Since 2001 Bloomberg Philanthropies has given $160 million to the Bloomberg School to fund a state-of-the-art research facility to mount a broad program of basic-science research to treat and control malaria, develop a vaccine and find new drug targets to prevent and cure this deadly disease.

**Diane Griffin, MD, PhD**
Founding Director, JHMRI
Former Chair, MMI Dept

**Connection with MMI**

The Institute resides in the Department of Molecular Microbiology & Immunology (MMI).
Leadership

Peter Agre, MD
Bloomberg Distinguished Professor & JHMRI Director

George Dimopoulos, PhD, MBA
Professor, JHMRI Deputy Director, Parasite Core Director

Bill Moss, MD, MPH
Professor, JHMRI Deputy Director, & ICEMR Program Director

Sean Prigge, PhD
Professor, JHMRI Deputy Director, & Co-Director Biophysics Core

Photini Sinnis, MD
Professor & JHMRI Deputy Director
Staff Support

**Trish Ward**, trish.ward@jhu.edu
Room E5143, 443-287-8745
Items related to Dr. Agre, Conferences, MRI Travel Funds

**Genevieve Williams**, genevieve.williams@jhu.edu
Room E5141, 410-614-4883
Seminars, Pilot Grants, Fellowships, Board mtg, Website, Listserves

**Ana Coyne**, acoyne4@jhu.edu
Room E5141, 410-614-3336
Communications, Marketing, PR, Video, Website, Social Media

**Lena Johnson-Bey**, ljohn164@jhu.edu
Room E5007, 410-502-2860
JHMRI Budget Items
19 Faculty/Labs

School of Public Health
- Molecular Microbiology & Immunology
- Epidemiology

School of Medicine
- Cell Biology
- Neuroscience
- Pharmacology

Core Facilities
- Insectary
- Parasite Core
- Biophysics Core
- Spatial Science Core
- \textit{MMI} Genetic Analysis & Sequencing Facility
- \textit{MMI} Imaging & Microscopy
- \textit{MMI} Flow Cytometry/Cell Sorting Core

Field Site
Macha, Zambia
Facility Co-Directors

Scott Bailey, PhD
Email: scott.bailey@jhu.edu

Sean Prigge, PhD
Email: sprigge2@jhu.edu

Biophysics Core
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room W8620
Baltimore, Maryland 21205
Telephone: 443-287-48227 Fax: 410-955-0105
Biophysics Core

The Biophysics Core Facility provides equipment for JHMRI investigators who want to characterize macromolecules or macromolecular complexes using biophysical techniques.

**Isothermal Titration Calorimetry:** This technique measures the heat of binding between two molecules, providing a direct measurement of binding affinity.

**Equipment:** MicroCal VP-ITC

**Location:** W8620
**Biophysics Core**

**Dynamic Light Scattering.** This technique provides information about the size, shape and oligomerization state of biomolecules.

**Equipment:** Proterion DynaPro with Peltier temperature control

**Location:** W8620
Biophysics Core

Circular Dichroism. This technique measures the overall secondary structure content of proteins and quantifies changes in structure under different conditions.

Equipment: Jasco J-810 Spectropolarimeter with Peltier temperature control, automated dual titration system, and scanning emission monochromator

Location: W8620
JHMRI Insect Core Facility

Location: SPH 4th floor, Room W4700

Size: 3000 sq ft. divided into two operational areas – High (Area 2) and Low containment (Areas 1, 3 & 4).

There are seven procedure rooms and an autoclave.

MAIN AREAS
- Arthropod Containment Level 3 (ACL3)
- Temperature, humidity and light intensity and cycle adjustable incubators

- Area 1: Mosquito rearing and rodent Plasmodium infections
- Area 2: High safety area for mosquito rearing and infections
  - 2A: Plasmodium falciparum procedure room
  - 2B: Wind tunnel lab
  - 2C: Zika lab
- Area 3: Mosquito rearing and rodent Plasmodium infections and wash room
- Area 4: Mosquito rearing and rodent Plasmodium infections
- Area 5: Mosquito rearing (backup)
• 7 environmentally controlled walk-in incubators for mosquito rearing.
• 10 reach-in incubators whose temperature and humidity can be custom adjusted.
Services

- Mosquito rearing: *An gambiae* and *An. stephensi*

- Provide space and assistance for rearing of other mosquito species.

- Training: insectary use, mosquito rearing, handling and identification techniques.

- Mosquito transformation (transgenic mosquitoes)
For new insectary users:

• Need orientation training by insectary manager before access to the insectary is granted.

• Need specialized training to work with *Plasmodium falciparum*-infected mosquitoes.

• Log in to iLabs to place mosquito orders.  
  https://johnshopkins.corefacilities.org/service_center/show_external/3806?name=malaria-mosquito-parasite-core
Contacts

Facility Director:
Dr. Marcelo Jacobs-Lorena
School of Public Health, Rm E4632
Tel: 443-287-0839
Email: ljacob13@jhu.edu

Facility Manager:
Mr. Christopher Kizito
School of Public Health Rm W4008
Tel: 443-287-0789
Email: ckizito1@jhu.edu
Olympus MVX-10 Macro Zoom Fluorescence Microscope System for Transgenic Screening

- Macro zoom fluorescence microscope for screening of transgenic *Anopheles* and *P. falciparum*, 4x to 250x magnification
- ECFP, EGFP and CY3 filter sets
- DP74 Color CMOS Cooled 20.7 MP Pixel-Shift Camera
Parasite Core Facility
http://www.parasitecore.org/

Facility Director:
George Dimopoulos, PhD, MBA
gdimopo1@jhu.edu

Facility Co-Manager:
Godfree Mlambo, PhD
gmlambo1@jhu.edu

Facility Co-Manager:
Abhai K. Tripathi, PhD
atripat2@jhu.edu

Parasite Core Facility
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room W4212
Baltimore, Maryland 21205
Telephone: 410-502-7744 Fax: 410-955-0105
Parasite Core Facility

Location

-TISSUE/CELL/PARASITE CULTURE ROOM W4214
-OFFICE AND MOLECULAR LAB ON 5TH FLOOR, W5315
*P. falciparum* Life-cycle Stages Established in Parasite Core
Parasite Core Services

• *P. falciparum* Blood-Stage Cultures
  Asexual Stage, asynchronous or synchronous (1-week prep time)
  Gametocyte Stage (3-week prep time)

• Mosquito Stage Parasites
  *P. falciparum* sporozoites (6 weeks prep time)
  *P. berghei* and *yoelii* sporozoites (4 weeks prep time)

• Training
  Malaria culture techniques
  Membrane feeding assay
  Safe technique for *P. falciparum* infected mosquito handling

• Blood for Malaria culture and mosquito blood feedings

iLabs Ordering:
https://johnshopkins.corefacilities.org/service_center/show_external/3806?name=malaria-mosquito-parasite-core
Microscope Facility
Isabelle Coppens, PhD
icoppen1@jhu.edu

DeltaVision Elite Deconvolution/TIRF Microscope
Anne Hamacher-Brady, PhD
abrady9@jhu.edu
Nathan Brady, PhD
nbrady7@jhu.edu

Imaging and Microscopy Resource Facility
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room E2214 | Baltimore, Maryland 21205
Telephone: 443-287-1589 Fax: 410-955-0105
Facility Services

The facility provides advanced instrumentation for the digital documentation of everything from macromolecules to cells and tissues

- Available Equipment
  - Nikon Eclipse E800 upright microscope
  - Nikon TE200 inverted microscope
  - Nikon Eclipse90i upright microscope
  - Zeiss AxioImager M2 upright microscope

- New Users must first register and pass a quiz before gaining access to the facility microscopes
DeltaVision Elite Deconvolution/TIRF microscope system (Installed: 6/16/2016)

Wide-field, fluorescence 3D deconvolution (image restoration) system, with a solid state illumination system and 488nm and 561nm laser lines.

**Deconvolution** is an algorithm uses the point spread function (diffraction pattern) to deblur and remap out-of-focus fluorescent light, improving image resolution and contrast.

Long-term live cell imaging experiments possible with incubation system with temperature control and an Ultimate Focus laser that monitors the position of the stage to eliminate z-drift during time-lapse studies. Further, precision stage allows continuous monitoring of multiple fields of view over extended periods of time.

**Advanced applications:**
TIRF (total internal reflection microscopy), a technique used to image samples within ~100-200nm of the coverslip surface, useful for cell surface, single molecule imaging (e.g. receptor mediated endocytosis).

Photoactivation (PA), Fluorescent Recovery After Photobleaching (FRAP), and Fluorescent Loss in Photobleaching (FLIP), for investigating intracellular dynamics, such as the kinetics of protein diffusion and organelle interactions.
Genomic Analysis and Sequencing Core Facility
Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room E4208
Baltimore, Maryland 21205
Telephone: 443-287-5967 Fax: 410-955-0105

Facility Director:
Andrew Pekosz, PhD
Email: apekosz1@jhu.edu

Facility Manager:
Anne Jedlicka, MS
Email: ajedlic1@jhu.edu

Amanda Dziedzic, MS
Email: adziedz1@jhu.edu
Core Services
("Tissue to Data")

• Next Generation Sequencing Library Prep (Illumina)
  • RNA-seq (Total RNA, mRNA, CAGE, NanoCAGE)
  • DNA-seq (Genomic, Metagenomic, Targeted, 16s)

• Microarray experiments (Agilent, Custom)

• Genotyping studies (TaqMan allelic discrimination)

• Real-Time PCR assays (TaqMan, PCRarray)

• DNA and RNA purification and Quality Assessment

• Detailed Data Analysis (microarray, qPCR, genotyping)

• Consultation on experimental design, implementation, and/or analysis

• Protocol adaptation and development, Pilot Studies

• Instrument and Applications training (qPCR, imagers, etc)
Recent Core projects

- **JHMRI**
  - Agilent Gene Expression Microarrays
    - Mouse/Human (Stins, cerebral malaria)
    - Custom *P. falciparum* (Prigge)
  - DNA-Seq, Transposon insertion profiling, *P. falciparum* (Prigge)
- **MMI and other**
  - RNA-seq
    - Host profiling, Influenza- and SARS-CoV2-infection (Pekosz)
    - Viral sequencing (Respiratory Pathogens)
    - Lung Tumor-derived xenografts and organoids (Marchionni, Hann, Tran)
  - Metagenomics, Ocular Sarcoidosis (Shifera)
  - 16s Microbiome, Interstitial Cystitis (Shatkin-Margolis)
  - qPCR, SARS-CoV2 (Sullivan, Pekosz)
- **Instruments and Software**
  - Agilent SureScan Microarray Scanner (JHMRI)
  - ABI StepOne Plus Systems (MMI/JHMRI)
  - Partek Genomic Suite and Flow (NGS) Software (MMI)
  - 10x Genomics Chromium (MMI)
  - Illumina iSeq100 (MMI)
  - Illumina MiSeq (JHMI Biological Chemistry Core)
  - Illumina NovaSeq6000 (JHMI High Throughput Seq Core)
Flow Cytometry and Cell Sorting Core Facility

Faculty Co-Directors

Jay Bream, Ph.D.
jbream1@jhu.edu

Joe Margolick, M.D., Ph.D.
jmargol1@jhu.edu

Facility Manager:
Tricia Nilles, MS, MBA
tnilles1@jhu.edu

Johns Hopkins Bloomberg School of Public Health
615 N. Wolfe Street, Room E1200
Baltimore, Maryland 21205
Telephone: 410-955-4825
iLab: https://johnshopkins.corefacilities.org/service_center/3828
Training, Consultation, Collaboration and Service

Knowledgeable and helpful staff happy to support your research

✧ Extensive flow cytometry, cell sorting, biomarker assay, and DD PCR experience

✧ State-of-the-art Instrumentation

✧ Can use core coins for any service!

Assisted Services
Flow cytometry, cell sorting, biomarker assay, digital droplet PCR
Experimental design
Assay/plate setup
Assisted acquisition
Optimization
Troubleshooting
Data analysis

Personalized Training
Flow cytometry, cell sorting
Data analysis,
Biomarker Assays
Digital Droplet PCR,
Assay development, experimental design, troubleshooting
No prior experience necessary
Hands on custom training by expert staff
Flow Cytometry

- Traditional and imaging flow cytometry
- Up to 23 colors
- Up to 5 lasers
- Automated tube/plate loaders.
- Personalized training by expert staff.
- Independent and assisted use
- 24/7 availability for trained users
- FlowJo software license available.

BD FACS Symphony-5 laser/23 color

BD FACS LYRIC-3 laser/12 color

BD LSR II-3 laser/14 color

Amnis ImageStream Mk II-4 laser/5 color + Brightfield
Cell Sorting

- Assisted and independent cell sorting
- Up to 17 colors
- Up to 4 lasers
- Up to 4-way sorting
- Single cell sorting into plates
- BSL2-BSL3 sorting
- Personalized training by expert staff.
- 24/7 availability for trained users.

MoFlo Legacy
3 laser/6 color

MoFlo XDP-4 laser/17 color

BD FACS Melody
3 laser/8 color
Biomarker Assays &
Digital Droplet PCR
(ddPCR)

**Multiplex Biomarker assays**
- Up to 100 analytes per well
- Low sample volume required
- High sensitivity (pg/ml range)

**Digital Droplet PCR**
- Improved sensitivity, accuracy and precision.
- Absolute quantification

**Both Technologies offer:**
- Assisted and independent use
- Personalized training by expert staff
- 24/7 availability for trained users.
Spatial Science Core

Timothy Shields, MA
Facility Co-Director
Department of Epidemiology
Email: tshields@jhu.edu

Frank Curriero, PhD
Facility Co-Director
Department of Epidemiology
Email: fcurriero@jhu.edu

Anton Kvit, MHS
Senior Data Analyst
Department of Epidemiology
Email: akvit@jhu.edu
Spatial Science Core Background

Characterize social and physical environment to support:
- epidemiology of malaria
- vector biology
- parasite genomics

Environmental context to better understand the drivers of malaria transmission in regions with different stages of malaria control.

Provide analytic support across projects in the application of spatial statistical methods:
- Spatial Clustering
- Cluster (hotspot) Detection
- Spatial Regression Modeling
Spatial Science Core Data

Hi-Res Satellite Imagery

HH Enumeration

Elevation

Climate

GPS logger

Other Imagery
Snapshot of SSC Supported Research

Vector Based Analyses
- Environment & vector abundance
- Habitat partitioning
- Mapping vector abundance
- Vector & malaria risk

Health Facility Data/Analyses
- Space-time incidence patterns
- Catchment area identification
- Risk map based on facility data

Health Behaviors and Malaria
- Mapping health seeking behaviors
- Mapping household refusals, absent
- Travel and malaria risk (logger)

Indoor Residual Spraying (IRS)
- Impact of IRS on malaria risk
- Impact of IRS on vectors

Additional/Ongoing Projects
- Reactive case detection
- Malaria hotspot detection
- Cross border transmission
- Multi-scale malaria risk maps
- Correlating rainfall w/ malaria & vectors
Leadership in Macha

Phillimon Ndubani, PhD  
Managing Director

Edgar Simulundu, PhD  
Scientific Director

Monica Mburu, PhD  
Senior Entomologist
Southern and Central Africa ICEMR Sites

Nchelenge District, Zambia
High transmission
Ineffective malaria control

Haut-Katanga District, DRC
High transmission
Minimal malaria control

Choma District, Zambia
Low transmission
Successful malaria control

Mutasa District, Zimbabwe
Seasonal and border transmission
Effective malaria control
Communications

Importance of the following to communicate JHMR’s vision, mission and results:

**STORY**
- Dr. Terry Shapiro’s *The Chemical Vaccine*:
  - [https://www.youtube.com/watch?v=FKEorJdwHjA&feature=youtu.be&ab_channel=JohnsHopkinsBloombergSchoolofPublicHealth](https://www.youtube.com/watch?v=FKEorJdwHjA&feature=youtu.be&ab_channel=JohnsHopkinsBloombergSchoolofPublicHealth)

**VISUAL STORYTELLING | VIDEO**
- Video is the most powerful and persuasive way to reach people
- Views of video content have increased **258%** on FB since 2017

**SOCIAL MEDIA**
- Twitter | Facebook | LinkedIn

**PROMOTE YOU**
- I’m here to promote your work; please let me know so I can best tell your story
JHMRI Pilot Grants for Faculty

Development of new malaria research ideas to lead to future external funding

Award amount: $150,000 maximum support over two years*

Timeline:
• Letters of Intent due May 1
• Invitation to apply & present in June
• Start date of your choice

* Does not cover indirect costs or a PI’s salary.

http://malaria.jhsph.edu/opportunities/pilot-grants/
JHMRI Fellowships for Trainees

One to two years of support for malaria research

**Eligibility**
Postdoc or PhD candidate* in a JHMRI laboratory

* has completed all coursework, lab rotations and departmental/school examinations including oral exam

**Timeline**
- Letter of Intent due November 1
- Invitation to apply & present in December
- Start date typically January 1

[http://malaria.jhsph.edu/opportunities/fellowships/]
Travel Funds

**MMI Travel Funds**
- 1st year MMI students are eligible for $500 per academic year
- Submit request to Kathleen Spinnato

**JHMRI Matching Travel Funds**
- Matching PI funds up to $600 per academic year
- For JHMRI Pre- and Post-docs to attend a conference to present a poster or to give a talk
- PI approval required
- Submit request to Trish Ward
Key MMI Staff

Leonid Shats, Ishats1@jhu.edu
Room E1305 (restricted access), 410-502-0510
Lab Equipment Training, Orientation, Safety, Room Access, and Equipment Maintenance

Lawanda Lewis, llewis36@jhu.edu
Room E5014, 443-287-4775
Human Resources and Payroll

Gail O’Connor, gail@jhu.edu
Room E5008, 410-614-4232
Academic advice and advocacy, BSPH procedures, student records, and MMI student recruitment

Thom Hitzelberger, thitzel1@jhu.edu
Room E5004, 443-287-5148
Grants Management, Poster Printing
Library Informationist for MMI Dept

Rob Wright
Basic Science Informationist
Welch Medical Library
Available to meet virtually via Zoom or Microsoft Teams
Provides support for literature searching, citation management, and finding biological data from NCBI and EBI
rwrigh32@jhmi.edu
MMI Student Research Group

Alysha Ellison, President
aelliso8@jhmi.edu

Grant Butschek, Vice President
grant@jhmi.edu
MMI/JHMRI Postdoc Organization

Postdoc Representative:
Gabriela Romero-Meza
Mugnier Lab
gromero5@jhu.edu

MMI Faculty Liaison:
Douglas Norris
Douglas.Norris@jhu.edu
Postdoc-focused Events

• MMI (and BMB) Postdoc Summer Seminar Series
  – Weekly seminar series for postdocs to present their work
• Monthly meeting with SPH Postdoctoral Association
  – Second Wednesday of the month at 12 p.m.
  – Updates and plan events for postdocs

Resources and Communities for Postdocs

• Hopkins Postdocs @ SPH
• Hopkins Postdoctoral Association (JHPDA)
  https://jhpda.jhmi.edu
• Professional Development and Career Office (PDCO)
  https://pdco.med.jhmi.edu
• Valeria Culotta: Provost’s Fellow and SPH Director of Postdoctoral Training (vculott1@jhu.edu)
JHMRI MALARIA DAY CONFERENCE

Malaria Vector Biology and Control

SAVE THE DATE | FRIDAY, APRIL 23, 2021

CONFIRMED SPEAKERS

Martin Donnelly - Liverpool School of Tropical Medicine
Abdoulaye Diabate - Institut de Recherche en Sciences de la Santé/Centre Muraz, Burkina Faso
Raymond St. Leger - University of Maryland
Elizabeth (Beth) McGraw - Pennsylvania State University
Carolina Barillas-Mury - National Institutes of Health
George Dimopoulos - Johns Hopkins Bloomberg School of Public Health
Anthony James - University of California, Irvine
Greg Lanzaro - University of California, Davis
Michael Santos - Foundation for the National Institutes of Health
Conor McMeniman - Johns Hopkins Bloomberg School of Public Health
Craig Montell - University of California, Santa Barbara
Helen Jamet - Bill & Melinda Gates Foundation

Registration opens in January 2021
Acknowledgments and New Logo

Publications & Presentations

“…..support from Johns Hopkins Malaria Research Institute and Bloomberg Philanthropies.”