat extremes and cold) and mortality in Japan and other parts of the world.
2. Effects of ocean-atmosphere interaction phenomenon and local weather on vector-borne, water-borne and other infectious diseases in tropical and sub-tropical settings.
3. Development of malaria early warning system in Southern Africa
4. Health effects of local and transboundary air pollution in Japan and in the East and Southeast Asia.
5. Respiratory health effects of the different chemical composition of airborne particulate matter and the sources.



1. Chung et al, Environ Health Perspect, 126(5):057002, 2018.
2. Matsushita et al, PLoS Negl Trop Dis, 12(4): e0006331, 2018.
3. Kim et al, Environ Health Perspect, 126(3):037002, 2018.
4. Kim et al, Environ Health Perspect, 125(7):077005, 2017.
5. Gasparrini et al, The Lancet, 386(9991):369-375, 2015.

## Clinical Epidemiological Studies of Pediatric Infectious Disease in Nha Trang, Vietnam

The Department of Pediatric Infectious Diseases conducts research on a wide range of infectious diseases with special attention on severe pediatric infectious diseases including pneumonia, diarrhea, and dengue which are the major causes of under 5 mortality.

1. Cohort studies on Pediatric Infectious Diseases in Vietnam: We receive funding from the Japan Initiative for Global Research Network on Infectious Diseases (JGRID), Japan Agency for Medical Research and Development (AMED) to conduct a large population based cohort study on Pediatric Infectious Diseases in Nha Trang, central Vietnam since 2006.
2. Pediatric ARI surveillance: A population based hospitalized Pediatric ARI surveillance at Khanh Hoa General Hospital, Nha-Trang, Vietnam was established to determine incidence, etiology and risk factors for pediatric ARI/pneumonia since 2007. We also investigate the emergence of new viruses and its molecular and clinical importance. In addition, we also investigate the impact or potential of various vaccine introduction on pneumonia and dengue in a population level.
3. Birth cohort study: We are also conducting a birth cohort study on 2000 new born babies in Nha Trang, Vietnam since 2009. This study was conducted to study congenital infection and host genetic factors on physical-neurological development of the child and development of SPID.
4. Pneumococcal conjugate vaccine (PCV) reduced dosing trial: We received a multimillion dollar grant from Bill and Melinda Gates Foundation to conduct a PCV reduce dosing trial in Vietnam. We believe that the study outcome will change global PCV vaccination strategy to improve the availability of PCV and other vaccines in developing countries.
5. Dengue intra-family transmission in the community: In collaboration with London School of Hygiene and Tropical Medicine, we are conducting a dengue intra-family transmission study in the community in Nha Trang. We identify dengue index cases by screening fever cases and followed up their family members for dengue transmission. We also conduct community IgG/M dengue survey in the community to determine yearly dengue infection in the community. These data will be used for future intervention studies to control dengue in the community.



Immunization with Pneumococcal Conjugate Vaccine



At Pasteur Institute Nha Trang

1. Do et al, Jap. J. Infect. Dis., 70(6):621-627, 2017.
2. Shi et al, Lancet, 390(10098):946-958, 2017.
3. Yoshihara et al, Sci. Rep., 16:6:27856, 2016.
4. Flasche et al, Vaccine, 32(51):6963-6970, 2014.
5. Toizumi et al, Pediatrics, 134(2):e519-26, 2014

Center for Infectious Disease  
Research in Asia and Africa

## Kenya Research Station



Chief Representative, Professor  
Satoshi Kaneko  
Assistant Professor  
Mohammad Shah  
Coordinator  
Rie Takeuchi

Nagasaki University Institute of Tropical Medicine and Kenya Medical Research Institute (NUITM-KEMRI) Project was launched by signing the Memorandum of Understanding between the President of NUITM, and the Director of KEMRI in 2005. The objective of the project was to enhance research and to develop capacity building in the tropical medicine at the field level. In January 2006, Kenya Research Station was established to manage the project. Biosafety Level 2 and 3 laboratories, and insectary for mosquitos were installed in the station. Research field sites were also established in Mbita near the Lake Victoria, and in Kwale on the coast side of Kenya. Health and Demographic Surveillance System (HDSS) has registered the population of about 120,000 people in the field, as well as vital events like birth, death and migration in two research areas. Additionally, Mosquito Surveillance System (MSS) has been functional for research on malarial mosquitos in Mbita.

Regarding the research activities based at the station: Basic research teams are organized according to the external research grants or funds. Until now, the SATREPS Project for rapid



diagnostics, and the establishment of an alert system for the outbreak of Yellow Fever and Rift Valley Fever were achieved and completed in 2017. AMED-funded project for serological surveillance on neglected tropical diseases (NTDs) is now on the 3rd phase of the project. Additionally, research activities are funded by the JSPS (KAKEN), the pharmaceutical companies, and the Grand Challenge Canada that supports the development of mother and child registration system.

Furthermore, we began a JICA Grass-root project focusing on community development and school health in Mbita since 2009, as means for the feedback to the communities.

In terms of education and training, the station is accepting Master's and PhD students from the Graduate School of Tropical Medicine and Global Health, and the Graduate School of Biomedical Sciences at Nagasaki University. The station is also providing research opportunities for young researchers, and students from Kenyan institutions.

1. Shah M, et al. *Jpn J Infect Dis.*70:442-447, 2017.
2. Wandera EA, et al., *Trop. med. Health.*, 45:9 DOI: 10.1186/s41182-017-0051-z, 2017.
3. Wandera EA, et al., *Vaccine*, 35, Issue 38:5217-5223, 2017.
4. Chadeka EA, et al., *PLOS NTD.*, DOI: 10.1371/ journal.pntd.0005872, September 1, 2017.

Center for Infectious Disease  
Research in Asia and Africa

## Vietnam Research Station



Professor  
Futoshi Hasebe  
Assistant Professor  
Takashi Tsunoda  
Assistant Professor  
Taichiro Takemura

Since 2015, the project has been taken over to the third phase under a grant from the newly established Japan Agency for Medical Research and Development and J-GRID Phase 3 is currently underway. Starting with the priority issues of the program, i.e., dengue fever, infectious diarrhea, influenza, and drug-resistant bacteria, research also covers severe childhood pneumonia, HIV/AIDS and tuberculosis to contribute to prevention of infectious diseases. As there was an outbreak of the Zika virus infection during the first half of 2016, mainly occurring in the southern part of Vietnam, in cooperation with WHO the training for the measurement of Zika virus-specific neutralizing antibodies was conducted in the National Institute of Hygiene and Epidemiology, Hanoi and in the Pasteur Institute of Ho Chi Minh City to differentiate from dengue virus infection.

In October 2016 the first case of microcephaly due to the Zika virus was discovered in the central highlands of Vietnam, and reported in to the *Lancet Infect Dis*. Furthermore, a lecture on infectious diseases aimed at Japanese residents of Hanoi was given and various other outreach activities were conducted as in other years. In the year 2017, a lecture for Japanese residents of Hanoi was held under the theme of "Knowing and communicating = personal protection," to which Dr. Makoto Ohnishi



NIHE-NU scientific symposium in Ninh Binh province, Vietnam.

and Dr. Masayuki Saijo, bacteria and virus experts from the National Institute of Infectious Diseases (NIID) were invited. It proved to be extremely well received.

The Vietnam Research Station in Hanoi is currently manned by 4 staffs from Nagasaki University (NU), and the Nha Trang sub-station by a permanent staff of 4 people, in addition to which 35 staff from NU and a further 55 researchers from other research institutions participate in the activities of the Station and conduct research. The Vietnam Research Station has been conducting educational support as an early exposure facility in the Program for Nurturing Global Leaders in Tropical and Emerging Communicable Diseases that was launched in 2015. Furthermore, the Station is also utilized as an on-the-job-training facility for other researchers not just from NU. In 2017 the Station was visited by 6 undergraduate university students, 4 graduate students, 4 high school students and 4 administrative staffs from NU, through which a wide diversity of human resource fostering activities were conducted.



Zika fever survey in Dak Lak province, Vietnam.

1. Ngwe Tun MM, et al., *Jpn J Infect Dis.*, Jul 24:70(4) : 357-361, 2017.
2. Moi ML, et al., *The Lancet Infect Dis.*, Aug 17(8):805-806, 2017.
3. Nguyen HLK et al., *Trans R Soc Trop Med & Hyg.*, Mar 1;111(3):137-139, 2017.
4. Obana S et al., *J Vet Med Sci.*, Jan 20;79(1):76-81, 2017.
5. Okada K et al., *Sci Rep.*, Jan 26;8(1):1631, 2018.

## Associated Facility Tropical Medicine Museum



Professor  
Junko Okumura  
Technologist  
Kazuo Araki

In April 2014, the Museum of Tropical Medicine moved to the Atomic Bomb Disease Institute Building No. 2, and expanded the exhibition area. The exhibition is divided into categories of 'Prologue', 'Parasitology', 'Bacteriology', 'Virology.' It provides information on Tropical Infectious Diseases by using 80 panels, microscopic images, movies, educational models and specimens. Although main visitors are Japanese, quite a few people visit from overseas. For these foreigners English translated panels are installed in i-Pads and lend them when it is requested. In addition to the contents on tropical infectious diseases, a corner expounding on Biosafety Level-4 (BSL-4) laboratory contributes to advocating on the needs, safety and security.

The section of Museum of Tropical Medicine mainly performs the following 3 functions.

1. Function as a museum and resource center on Tropical Medicine: There are sections providing



information on tropical diseases, parasites, bacteria, virus, insects (vectors), specimen of dangerous animals, audio-visual materials and documents. The audio-visual corner demonstrates interesting scientific movies with 80-inch screen. There are more than thousands of data/resource collections.

2. IT infrastructure maintenance: Network tools and servers are updated with technological innovation and maintaining its security. The renewal of IT infrastructure in 2018 strengthened VPN and data backup system. It provides safe and secure it environment to researchers work at NEKKEN and the overseas research stations in Kenya and Vietnam.

3. Research: Prof. Okumura conducts field research in Lao PDR and Republic of Guinea. She collects epidemiological data on infectious diseases, health seeking behavior, nutrition etc. in order to identify factors affect child health.

1. Delamou et al., The Lancet GH., 5 (4): e448-e457, 2017.
2. Camara et al., Trans. Roy. Soci. of Trop Med & Hyg., 111: 22-29, 2017.
3. Delamou et al., BMJ Global Health, 2:e000202, Doi: 10.1136/bmjgh-2016-000202, 2017.
4. Delamou et al., African J. of Repro Heal., 21 (1): 104-113, 2017.
5. Camara et al., Public Health Action, 7 (2): 161-167, 2017.

## Associated Facility Central Research Laboratory



Head and Professor  
Shinjiro Hamano  
Senior Assistant Professor  
Mihoko Kikuchi  
Assistant Professor  
Miako Sakaguchi

The aim of Central Laboratory is to operate and efficiently manage common equipment and to support general laboratory activities in the institute. In addition, this laboratory also supports research activities conducted in the institute by extramural investigators.

### ○Molecular & Cellular Biology Unit

Molecular & Cellular Biology Unit is responsible to maintain and operate following equipment located in Central Laboratory; 16- and 48-capillary sequencers, GS junior genome sequencer and mass spectrometry-based genotyping system for genome analysis; Flow Cytometer for cell function analysis; fluorescence-luminescence imager for visualization analysis; and Luminex bead-array system and fluorescence-luminescence multilabel counter for multipurpose analysis. In addition, this unit is also responsible to maintain equipment/facilities to support general laboratory activities; such as pure water supply, ultracentrifuge, lyophilizer, Speed-Vac, French press, Bioruptor, sample storage in liquid nitrogen, autoclave, dark room and cold room.

### ○Light Microscope Unit

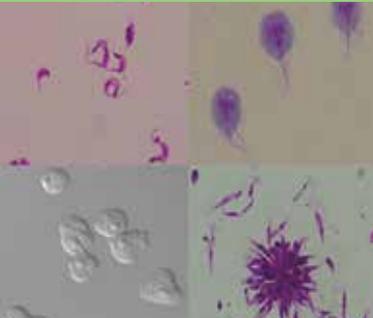
Light Microscope Unit provides optical

instruments to perform basic, translational, and clinical research on the imaging features of infectious disease. We operate Nikon Infectious Disease Imaging Core laboratory established in April 2015. The laboratory has equipped laser scanning confocal/fluorescence microscope (NIKON), Imaging Flow Cytometer (MERCK), laser scanning confocal/superresolution microscope (ZEISS), and a Virtual Slide Scanner (Nanozoomer 2.0-RS, Hamamatsu Photonics).

### ○Electron Microscope Unit

Electron Microscope Unit supports ultrastructural characterization of microbial pathogens and the structural change of the pathogen-infected cells. This unit offers high quality imaging services by state-of-art techniques such as conventional and immuno-electron microscopy and 3D tomography, and also provides training on sample preparation and equipment usage. This unit is responsible for transmission and scanning electron microscopes (JEOL), high-pressure freezer (LEICA), ultra-microtomes (LEICA and REICHERT), vacuum coater, hydrophilic treatment device, and osmium plasma coater in addition to general laboratory facilities for a wide range application of electron microscopy.

Associated Facility  
**NEKKEN Bio-Resource  
Center**



Project Representative, Professor  
**Osamu Kaneko**  
Service Manager, Assistant Professor  
**Makoto Kazama**

In 2015, NEKKEN Bio-Resource Center (NBRC) was established to take charge of National BioResource Project (NBRP) mission in Institute of Tropical Medicine (NEKKEN). NBRP constructs the framework for systematic collection, preservation, and distribution of bio-resources with a focus on those that required strategic development by the National Government. To promote life sciences it is important for researchers to share the various bio-resources necessary for pursuing researches and developments. NEKKEN has participated to NBRP services since 2002 when it was initiated by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), and has been maintained by Japan Agency for Medical Research and Development (AMED) from 2015. We have been serving as Division of Protozoa in “Pathogenic Eukaryotic Microorganisms of a Core Facility Upgrading Program” under Medical Mycology Research Center (MMRC), Chiba University. NBRC supports the research and education of pathogenic protozoa by the following services; (1) information gathering about owners and strains of

pathogenic protozoa in Japan, and disclosure of them on the web-based database, (2) supply of protozoan strains from NBRC, (3) acceptance of protozoan strains to NBRC, (4) preservation and maintenance of these strains, (5) supply of protozoan specimens for practice of education in academic organizations such as medical school. To facilitate the collection, preservation, and provision of bio-resources, NBRC also implements the development of related technologies. Approximately 800 strains of pathogenic protozoa are preserved in NBRC, and approximately half of them are available to supply. NBRC has provided 807 protozoan strains until last year. Please visit our website. Your cooperation and support to the project would be highly appreciated. Pathogenic protozoan resources, which can be supplied by NBRC, are listed in the following websites.

<http://www.tm.nagasaki-u.ac.jp/nbrc/>  
E-mail:protozoa@tm.nagasaki-u.ac.jp

Associated Facility  
**NTD Innovation  
Center**



Center Director, Professor  
**Satoshi Kaneko**

The Neglected Tropical Diseases (NTDs) are a group of parasitic, viral and bacterial infectious diseases that prevail in the tropical and poverty-stricken areas. They affect more than one billion people worldwide, resulting in prolonged poverty and economic hardship at both individual and geographical unit levels.

Ryutaro Hashimoto, then Japanese Prime Minister, kicked off the global parasite strategy to combat NTDs in 1998, so-called Hashimoto Initiative, at the Birmingham G8 Summit held in the UK. The Initiative created the global momentum including various milestones; such as the NTD Roadmap in 2012, the International Public-Private Partnership, and the London Declaration for the mission to eradicate, eliminate and control 10 NTDs by 2020. Also, in May 2013, the World Health Assembly resolved the resolution WHA 66.12, expanding the NTD definition to 17 illnesses, which worked as another driver for active, global deployment of the initiative. 20 diseases are currently classified under NTDs, as of October 2018.

Since the Hashimoto Initiative rolled out, Japan has been leading the G7 by supporting the core programs such as the Hashimoto Initiative Parasite Intervention Project and Pacific Programme to Eliminate Lymphatic Filariasis (PacELF). It is, however, not sufficient. As the top tropical infectious disease research organization in Japan, NEKKEN has the mission to take the leadership role in research and drug development to effectively

eliminate or eradicate NTDs. Another drawback is Japan-lead research results and interventions were not globally communicated or utilized. This is an area NEKKEN should step in by globally disseminating the activity results, and seek the avenue to translate the research results to effective real-life application.

To rectify this situation, NEKKEN has established an in-house section “Neglected Tropical Diseases Innovation Center (NTDi Center)” in 2016, mandating to establish industry-academia-government partnership to accelerate drug development and to create the global and domestic NTD network for effective sharing of information on NTD research and activities.

The NTDi Center carries out the strategic supports and seminars for researchers on research ethics, drug development and medical economics to acquire more grants to strengthen research activities. Furthermore, the center is establishing a Japanese NTD network to link domestic and international NTD organizations.



Aug. 2018 Diploma Course

Associated Facility  
Office of Coordination  
for Humanitarian Affairs



Section Chief, Professor  
Taro Yamamoto

(Introduction)

In 2016, the Office of Coordination for Humanitarian Affairs was set up in our institute. Prof. Taro Yamamoto, who also heads the Department of International Health, was nominated as the first chief of this section. One year has passed since its inception during which time we have dispatched missions to natural disaster affected areas and yellow fever epidemic areas.

(Aims)

The aims of this office are to provide support to both natural and manmade disaster areas. In order to undertake these missions, this office shall develop more human resources, do research, and become the center of an international humanitarian network.

(Organization)

1. Office of Coordination for Humanitarian Affairs was set up in NEKKEN
2. Appoint one section chief (professor)

(Past, Present and Future)

NEKKEN has dispatched missions to disaster afflicted areas such as Haiti in 2010, Tohoku region in 2011 just after the

East Japan Great Earthquake, West Africa in 2014 and Nepal 2015. These activities make NEKKEN one of the leading organizations in Japan in terms of disaster relief activities.

Further, the infectious diseases team for Japanese Disaster Relief was decided in a cabinet meeting in October, 2015 based upon the fact that Ebola broke out in West Africa in 2014 and there was an international call for cooperation to help deal with it. NEKKEN is expected to serve as one of the main stakeholders in this field and was asked to participate on that team.

Because of all these events, setting up the Office of Coordination for Humanitarian Affairs was proposed.



The University Hospital  
Infectious Disease Ward



- Professor  
Koya Ariyoshi  
Associate Professor  
Konosuke Morimoto  
Senior Assistant Professor  
Hirotomo Yamanashi  
Assistant Professor  
Kensuke Takahashi  
Assistant Professor  
Mai Izumida  
Visiting Lecturer  
Akitsugu Furumoto

It was 16 June 1967 when the clinical department of the Institute of Tropical Medicine (NEKKEN) was established in the Nagasaki University Hospital. Currently the department of clinical medicine has been running a clinic and providing in-patients care in the Department of Infectious Diseases locally known as "NEKKEN-NAIKA". Our ward has 16 beds with 8 negative pressure rooms, of which two can accommodate patients with BSL4 pathogens. We are specialized in infectious diseases; we treat patients with systemic infectious diseases, including tropical infectious diseases, HIV/AIDS, tuberculosis, pneumonia, and other febrile cases. We receive approximately 500 consultation cases a year from other wards. Outpatient

clinic is open twice a week where we also run a travel clinic for international travelers.

For training and education, we provide a number of lectures on infectious diseases to undergraduate students and bed-side training programs for resident physicians. We organize a clinical case conference of tropical infectious diseases as a part of Master of Tropical Medicine course, School of Tropical Medicine and Global Health. Staff and resident doctors are regularly dispatched for a long-term to abroad, San Lazaro Hospital, the Philippines and the infectious disease ward in Bac Mai Hospital, Vietnam to accumulate our knowledge and experience with clinical tropical medicine.



## Three-month Course on Tropical Medicine

This is a short-course of tropical medicine. This course aims to support medical and co-medical personnel who plan to work in the tropics, by providing opportunities to learn a broad range of skills and knowledge relevant to practicing medicine, implementing disease control programs and conducting medical research in tropical and developing countries. The course began in 1978 and since 2017, it opens to the researchers who pursue technology for global health. Over 15 participants are accepted to attend the course in each year. As of the 41th course in 2018, 543 participants in total (including 199 medical doctors, and 344 co-medical such as nurses, community health nurses, midwives, pharmacists) from all over Japan have completed the course.

The course is run by the steering committee, which consists of members from both inside and outside the Institute of Tropical Medicine (NEKKEN).

During thirteen weeks (April to June), the full-time staff members of NEKKEN and a substantial number of visiting professors and lecturers provide lectures, laboratory practicals and field work, in the fields of virology, bacteriology, protozoology, parasitology, medical entomology, pathology, immunogenetics, epidemiology, human ecology, social medicine, clinical medicine and also geography and culture in tropics. Participants who successfully completed the course are awarded the Diploma in Tropical Medicine.



Admission ceremony in 2018

## Publications

Our official publications are as follows;

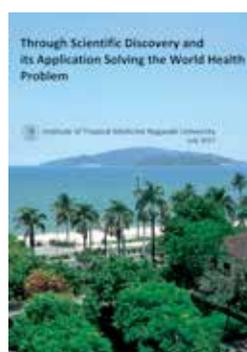
1. Bulletin of Nagasaki University Institute of Tropical Medicine (in Japanese, yearly since 1964, PDF files are available at our web page.)
2. Japanese Brochure (in Japanese yearly since 1977, PDF files are available at our web page.)
3. English Brochure: INSTITUTE OF TROPICAL MEDICINE NAGASAKI UNIVERSITY (this copy. Yearly since 1977, PDF files are available at our web page.)
4. Report of Nation-wide Cooperative Research Projects (Information of research activities and achievements as a nation-wide cooperative research center for tropical medicine is compiled.)



1



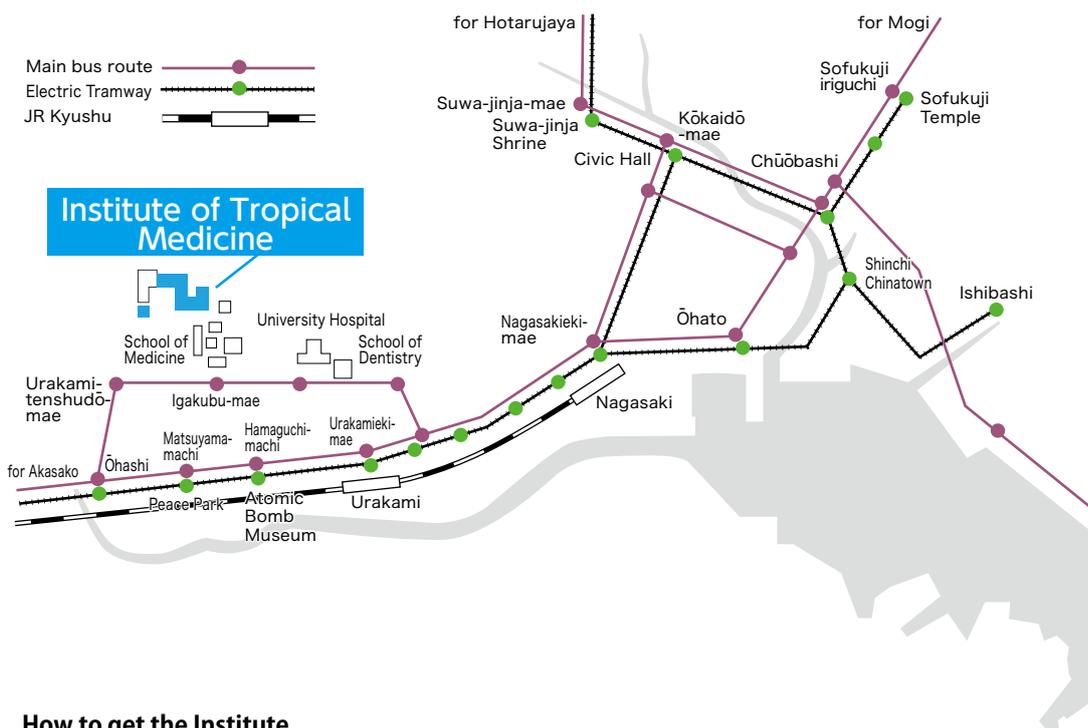
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3



4



**How to get the Institute**

- From JR Nagasaki Station
  - ▶ Electric Tramway "Nagasaki Station" (bound for "Akasako") → "Atomic Bomb Museum" → about 10-minute walk
  - ▶ Nagasaki Bus "Nagasaki Station" (No.8 bound for "Shimoohashi" via "School of Medicine") → "School of Medicine"
- From JR Urakami Station
  - ▶ Electric Tramway "Urakami Station" (bound for "Akasako") → "Atomic Bomb Museum" → about 10-minute walk
- From Nagasaki Airport
  - ▶ Kenei Bus "Nagasaki Airport No.4" Bus Stop (For "Nagasaki Sta". (via "Showa-machi" / via "Showa-machi • Sumiyoshi")) → "Hamaguchi-machi" → about 10-minute walk



**Nagasaki University**  
**Institute of Tropical Medicine**

Location 1-12-4 Sakamoto Nagasaki 852-8523  
 URL <http://www.tm.nagasaki-u.ac.jp/nekken/>

