



**WIPO | Re:Search**  
Sharing Innovation  
in the Fight Against  
Neglected Tropical Diseases

# BVGH Partnership Hub

## **MID-YEAR REPORT**

2019

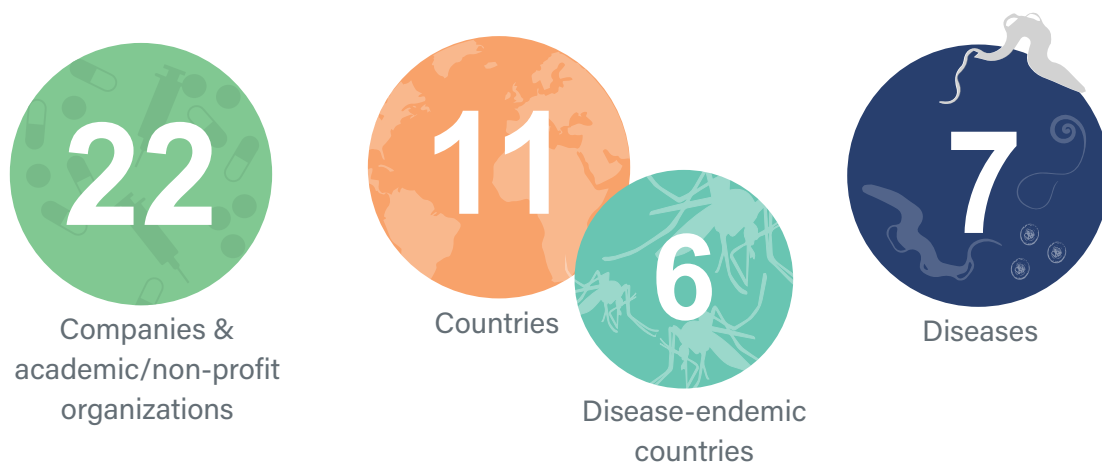


# Collaborations

BVGH's targeted partnering approach catalyzes intellectual property (IP) sharing across sectors and geographies to drive product R&D for malaria, tuberculosis, and neglected tropical diseases

Since 2011, BVGH has **catalyzed 154 innovative IP-sharing collaborations** - **54 are active**, including **10 that are advancing critical solutions** for neglected infectious diseases along the product development pathway

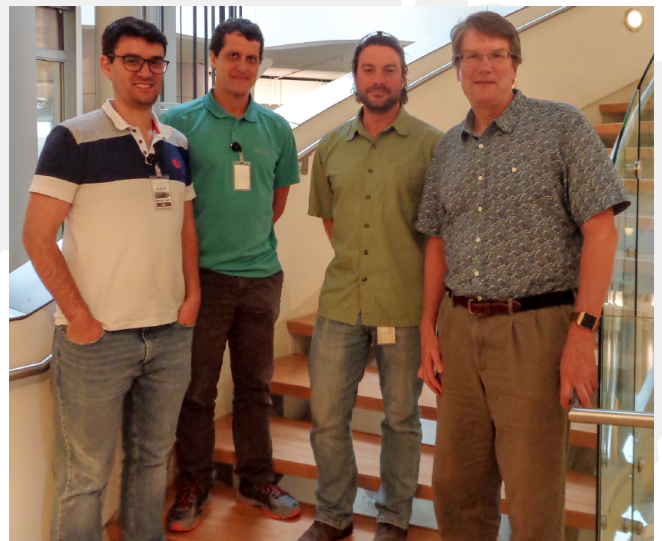
BVGH established **14 new collaborations** in the first half of 2019, spanning



## New Collaboration Highlights

### Brazilian Researcher Partners with Novartis to Combat Chagas Disease

Chagas disease, a potentially life-threatening condition caused by the parasite *Trypanosoma cruzi*, affects an estimated eight million people, mainly in Latin America. Dr. Artur Cordeiro at **Laboratório Nacional de Biociências (LNBio)** in Brazil previously discovered compounds that inhibit two key *T. cruzi* enzymes and are active against the parasite within human cells. BVGH connected him with **Novartis**, which provided access to proprietary compounds and advanced instrumentation through its FAST Lab to help Dr. Cordeiro move his drug discovery work forward. The partnership between Dr. Cordeiro and Novartis was LNBio's first WIPO Re:Search collaboration.



From left: Drs. Gustavo Fernando Mercaldi (LNBio), Artur Cordeiro (LNBio), Dominick Casalena (Novartis), and Douglas Auld (Novartis). Photo courtesy of Novartis.

## Eisai Co., Ltd. Bolsters Scientist's Antiparasitic Drug Discovery Programs



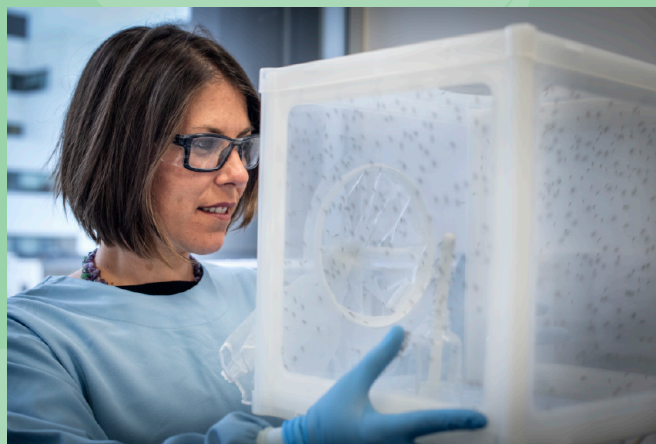
Malaria, leishmaniasis, and human African trypanosomiasis are parasitic diseases that collectively afflict hundreds of millions of people each year, mostly in low- and middle-income countries (LMICs). Better treatments are urgently needed. In alignment with its mission of improving human health through creation and delivery of innovative medicines, **Eisai** is supporting the antiparasitic drug discovery efforts of Professor Fabrice Boyom at the **University of Yaoundé I** in Cameroon. Professor Boyom is screening Eisai's dihydrofolate reductase inhibitors and potassium channel blockers through a BVGH-coordinated collaboration to identify compounds with activity against *Plasmodium falciparum*, *Leishmania*, and *Trypanosoma brucei gambiense*.

## Updates on Ongoing Collaborations

### Australian Researchers Partner with Industry to Pursue Antimalarial Drug Discovery

The World Health Organization (WHO) sounded an alarm in its *World Malaria Report 2018*, noting that progress against the disease has stalled after years of unprecedented successes. Through WIPO Re:Search, two pharmaceutical companies are partnering with the **Walter and Eliza Hall Institute of Medical Research (WEHI)** in Australia to change this narrative.

A BVGH-facilitated collaboration between Professor Alan Cowman's team at WEHI and **MSD\*** — which has received over US \$3.5 million in Wellcome Trust funding — focuses on repurposing the company's aspartyl protease inhibitors to identify new antimalarial agents. The partners identified several novel drug-like hits in initial screens and are optimizing potency and selectivity in search of a development candidate. Wellcome Trust recently determined that the team has met all of the ambitious first-year milestones under the current grant.



*Dr. Paola Favuzza (WEHI). Photo courtesy of WEHI.*

*"The MSD/WEHI collaboration has made some great progress identifying potent chemical matter that has also provided useful tools to decipher some important malaria biology. We are hopeful that our research will lead to drugs that will benefit those who suffer from deadly effects of this horrible parasite." – Alan Cowman*

In a separate project, BVGH connected the WEHI team with **Johnson & Johnson** to develop drugs targeting critical *Plasmodium* pathways. Screening of the company's Jump-stARter library—80,000 compounds with a wide array of targets and mechanisms of action—yielded multiple novel hits. Building on these exciting results, the WEHI researchers and Johnson & Johnson are chemically modifying the hits to improve their potency and drug-like properties.

## Fighting River Blindness through Global North/South Collaborations

Collaborations



Onchocerciasis (river blindness) is the second leading cause of blindness due to infection globally. The recommended treatment cannot be used in areas with high rates of co-infection with *Loa loa* worms—which are in many parts of West and Central Africa—due to severe and sometimes fatal toxicities caused by the killing of juvenile *L. loa* worms by the drug. Another shortcoming of the drug is that it kills juvenile but not adult *Onchocerca volvulus*.

BVGH is coordinating a partnership between Professor Fidelis Cho-Ngwa at the **University of Buea** in Cameroon and **Merck KGaA, Darmstadt, Germany**—a company committed to fostering global North/South collaborations to accelerate neglected infectious disease R&D—to develop a medication with activity against both adult and juvenile *O. volvulus* but not *L. loa*. Supported by a Wellcome Trust Pathfinder Award, Professor Cho-Ngwa identified several promising hits in a screen of over 5,500 Merck KGaA compounds. BVGH assisted the partners in identifying a medicinal chemistry expert to collaborate on hit-to-lead optimization, and they are co-preparing a second proposal to Wellcome Trust to fund this work. Merck KGaA will contribute corporate affairs, patents, global health, and medicinal chemistry expertise to support the advancement of this drug development program.

## Developing Innovative Tuberculosis Drugs to Address Antimicrobial Resistance

There is a critical need for new tuberculosis medications with novel mechanisms of action to address growing concern over resistance to current therapies. *Mycobacterium tuberculosis* (*Mtb*) can survive and reproduce inside the macrophages of infected individuals, eventually killing the cells and suppressing the body's immune response to the disease. Dr. Yossef Av-Gay at the **University of British Columbia (UBC)** previously identified a human protein that promotes the survival of *Mtb* within macrophages. He is partnering with **Takeda Pharmaceutical Company Limited** through a BVGH-facilitated collaboration to develop inhibitors of the protein to treat tuberculosis. Using Takeda's inhibitors—developed to treat other diseases—as a starting point, Dr. Av-Gay identified highly active hits in screening assays. UBC has filed a provisional patent application covering the use of this compound class as antitubercular drugs, and several of the hits will advance to animal studies in the near future.



# Welcome, New Members!

BVGH strategically recruits new Members to expand the breadth and impact of WIPO Re:Search collaborations

## Nexus of West African Medicinal Chemistry Expertise

**Umaru Musa Yar'adua University** is a Nigerian institution established to serve as a nucleus for socioeconomic, technological, and political development by producing highly skilled human resources through face-to-face and distance learning modes. The University is the headquarters for the Chemistry Research Network of West Africa (CHEMRENWA), which unites experienced academic pharmaceutical, biochemical, biological, and microbiological scientists for cross-disciplinary research projects, including development of synthetic and natural products to treat malaria and other serious diseases.

## First Member in Puerto Rico

The **Puerto Rico Science, Research & Technology Trust** invests, facilitates, and builds capacity to advance Puerto Rico's economy and wellbeing through innovation-driven enterprises. The Trust engages Puerto Rico's academic institutions through research grant funding and collaborative initiatives, including Brain Trust for Tropical Disease Research and Prevention, Center for Biodiversity and Bioprospecting, Puerto Rico Consortium for Clinical Investigation, Puerto Rico Vector Control Unit, and Puerto Rico Public Health Trust. The Trust's Technology Transfer Office supports and manages IP and commercialization in partnership with Puerto Rican academic organizations.

Current Membership

**141\***  
Member  
Organizations

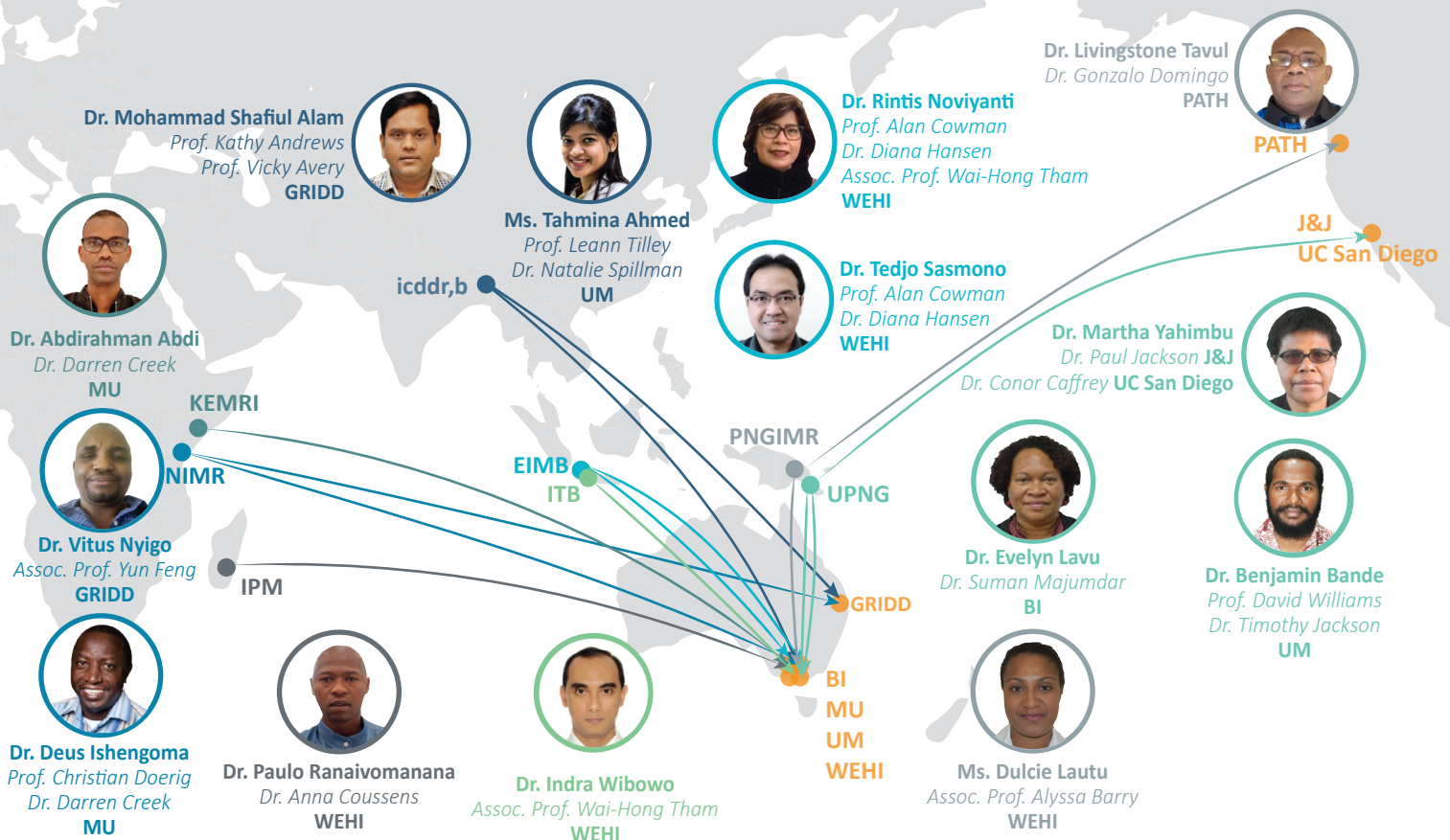
**41**  
Countries

**\*58 in LMICs**

# WIPO Re:Search Fellowship Program

**BVGH bolsters the capacity of LMICs to engage in neglected infectious disease R&D by coordinating training sabbaticals in advanced laboratories**

Supported by the Government of Australia through WIPO Funds-in-Trust (FIT), BVGH organized **20** fellowships—totaling **100+** months of training—for scientists from **11** LMICs. Key outcomes and impacts included grant funding (over **US \$750,000** for one fellow), promotions, international publications and presentations, and research collaborations. BVGH is co-developing a publication on the Fellowship Program.



## Fellow Institutes

- EIMB:** Eijkman Institute for Molecular Biology
- icddr,b:** International Centre for Diarrhoeal Disease Research, Bangladesh
- IPM:** Institut Pasteur de Madagascar
- ITB:** Institut Teknologi Bandung
- KEMRI:** Kenya Medical Research Institute
- NIMR:** National Institute for Medical Research
- PNGIMR:** Papua New Guinea Institute of Medical Research
- UPNG:** University of Papua New Guinea

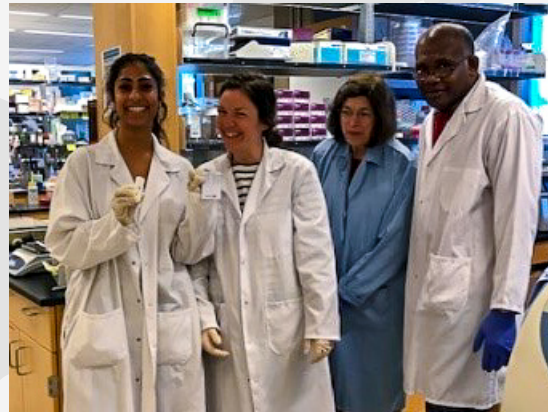
## Host Institutes

- BI:** Burnet Institute
- GRIDD:** Griffith Institute for Drug Discovery
- J&J:** Johnson & Johnson
- MU:** Monash University
- UM:** University of Melbourne
- WEHI:** Walter and Eliza Hall Institute of Medical Research
- UC San Diego:** University of California, San Diego

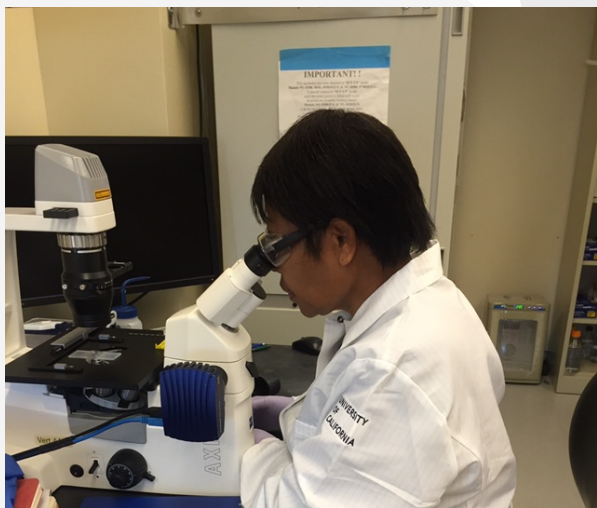
# Fellowship Highlights - Papua New Guinea

## Dr. Livingstone Tavul

Dr. Tavul's partnership with **PATH** focused on improving malaria control programs in Papua New Guinea. Nearly 40% of malaria cases outside of Africa are caused by *Plasmodium vivax*. The parasite's ability to relapse from dormant liver stages makes it difficult to eliminate. Primaquine and tafenoquine can kill the dormant stages of *P. vivax* and prevent relapse. However, the drugs cannot be taken by individuals with deficiencies in an enzyme called glucose-6-phosphate dehydrogenase (G6PD), as the medications can cause a potentially deadly destruction of red blood cells. The collaborators collected and analyzed data on patient and provider acceptance of G6PD deficiency testing and adherence to treatment guidelines; safety of the testing; and costs. They also explored ways to expand coverage of malaria diagnosis, G6PD deficiency screening, and treatment through community engagement. The WIPO Re:Search fellowship has inspired Dr. Tavul to consider how he and his colleagues can translate their research data into new strategies that support Papua New Guinea's malaria control efforts. Dr. Tavul's presence at PATH and interactions with the product development and introduction team greatly assisted PATH in thinking about priorities for operational research that can greatly improve successful adoption of the new G6PD diagnostic product and other malaria commodities. Dr. Tavul and PATH plan to continue their partnership, including performing field studies in Papua New Guinea.



*Dr. Livingstone Tavul (right) with colleagues at PATH. From left: Nicole Advani, Emily Gerth-Guyette, and Maria Kahn. Photo courtesy of PATH/Sampa Pal.*



*Dr. Yahimbu counting *Trypanosoma* parasites in the tissue culture suite at the Center for Discovery and Innovation in Parasitic Diseases, Skaggs School of Pharmacy and Pharmaceutical Sciences, UC San Diego. Photo courtesy of Dr. Yahimbu.*

## Dr. Martha Yahimbu

Dr. Yahimbu's research leverages Papua New Guinea's unique medicinal plants and marine organisms to develop better treatments for diseases prevalent in the country. During her fellowship, Dr. Yahimbu honed her skills in compound screening, natural product isolation and purification, and mass spectrometry at **Johnson & Johnson**, then immediately applied those skills on a human African trypanosomiasis drug discovery project at the neighboring **University of California (UC) San Diego**. Dr. Yahimbu also gained leadership, project management, data analysis, and oral and written communications experience. Now back in Papua New Guinea, she is applying her learnings to lead international drug R&D projects, secure grant funding, and train junior investigators. Dr. Yahimbu anticipates continuing her drug discovery collaborations with Johnson & Johnson and UC San Diego.

# Communications

BVGH shares WIPO Re:Search successes with global audiences to increase program visibility and help attract funding and partners

## BVGH Publications

- ◆ 2 peer-reviewed papers in *Tropical Medicine and Infectious Disease*, featuring 13 collaborations
  - ◆ WIPO Re:Search: Catalyzing Public-Private Partnerships to Accelerate Tropical Disease Drug Discovery and Development
  - ◆ WIPO Re:Search: A Platform for Product-Centered Cross-Sector Partnerships for the Elimination of Schistosomiasis
- ◆ Partnership Hub Snapshot Newsletter: Distributed monthly to ~1,700 global subscribers
- ◆ Partnership Hub 2018 Annual Report
- ◆ Collaboration storybook and advancing collaborations brochure in development

BVGH's communications are **amplified** by Members and external stakeholders

## Peer-Reviewed Publications by WIPO Re:Search Investigators

Malaria Detection by Third-Harmonic Generation Image Scanning Cytometry, *Analytical Chemistry*

Kelch 13 Propeller Gene Polymorphism Among *Plasmodium falciparum* Isolates in Lagos, Nigeria: Molecular Epidemiologic Study, *Tropical Medicine and International Health*

## BVGH Website



## Social Media Promotion



## People are Talking about WIPO Re:Search



*Devex: A Seattle Perspective of DFAT as a Funder*, by Lisa Cornish  
*WIPO Re:Search Fellowship Program feature*



WIPO Re:Search Members: Websites, social media, presentations



## WIPO | Re:Search

Sharing Innovation  
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Developed in cooperation with our funding Members:



*Johnson & Johnson*

Merck KGaA\*  
Darmstadt, Germany



\*Known as EMD in the USA and Canada | \*\*MSD is a trademark of Merck & Co., Inc.,  
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