# WEILL CORNELL MEDICINE
# NEW YORK-PRESBYTERIAN HOSPITAL

## DEPARTMENT OF MEDICINE

## DIVISION OF
## INFECTIOUS DISEASES


DIVISIONAL PROGRAMS &
FACULTY AND FELLOW PROFILES

2022 – 2023

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https://medicine.weill.cornell.edu/divisions-programs/infectious-diseases

# DIVISION OF INFECTIOUS DISEASES
# INTRODUCTION

The mission of the Division of Infectious Diseases (ID) at Weill Cornell Medicine and New York-Presbyterian Hospital (NYPH) is to conduct cutting-edge research; to provide outstanding clinical care; and to provide the highest quality education and training in infectious diseases. We have 60 full-time faculty members, and our division includes basic, translational, clinical, and epidemiologic research programs; ambulatory and inpatient ID clinical services at NYPH-Weill Cornell Medical Center; and the ID Fellowship Training Program.

The Division of ID facilities include over 12,000 square feet of research and administrative space. There are 10 research laboratories (7,500 sq. ft.) in the medical college and the Belfer Research Building equipped for basic and translational molecular, microbiological, and immunologic studies. Major laboratory research projects investigate antibiotic and antifungal drug development, bacterial pathogenesis, HIV, influenza, malaria/babesia, and tuberculosis. Major clinical research projects investigate antimicrobial drug resistance, COVID-19, hepatitis, HIV/AIDS, hospital epidemiology/infection control, human papillomavirus, respiratory viruses, and transplantation/oncology ID. In collaboration with the Center for Global Health, we have clinical, research and training programs in Brazil, Haiti, and Tanzania, with full-time faculty and/or fellows at each site. Research interests include diarrheal diseases, HIV/AIDS, HTLV-1, leprosy, malaria, leishmaniasis, schistosomiasis, and tuberculosis. Since the beginning of the COVID-19 pandemic, divisional members have been engaged in research on SARS-CoV-2/COVID-19 epidemiology/outcomes, pathogenesis, therapeutics, and vaccine development. Current annual funding for sponsored research and training in the Division of ID in 2021-2022 exceeds **$30 million**.

Our clinical programs provide primary and consultative care in both outpatients and inpatient settings for patients from the New York City area. Weill Cornell ID Associates houses several outpatient programs including general ID consultations (attending and fellows), travel medicine, transplant/oncology ID, and outpatient parenteral antibiotic therapy (OPAT) at two locations seeing 4,500patients annually. Inpatients are seen at New York Presbyterian Hospital/Weill Cornell Medical Center, a large 867–bed tertiary care hospital, and the Hospital for Special Surgery, a 172–bed rheumatology and orthopedic specialty hospital, co-located on the Upper East Side of Manhattan. The HIV/AIDS Program provides care to over 3000 HIV-infected persons, in addition to conducting translational and clinical research. The Center for Special Studies (the HIV primary care clinic) and the Cornell HIV Clinical Trials Unit (CCTU) outpatient facilities occupy two floors of NYPH as well as an off-site location in the Chelsea neighborhood of Manhattan (West 23rd Street and 6th Avenue). Other major clinical programs in the division are the Transplantation/Oncology ID Service, serving patients with stem cell transplants, solid organ transplants (kidney, pancreas, liver) and/or malignancies with clinical care and clinical research studies, and the Hospital Epidemiology/Infection Control Program.

Our ID Fellowship Training Program provides intensive clinical and research training for developing physician scientists and academic clinicians. Graduates of the program are highly qualified to conduct research, provide clinical care, and/or assume leadership roles in ID. Our fellows typically go on to academic faculty appointments, positions in state, federal, or international public health organizations, or the pharmaceutical industry. During their first year, fellows receive both inpatient and ambulatory clinical training. The second and (optional) third year emphasize basic, translational, clinical, or epidemiologic training research at Weill Cornell, Rockefeller University, Memorial Sloan-Kettering Cancer Center, and other affiliated programs. Fellow research training is supported by an NIH-sponsored T32 Training Grant (AI007613; Gulick, 1999-2025). Additional training is available through master's degree programs in clinical investigation or clinical epidemiology/health services research and other specialized training programs in preventive medicine. In addition, our division offers clinical electives in ID and HIV/AIDS for residents and medical students and sponsors educational programs for providers at NYPH and in the community.

## DIVISION OF INFECTIOUS DISEASES FACULTY

**Roy M. Gulick, MD, MPH**
Professor of Medicine and Chief, Division of Infectious Diseases / COVID-19 and HIV Clinical Research

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Susan Ball, MD**<br>Professor of Clinical Medicine | Clinical HIV | **Ali Danesh, PhD**<br>Assistant Professor of<br>Research in Medicine | Immunologist |
| **Matthew Bendall, PhD**<br>Assistant Research Professor<br>of Computational Biology<br>Research in Medicine | Computational<br>biology<br>and data analysis | **Jennifer A. Downs, MD, PhD**<br>Associate Professor of Medicine<br>**(Tanzania)** | HIV and Schistosomiasis |
| **Barry Brause, MD**<br>Professor of Clinical Medicine<br>**(Hospital for Special Surgery)** | Bone and Joint<br>Infections | **Alexander C. Drelick, MD**<br>Assistant Professor pf<br>Clinical Medicine | Transplant – Oncology<br>Infectious Diseases |
| **Christopher Brown, MD, PhD**<br>Instructor of Medicine | Tuberculosis | **Kate Dupnik, MD**<br>Assistant Professor<br>of Medicine | Tuberculosis infections |
| **Adeel Butt, MD, MS,**<br>**FACCP, FIDSA**<br>Professor of Medicine<br>Hamad Medical Corporation<br>**(Qatar)** | Hepatitis | **Tanya Ellman, MD, MS**<br>Assistant Professor<br>of Clinical Medicine | Clinical HIV |
| **David Calfee, MD, MS**<br>Professor of Medicine and<br>Public Health<br>Chief Hospital Epidemiologist | Hospital<br>Epidemiology /<br>Infection Control | **Grant Ellsworth, MD**<br>Assistant Professor of Medicine | COVID-19, HIV; HPV<br>Clinical Research |
| **Marina Caskey, MD**<br>Adjunct Associate Professor of<br>Medicine<br>**[Rockefeller University]** | HIV, Monoclonal<br>Antibodies | **Teresa Evering, MD, MS**<br>Assistant Professor<br>Of Medicine | HIV Translational<br>Research |
| **Juliette Charles-Rawlins, MD**<br>Assistant Professor of Obstetrics<br>and Gynecology in Clinical Medicine | Obstetrics and<br>Gynecology | **Daniel Fitzgerald, MD**<br>Professor of Medicine,<br>Immunology and Microbiology<br>Director, Center for Global Health | Global Health |
| **Stanley E. Cooper, MD**<br>Instructor of Medicine | Clinical HIV<br>HIV Prevention<br>(PrEP/PEP) | **Robert L. Furler, PhD**<br>Assistant Professor of Immunology<br>in Medicine | Biophysical Dynamics of<br>Cellular Immunology |

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Michael Corley, PhD**<br>Assistant Professor<br>of Immunology in Medicine | HIV, Immuno-epigenetics | **Marshall J. Glesby, MD, PhD**<br>Professor of Medicine and<br>Public Health<br>Associate Chief, Division of<br>Infectious Diseases | COVID-19 and<br>HIV clinical research |
| **Natalya Goldshteyn, MD**<br>Assistant Professor of Medicine<br>**(NYPH Brooklyn Methodist)** | Infectious Diseases | **Jonathan L. Jacobs, MD**<br>Professor of Clinical Medicine<br>Executive Director,<br>Center for Special Studies | Clinical HIV |
| **Linnie M. Golightly, MD**<br>Associate Professor of Clinical Medicine and Microbiology & Immunology; Associate Dean of Diversity and Inclusion | Malaria | **Warren D. Johnson, Jr., MD**<br>Professor of Medicine | Global Health |
| **Andrea Gramatica, PhD**<br>Instructor of Immunology<br>In Medicine | HIV Biology, Latency, and Pathogenesis | **Carrie Down Johnston, MD**<br>Assistant Professor<br>of Medicine | HIV & Aging |
| **Catherine C. Hart, MD**<br>Clinical Associate<br>Professor of Medicine | Clinical Infectious Diseases | **Richard Bradley Jones, PhD**<br>Associate Professor of<br>Immunology in Medicine | HIV - Immunology |
| **Barry J. Hartman, MD**<br>Professor of Clinical Medicine | Antibiotic Therapy, Clinical Infectious Diseases | **Shashi Kapadia, MD**<br>Assistant Professor<br>of Medicine and<br>Population Health Sciences | Treatment Access Disparities in HIV and HCV |
| **Travis Hartman, MS, PhD**<br>Instructor of Microbiology<br>in Medicine | Tuberculosis | **Jason Kendler, MD**<br>Clinical Associate Professor of Medicine | Clinical Infectious Diseases |
| **David Helfgott, MD**<br>Assistant Professor<br>Clinical Medicine | Infections in Immunocompromised Hosts | **Laura A. Kirkman, MD**<br>Associate Professor<br>of Medicine,<br>Microbiology and Immunology.<br>Associate Director – Research | Malaria and Babesia |
| **Michael Henry, MD**<br>Assistant Professor of Medicine<br>**[Hospital for Special Surgery]** | Bone / Joint and Rheumatologic-Associated Infections | **Priya Kodiyanplakkal, MD**<br>Assistant Professor of Clinical Medicine; Associate Director of ID Fellowship Program | Transplant – Oncology<br>Infectious Diseases |

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Harold Horowitz, MD**<br>Professor of Clinical Medicine<br>Chief, Infectious Diseases<br>**[NYPH Brooklyn Methodist]** | Hospital Epidemiology | **Guinevere Lee, PhD**<br>Assistant Professor of<br>Virology in Medicine | HIV – Immunology |
| **Douglas MacQueen, MD**<br>Assistant Professor<br>of Clinical Medicine<br>**(Cayuga Medical Center)** | Clinical Infectious<br>Diseases | **Douglas Nixon, MD**<br>Professor of Immunology<br>in Medicine | Retrovirology.<br>Human Immunology |
| **Grace Maldarelli, MD, PhD**<br>Instructor of Medicine | Clinical Infectious<br>Diseases | **Oksana Ocheretina, PhD**<br>Assistant Professor of<br>Microbiology Research in Medicine<br>**(Haiti)** | Global Health |
| **Kristen M. Marks, MD, MS**<br>Associate Professor of Medicine | COIVID-19 and HIV/HCV<br>Co-infection Clinical<br>Research | **Jean W. Pape, MD**<br>Professor of Medicine<br>Director, GHESKIO Center<br>**(Haiti)** | Tuberculosis; HIV |
| **Usha Mathur-Wagh, MB.BS**<br>Assistant Professor of<br>Clinical Medicine | Clinical HIV | **Robert Peck, MD**<br>Assistant Professor in<br>Medicine and Pediatrics | HIV and renal disease;<br>Tuberculosis and<br>Diabetes Mellitus. |
| **Samuel T. Merrick, MD**<br>Professor of Clinical Medicine<br>Medical Director<br>Center for Special Studies | Clinical HIV | **Ruta Petraitiene, MD**<br>Assistant Professor of<br>Research in Medicine | Fungi & Antifungals |
| **Andy Miller, MD**<br>Associate Professor<br>of Clinical Medicine<br>**(Hospital for Special Surgery)** | Bone/Joint and<br>Rheumatologic –<br>Associated Infections | **Vidmantas Petraitis, MD**<br>Assistant Professor of<br>Research in Medicine | Fungi & Antifungals |
| **Ayana Morales, MD**<br>Assistant Professor of Medicine | Kaposis Sarcoma-Virus | **Khanh Pham, MD**<br>Instructor of Medicine | Clinical Infectious<br>Diseases |
| **Henry Murray, MD**<br>Professor of Medicine | Clinical Infectious<br>Diseases | **Markus Plate, MD**<br>Assistant Professor of Medicine | Transplant – Oncology<br>Infectious Diseases |
| **Thomas Nash, MD**<br>Clinical Assistant<br>Professor of Medicine | Clinical Infectious<br>Diseases | **Kyu Y. Rhee, MD, PhD**<br>Professor of Medicine;<br>Microbiology and Immunology | Antibiotic Development/<br>Drug Resistance;<br>Tuberculosis |

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Lishomwa (Lish) Ndhlovu, MB, BS.PhD**<br>Assistant Professor of Immunology in Medicine (Interim) | HIV, Immunology, Neuroimmunology | **Howard E. Rosenberg, MD**<br>Clinical Assistant Professor of Medicine | Clinical Infectious Diseases |
| **Kohta Saito, MD**<br>Assistant Professor of Medicine | Tuberculosis | **Catherine B. Small, MD**<br>Professor of Medicine; Associate Director of Transplant/Oncology ID Director, Clinical Research Trials Unit | Transplant – Oncology Infectious Diseases |
| **Mirella Salvatore, MD**<br>Assistant Professor of Medicine Population Health Sciences | Immunology; Influenza | **Duane M. Smith, MD**<br>Assistant Professor of Clinical Medicine<br>Associate Medical Director, Center for Special Studies | Clinical HIV |
| **Michael J. Satlin, MD, MS**<br>Associate Professor of Medicine<br>Clinical Director, Transplant-Oncology/ID | Transplant – Oncology Infectious Diseases | **Paul T. Smith, MD**<br>Clinical Assistant Professor of Medicine | Clinical Infectious Diseases |
| **Bruce R. Schackman, PhD**<br>Saul P. Steinberg Distinguished Professor of Health Sciences<br>Executive Vice Chair, Department of Population Health Sciences | Population Health Sciences | **Rosemary Soave, MD**<br>Associate Professor of Clinical Medicine | Transplant – Oncology Infectious Diseases |
| **Douglas Sepkowitz, MD**<br>Assistant Professor of Clinical Medicine<br>**(Brooklyn Methodist)** | Clinical Infectious Diseases | **Vijay Soni, PhD**<br>Instructor of Microbiology in Medicine | Tuberculosis Research |
| **Lawrence Siegel, MD**<br>Assistant Professor of Clinical Medicine | Clinical HIV; STDs | **Heidi Torres, MD**<br>Instructor of Medicine | Hospital Epidemiology / Infection Control |
| **Matthew Simon, MD**<br>Professor of Clinical Medicine; Fellowship Director.<br>Associate Hospital Epidemiologist | Hospital Epidemiology; Infection Control Antimicrobial stewardship; Cost-Effectiveness Analysis | **Carlos Vaamonde, MD**<br>Assistant Professor of Clinical Medicine | Clinical HIV |

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Harjot Singh, MD**<br>Associate Professor<br>of Clinical Medicine<br>Site Director of ID, LMH<br>Hospital Epidemiologist, LMH | Clinical Infectious Diseases,<br>Hospital Epidemiologist | **Timothy J. Wilkin, MD, MPH**<br>Professor of Medicine<br>Assistant Dean for Clinical Research Compliance | COVID-19, HIV<br>Clinical Trials |
| **Ole Vielemeyer, MD**<br>Associate Professor of Clinical Medicine<br>Associate Director, ID Fellowship Program Clinical Director | Clinical Infectious Diseases;<br>Travel Medicine | **Lars F. Westblade, PhD, (ABMM)**<br>Associate Professor of Pathology and Laboratory Medicine<br>Associate Director, Clinical Microbiology Laboratory | Clinical Microbiology |
| **Mary Vogler, MD**<br>Associate Professor<br>of Clinical Medicine | Clinical HIV,<br>HIV in Women | **Cecilia Yoon, MD**<br>Assistant Professor of Medicine | Clinical HIV;<br>Medical Education |

**Division of Infectious Diseases Faculty (not all inclusive)**

**Back Row – Left to Right:**

Lishomwa (Lish) Ndhlovu; Joshua Rosenblatt; Grant Ellsworth

**Middle Row– Left to Right:** Linnie Golightly; Matthew Simon; Teresa Evering; Mary Vogler; Robert Furler; Kristen Marks, David Calfee; Ole Vielemeyer; Andy Miller; Usha Mathur-Wagh; Carrie Johnston; Shashi Kapadia

**Front Row – Left to Right:**

Laura Kirkman; Marshall Glesby; Trip Gulick; Harjot Singh; Priya Kodiyanplakkal; Lars Westblade; Ali Danesh

## ADJUNCT AND EMERITUS FACULTY

| Faculty Name | Specialty | Faculty Name | Specialty |
|---|---|---|---|
| **Marina Caskey, MD**<br>Adjunct Associate Professor of Medicine<br>**(Rockefeller University)** | HIV, Monoclonal Antibodies | **Steven G. Reed, PhD**<br>Adjunct Professor of Microbiology in Medicine<br>**(U. of Washington)** | Antigen Discovery |
| **Lewis M. Drusin, MD**<br>Professor Emeritus of Clinical Medicine | Nosocomial Infections; STDs | **Lee W. Riley, MD**<br>Adjunct Professor of Medicine<br>**(U. California, Berkeley)** | Molecular Epidemiology |
| **Edgar M. Carvalho, MD, PhD**<br>Adjunct Professor of Medicine<br>**(Universidade Federal da Bahía, Brazil)** | Immunology; Leishmaniasis; HTLV-1 | **Richard B. Roberts, MD**<br>Professor Emeritus of Medicine | Antimicrobial Resistance |
| **R. Gordon Douglas, Jr., MD**<br>Professor Emeritus of Medicine | Vaccines | **Charles Robb Steinberg, M.D.**<br>Professor Emeritus of Clinical Medicine | Clinical Infectious Diseases |
| **Stephen Gerard Jenkins, Ph.D.**<br>Professor Emeritus of Pathology and Laboratory Medicine | Clinical Microbiology | **Mark Y. Stoeckle, MD**<br>Clinical Associate Professor of Medicine<br>**(Rockefeller University)** | DNA Barcoding |
| **Thomas C. Jones, MD**<br>Professor Emeritus of Medicine | Clinical Trials | **Alexander Tomasz, Ph.D.**<br>Adjunct Professor of Microbiology in Medicine<br>**(Rockefeller University)** | Genetics of Infectious Diseases |
| **Jose R. Lapa e Silva, MD, PhD**<br>Adjunct Professor of Immunology in Medicine<br>**(Universidade Federal doRio de Janeiro, Brazil)** | TB Pathogenesis | **Charles Vorkas, MD**<br>Adjunct Assistant Professor of Medicine<br>**(Stony Brook School of Medicine)** | Mycobacteriology and Immunology |

**DIVISIONAL STAFF**

**Avi Bueno**

**Gideon Dunkley**

**Marisol Valentin**

**Rabikha Rani**

| Staff Member | Title | Email Address |
|---|---|---|
| Avi Bueno | Division Administrator | aeb3001@med.cornell.edu |
| Gideon Dunkley | Grants Administrator | gad2017@med.cornell.edu |
| Marisol Valentin | Administrative Specialist | mav2009@med.cornell.edu |
| Rabikha Rani | Administrative Coordinator | rkr4001@med.cornell.edu |

## Mission

The major goal of our program is to train the next generation of academic clinicians and physician-scientists. Our program provides an individualized and diverse training experience through close faculty guidance, flexible clinical rotations, mentored research, and didactic coursework. Graduates of the program are highly qualified for the practice of infectious diseases, bench, and clinical research, and for leadership roles in medicine and public health. We provide a wide variety of clinical training experiences in different venues including: the inpatient consult services of New York-Presbyterian (NYPH)/Weill Cornell (general and immunocompromised), the Hospital for Special Surgery (orthopedics, rheumatology), and Memorial Sloan Kettering Cancer Center; weekly outpatient clinic experiences encompassing general ID, HIV/AIDS, and travel medicine; clinical elective rotations; clinical microbiology laboratory and hospital epidemiology rotations. Many fellows have rotated through the New York City Department of Health and Mental Hygiene in the Bureaus of Communicable Diseases or Sexually Transmitted Infection and affiliated clinics. All fellows develop a research project after identifying one or more faculty mentors from within Weill-Cornell or one of our affiliated academic institutions (Rockefeller University, Memorial Sloan-Kettering Cancer Center). Fellows' research projects span basic, translational, clinical, and epidemiologic and outcomes research in diverse areas of investigation. The majority of our fellowship graduates seek careers either in academia, government or industry.

## Clinical Rotations

The New York- Presbyterian Hospital-Weill Cornell Medical Center is the primary institution of our fellowship training program located in a large clinical and research complex on the Upper East Side of Manhattan. New York-Presbyterian Hospital (NYPH) is the result of a merger of two formerly distinct institutions: the Cornell-New York Hospital and the Columbia-Presbyterian Medical Center. NYPH is one of the largest health care facilities in the larger New York metropolitan area, ranked number one in New York City and among the most prestigious in the world. The Greenberg Pavilion of New York-Presbyterian/Weill Cornell is a one million square foot facility with 867 patient beds. While the hospitals are merged, Weill Cornell Medicine and Columbia University Vagelos College of Physicians and Surgeons remain independent institutions with separate I.D. fellowship programs.

The clinical rotations are concentrated in the first year of training. First-year fellows spend ~10 months on clinical rotations and second-year fellows spend ~2 months, with the majority of this time spent on the inpatient consultation service. Our active consultation service serves a broad range of complex medical and surgical patients. It manages on average 80-90 inpatient-consults per month from both New York-Presbyterian Hospital as well as from the Hospital for Special Surgery (affiliated 172-bed hospital renowned for treatment of orthopedic and rheumatologic conditions). An infectious-disease trained specialty PharmD participates actively on the consult service as do Cornell's Internal Medicine residents and 4$^{th}$ year medical students. In addition to the NYPH general ID consult service, fellows rotate on our immunocompromised host and transplant services (leukemia, lymphoma, bone marrow and solid organ transplantation including kidney, liver, and pancreas). They also spend one month on the Memorial Sloan-Kettering Cancer Center (MSKCC) inpatient consultation service, located just across the street. MSKCC is a tertiary care cancer hospital with a separate freestanding infectious diseases fellowship program. Fellows also have the opportunity to rotate through selected clinical electives including cardiovascular and neurologic infections, HIV/AIDS, orthopedic and rheumatologic infections, and pediatric infectious diseases. Finally, fellows spend at least two weeks each in NYPH's Clinical Microbiology Laboratory and in the Hospital Epidemiology/Infection Control Department. Fellows may opt for a rotation with NYC Department of Health Sexually Transmitted Infections Clinics and international elective at Weill Buganda Medical Center in Tanzania or other affiliated international sites.

First- and second-year fellows follow patients in a weekly continuity outpatient clinic that alternates between care for patients with general infectious diseases and for patients with HIV/AIDS. Here, fellows build a panel of patients whom they will follow over the course of the entire clinical fellowship, with guidance from a faculty preceptor. Fellows also have the opportunity to participate actively in the care of patients seeking consultation prior to international travel.

A sample schedule of the first two fellowship years follows:

| Month | First Year | Second Year |
|---|---|---|
| July | NYPH Consult Service | Research |
| August | Epidemiology Rotation<br>Microbiology Rotation | NYPH Consult Service |
| September | NYPH Consult Service | STI Clinic Rotation |
| October | NYPH Consult Service<br>Research | Research |
| November | Vacation<br>Clinical Elective #1 | Research |
| December | NYPH Consult Service | Research<br>Vacation |
| January | Memorial Sloan Kettering Cancer<br>Center Consult Service | NYPH Consult Service<br>Transplantation-Oncology ID |
| February | Transplant Oncology ID | Research |
| March | Transplant Oncology ID Research | Research |
| April | NYPH Consult Service | Research<br>Vacation |
| May | Clinical Elective #2<br>Vacation | International Elective (Tanzania) |
| June | NYPH Consult Service<br>Transplantation Oncology ID | Research |

Leukemia, Lymphoma, Stem Cell Transplant and Solid Organ Transplant

<u>Clinical Elective offerings:</u>

- Cardiovascular/Neurosurgical Infections – Barry Hartman, MD
- HIV Outpatient Interdisciplinary Care Team – Carlos Vaamonde, MD
- Orthopedic/Rheumatologic Infections – Barry Brause, MD, Michael Henry, Andy Miller, MD
- Pediatric Infectious Diseases – Christine Salvatore, MD

**Basic, Translational, Clinical, and Epidemiologic Research**

Research training occupies the majority of the second (and optional third) year of fellowship. Fellows select from a broad range of research opportunities in basic, translational, clinical, epidemiologic, education or outcomes research. Fellows conduct their research in the Weill-Cornell Division of Infectious Diseases, other divisions within the Department of Medicine (e.g., Gastroenterology/Hepatology), other departments within the Medical College (e.g., Department of Microbiology and Immunology, Department of Population Health Sciences), Rockefeller University, or the Memorial-Sloan Kettering Cancer Center. Faculty mentorship from these institutions allows a wide diversity of research opportunities.

The Division has an NIH-sponsored T32 training grant to support research training of developing physician-scientists that supports fellows during their research years (AI007613; Gulick, 1999-2025). The objective is to train physician-scientists in biomedical research, with an emphasis on the pathogenesis of infectious diseases. Weill Cornell also has an NIH-funded Clinical and Translational Science Center (CTSC; TR00457; Imperato, 2007-2022) with state-of-the-art facilities for conducting translational and clinical research.

Our fellowship graduates have generally received independent research awards following their fellowship, primarily from the NIH, including K08 (Mentored Clinical Scientist Research Career Development Award), K23 (Mentored Patient-Oriented Research Career Development Award), and KL2 Post-Doctoral Scholars awards. Of 53 fellows to complete our program in the past 20 years, 23 (43%, over 90% who applied) received NIH research career development awards (K08, K23, or KL2), and 14 (26%) went on to serve as Principal Investigator on federal research grants (NIH R grants, other federal grants [e.g., Agency for Health Research and Quality, CDC, Department of Defense, Veteran's Administration], or foundation grants (e.g. Doris Duke, Gates). A total of 38 (72%) currently are in academics as physician-scientists or academic clinicians (including 21 on the Weill Cornell faculty), 4 (8%) are in government (CDC, NYC Department of Health), 8 (15%) in pharmaceutical research, and 3 (6%) are in other clinical settings.

**Supplemental Training Programs**

Other training programs within the medical college are available to supplement fellowship training, depending on the fellow's specific interests.

**Clinical Research Training: Certificate and master's degree Programs**

http://weill.cornell.edu/ctsc/training_and_education/ The Graduate Program in Clinical and Translational Investigation at Weill Cornell Medical College trains patient-oriented researchers to conceive, design, and conduct independent clinical research in a well-structured cross-disciplinary team environment. The National Institutes of Health funds this program through their Clinical & Translational Science Award. The curriculum offers two tracks that are designed for rigorous training in clinical investigation. The first track covers a core curriculum providing the basic skills of clinical investigation and leads to a Certificate of Clinical Investigation. It includes training in the development of research hypotheses and methods of hypothesis testing; grant writing and manuscript preparation; data collection, construction of databases and data management systems; computer programs for data analysis; statistical analysis and the appropriate use of various statistical techniques in clinical research; basic epidemiologic principles in clinical research; design and conduct of meta-analyses and clinical trials; ethics and human subjects protection in the conduct of patient-oriented research; regulatory requirements of clinical research; preparing protocols for the Institutional Review Board and other agencies; grants management and intellectual property; and general and specific state-of-the-art research tools and techniques.

https://ctscweb.weill.cornell.edu/education-training/programs/masters-degree-clinical-translational-investigation

The second track leading to a **master's degree in Clinical and Translational Investigation** from Cornell University includes the core curriculum; additional electives in the trainee's area of interest; and a clinical research project mentored in its design and implementation by a clinical investigator. Members of the Infectious Disease Division (Drs. Glesby, Gulick, and Wilkin) serve as faculty for this training program. Many of our fellows and junior faculty members have used this program to supplement their training as clinical researchers. A K30 training grant covers tuition for those accepted to the program.

**Master of Science in Health Informatics at Weill Cornell Graduate School of Medical Sciences**

https://phs.weill.cornell.edu/graduate-education-clinical-training/masters-track/health-informatics

The Master of Science in Health Informatics prepares students for careers at the intersection of health and information technology, through training in research, innovation, and analysis. As our nation strives to improve health and healthcare, these skills are vital to positions in health analytics, policy and management in academia, industry, and government. The innovative curriculum addresses the need for systems science perspectives in healthcare and incorporates a transdisciplinary approach by fusing traditional methods from health services research with computational and informatics techniques. This program provides a vibrant alternative to traditional training in health services research, health care management, health information technology and related fields.

**Master of Science in Health Policy and Economics**

https://phs.weill.cornell.edu/graduate-education-clinical-training/masters-track/ms-health-policy-and-economics

The program provides a strong foundation in healthcare research methods with specialized training in health economics, health policy, data analytics, and implementation science. Each student acquires hands-on experience through a faculty-mentored research project. In contrast to an MPH program, it covers a broader policy perspective to include payment policy, health insurance coverage, and structural issues related to the healthcare delivery system. Additionally, this program is mostly practice-based while M.P.H. programs tend to be more theoretical.

**Preventive Medicine Training**

https://phs.weill.cornell.edu/graduate-education-clinical-training/residencies-fellowships – Weill Cornell's Department of Population Health Sciences offers a General Preventive Medicine Training Program, for which ID fellows may apply after their initial year of clinical ID training. As part of the General Preventive Medicine Program, fellows enroll in the master's degree Program in Clinical Investigation or other affiliated master's programs in the Department of Population Health Sciences (such as Master's in Health Informatics or Master's in Healthcare Policy and Economics). At the end of the program, they are eligible for certification by the American Board of Preventive Medicine. The program emphasizes epidemiology, biostatistics, clinical and preventive medicine, medical care organization, medical sociology, and health economics and education. Fellows participate in Cornell's Public Health seminars. Fellows also undertake an original research project. Each fellow will have an individual program designed to meet his/her specific professional goals. Fellows have used this program to supplement their training in hospital epidemiology and public health.

**Graduate Program in Clinical Epidemiology & Health Services**

https://gradschool.weill.cornell.edu/programs/weill-cornell-medicine-clinical-epidemiology-program- The Graduate Program in Clinical Epidemiology & Health Services offers an 8-week intensive summer program or a 2-year Master of Science (MS) degree in Clinical Epidemiology & Health Services Research from Cornell University. The program is designed for fellows who wish to plan, implement, and analyze quantitative and qualitative research studies, using appropriate research designs. The core of the curriculum includes research methodology, biostatistical techniques, data management, decision analysis, health economics and program evaluation. Graduates of the master's program will be prepared to pursue academic careers in a variety of settings where data is required to answer complex questions. The emphasis is on training clinician researchers to teach research methods, conduct methodologically rigorous and scientifically sound studies, evaluate programs, and perform cost-effectiveness and cost-benefit studies in a variety of populations. Many of our fellows doing international research have supplemented their clinical research training by participating in this program's Global Health track. Members of the Infectious Diseases Division (Drs. Fitzgerald, Glesby) serve as faculty for this training program.

**Conferences:**

A variety of conferences are offered to support education and training of Infectious Diseases Fellows. These include:

- Department of Microbiology and Immunology Research-In-Progress talks (monthly)
- Topics in Transplant Oncology ID (monthly)
- Fellow Journal Club (every other week with MSKCC fellows)
- Clinical Case Conference (weekly discussion of cases led by the fellows)
- Fellow Core Topics in Infectious Diseases (weekly basic lectures during the summer and every other week during the year with MSKCC fellows)
- Joint Case conference with Columbia ID Division (new 2022)
- Medical Grand Rounds (weekly)
- Faculty Research in Progress (monthly)
- ID Fellow Research-In-Progress talks (annually in 2nd and 3rd years)
- Divisional Journal Club and Research Conference (alternating, every 2 weeks)
- Microbiology Laboratory Plate Rounds (weekly review of interesting specimens, often from the clinical service)
- Advanced Topics in Infectious Diseases (weekly lectures from WCMC and MSKCC faculty or outside speakers on ID-related topics)
- HIV Conference (weekly alternating with journal club, lectures, and discussion of ongoing clinical trials)
- Outpatient ID Clinical Conference (monthly)
- Careers in Infectious Diseases Seminar (monthly presentation and discussion)

**CURRENT INFECTIOUS DISEASES FELLOWS (2022-2023)**

| Name | Year of Fellowship | Medical School | Internal Medicine Residency | Research Project |
|---|---|---|---|---|
| **Fiona Gispen, MD** | 1 | Johns Hopkins University | Massachusetts General Hospital | TBD |
| **Lee Gottesdiener, MD** | 1 | NewYork-Presbyterian/ Weill Cornell Medicine | NewYork-Presbyterian/ Weill Cornell Medicine | TBD |
| **Wesley Rogers, MD** | 1 | NewYork-Presbyterian/ Weill Cornell Medicine | NewYork-Presbyterian/ Weill Cornell Medicine | TBD |
| **Anna Mertelsmann, MD** amm9160@nyp.org | 2 | Universität Hamburg Medizinische Fakultät | NewYork Presbyterian/ Weill Cornell | Kaposi's Sarcoma-associated Herpesvirus Shedding in Saliva and Cervical Secretions in Tanzanian Women |
| **Alexander Stabell, MD** als9294@nyp.org | 2 | University of Colorado | NewYork Presbyterian/ Columbia | Immunology of viral-host interactions |
| **Catherine Stoeckle, MD** ccs9009@nyp.org | 2 | Harvard Medical School | NewYork Presbyterian/ Weill Cornell | A cohort study of COVID-19-vaccinated healthcare workers to determine rate of asymptomatic SARS-CoV-2 shedding |
| **Johan Guillaume, MD** jog9235@nyp.org | 3 | Stanford University School of Medicine | Northwestern/ NYU (Brooklyn) | Factors influencing COVID-related prevention and treatment measures among Caribbean-Americans in NYC |

**CURRENT INFECTIOUS DISEASES FELLOWS**

**Fiona Gispen**
**PGY4**

**Lee Gottesdiener**
**PGY4**

**Wesley Rogers**
**PGY4**

**Anna Mertelsmann, MD**
**PGY5**

**Alexander Stabell, MD**
**PGY5**

**Catherine Stoeckle**
**PGY5**

**Johan Guillaume, MD**
**PGY6**

**RECENT INFECTIOUS DISEASES FELLOWS (LAST 10 YEARS)**

| Name | Medical School | Internal Medicine Residency | Period of Fellowship Training and Research Topic | Current Position / Career Awards |
|---|---|---|---|---|
| **Stanley E. Cooper, MD** | Georgetown Medical School | Georgetown | 2020-2022<br>Correlation between self-reported adherence and pharmacologic drug detection in PrEP<br><br>Real-world experiences and outcomes of long-acting cabotegravir and rilpivirine for maintenance of HIV-1 suppression | Instructor of Medicine<br>Weill Cornell Medicine |
| **Grace Maldarelli, MD** | University of Maryland School of Medicine | NewYork Presbyterian/ Weill Cornell | 2019-2022<br>The Gut Microbiome in inflammatory bowel disease | Instructor of Medicine<br>Weill Cornell Medicine |
| **Khanh Pham, MD** | University of Massachusetts Medical School | NewYork Presbyterian/ Weill Cornell | 2019-2022<br>Schistosomiasis and<br>Its effects on the GI system | Instructor of Medicine<br>Weill Cornell Medicine |
| **Eli Finkelstein, MD** | Universidad De Los Andes (Colombia) Medical School | NewYork Presbyterian/ Brooklyn Methodist | 2020-2022<br>Antimicrobial resistance, COVID-19<br>SARS-CoV2 viral shedding in vaccinated health care workers | Clinical Attending<br>Infectious Disease and<br>Cayuga Medical Center<br>Ithaca, NY |
| **Michael Burkitt, MD** | University of Tennessee | Allegheny Health Network | 2018-2021<br>Impact of rapid diagnostics on outcomes in VRE bacteremia; Phase 1 trial of polyclonal antibodies against SARS COV-2 | Clinical Attending<br>Pittsburgh Infectious Diseases Ltd in Pittsburgh, Pennsylvania |
| **Heidi Torres, MD** | University of Puerto Rico | University of Texas Health Science Center San Antonio | 2019-2021<br>Disinfection and nosocomial spread of COVID-19 | Instructor of Medicine<br>Weill Cornell Medicine<br>Assistant Hospital Epidemiologist |

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| **Alex Trzebucki, MD** | NY Medical College | Stanford Healthcare | 2018-2020<br>Antimicrobial stewardship outcomes with rapid detection of carbapenemases | Assistant Professor of Medicine<br>University of Pittsburgh Medical Center<br>Division of Infectious Diseases |
| **Josef Brejt, MD** | State University of New York Downstate | NewYork Presbyterian /Weill Cornell | 2018-2020<br>The Impact of Indoor Air Pollution on Macrophage Immunologic Function and TB Risk | Assistant Professor of Medicine<br>Weill Cornell Medicine |
| **Carrie Johnston, MD** | Virginia Commonwealth University | NewYork Presbyterian /Weill Cornell | 2017-2020<br>Biomarkers of HIV aging | Instructor of Medicine<br>Weill Cornell Medicine<br>Department of Medicine Pre-K Award |
| **Maiko Kondo, MD** | Albert Einstein College of Medicine | Albert Einstein College of Medicine | 2017-2020<br>Utilization of rapid molecular diagnostics | Assistant Professor of Medicine<br>Director, Infection Control<br>and ID physician<br>Lenox Hill Hospital Northwell Health |
| **Tina Wang, MD** | University of Michigan | Mount Sinai Beth Israel | 2017-2020<br>Procalcitonin impact on antimicrobial use | Research Associate<br>Weill Cornell Medicine<br>WCM COVID19 Vaccine Study |
| **Reed Magleby, MD** | Cornell University | NewYork Presbyterian /Weill Cornell | 2017-2020<br>Machine learning to predict Pseudomonas resistance | U.S. Centers for Disease Control and Prevention<br>(CDC) Epidemic Intelligence Service (EIS) Officer |
| **Christopher Brown, MD** | University of Wisconsin | NewYork Presbyterian /Weill Cornell | 2016-2019<br>Tuberculosis Aerosol Biology | Instructor in Medicine,<br>Weill Cornell Medicine<br>Department of Medicine Pre-K Award |

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| **Grant Ellsworth, MD** | University of Utah | University of Utah | 2016-2019<br>HPV in Anal Dysplasia | Instructor in Medicine,<br>Weill Cornell Medicine<br>Department of Medicine Pre-K Award and<br>AIDS Malignancy Consortium Fellowship |
| **Ayana Morales, MD** | Brown University | Boston<br>University | 2015 – 2018<br>Kaposis Sarcoma/HHV8 | Instructor in Medicine,<br>Weill Cornell Medicine<br>KL2 Post-Doctoral Scholars Award |
| **Maroun Sfeir, MD** | Lebanese<br>University | University<br>of Miami | 2015 – 2018<br>Microbiological characterization of multidrug-resistant bacteria | Assistant Professor of Pathology and<br>Laboratory Medicine<br>Director Microbiology Laboratory<br>University of Connecticut |
| **Charles Vorkas, MD** | Weill Cornell Medical<br>College | UNC Hospital | 2015 – 2018<br>Mycobacterium TB infection | Assistant Professor, Division of<br>Infectious Diseases, Department of<br>Medicine, Stony Brook University<br>K08 Mentored Clinical Scientist Research<br>Career Development Award |
| **Miriam Torchinsky, MD** | Icahn School of<br>Medicine at<br>Mount Sinai | University of<br>British Columbia | 2015 – 2017<br>Microbiome analysis and mechanisms of colonization | University of British Columbia<br>Vancouver |
| **Thomas Baker, MD** | Temple | NewYork Presbyterian/<br>Weill Cornell | 2014 – 2017<br>Antimicrobial<br>Resistance in GNR | Associate Medical Director,<br>Janssen Pharmaceuticals<br>Spring House, PA |
| **Shashi Kapadia, MD** | Rutgers New<br>Jersey Medical<br>School | Rutgers New<br>Jersey Medical<br>School | 2014 – 2017<br>Disparities in HCV care | Assistant Professor of Medicine,<br>Weill Cornell Medicine<br>K-01 Mentored Research<br>Scientist Development Award |

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| **Kohta Saito, MD, MPH** | Harvard | Mt. Sinai Medical Center | 2013 – 2017<br>Tuberculosis biology | Assistant Professor of Medicine,<br>Weill Cornell Medicine<br>K-08 Mentored Clinical Scientist Research Career Award |
| **Benjamin Eckhardt, MD** | Albert Einstein College of Medicine of Yeshiva Univ | New York University | 2013-2016<br>HCV in injection drug users | Assistant Professor of Medicine,<br>New York University Medical School- Bellevue |
| **John Humphrey, MD** | Ben-Gurion University of the Negev, Israel | Tulane | 2013-2016<br>Diarrheal diseases of migrant workers in Qatar | Assistant Professor of Medicine and Pediatrics,<br>Indiana University |
| **Ashita Batavia, MD, MSc** | Weill Cornell | NewYork Presbyterian/ Weill Cornell | 2012-2015<br>Long-term effects of delayed ART initiation on inflammation and chronic disease in a Haitian cohort | Assistant Professor of Medicine,<br>Weill Cornell Medicine<br>McKinsey Consulting |
| **Daniel Eiras, MD, MPH** | Mount Sinai | New York University | 2012-2015<br>Hospital acquired Infections, and multidrug-resistant gram-negative bacterial infections | Director STD Clinic<br>New York City, Department of Health |
| **Flonza Isa, MD** | NYP/Weill Cornell | NYP/Weill Cornell | 2012-2015<br>Biomarkers for M. Tuberculosis | KL-2 Post-Doctoral Scholars Award |

**PUBLICATIONS RELATED TO FELLOWSHIP ACTIVITIES BY CURRENT AND RECENT FELLOWS**
**(LAST 10 YEARS; fellows' names bolded)**

1. **Pham, K.**, Torres, H., Satlin, M.J., Goyal, P. and Gulick, R.M. 2021. Failure of chronic hydroxychloroquine in preventing severe complications of COVID-19 in patients with rheumatic diseases. *Rheumatology Advances In Practice*.
2. **Pham, K.**, Magro, C., Plate, M. 2021. Case #20004: Sporotrichoid Rash in an Immunocompromised Patient [Internet]. Partners Infectious Disease Images.
3. **Johnston CD**, Hoover DR, Shi Q, Sharma A, Hanna DB, Anastos K, Tien PC, Fischl M, Gustafson D, Spence A, Karim R, French A, Schneider M, Adimora AA, Moran C, Konkle-Parker D, Glesby MJ. White Blood Cell Counts, Lymphocyte Subsets, and Incident Diabetes Mellitus in Women Living With and Without HIV. AIDS Res Hum Retroviruses. **2020** Feb;36(2):131-133. doi: 10.1089/AID.2019.0174
4. **Johnston CD**, Ifeagwu KC, Siegler EL, et al. Elevated cardiac risk score by Atherosclerotic Cardiovascular Disease calculation is associated with albuminuria in older people living with HIV. *AIDS*. **2020**;34(6):947-949. doi:10.1097/QAD.0000000000002492
   Antimicrobial resistance in nephrology.
5. Derry HM**, Johnston CD,** Burchett CO, Brennan-Ing M, Karpiak S, Zhu YS, Siegler EL, Glesby MJ. Links between inflammation, mood, and physical function among older adults with HIV. J Gerontol B Psychol Sci Soc Sci. 2021 Feb 13;. doi: 10.1093/geronb/gbab027. [Epub ahead of print] PubMed PMID: 33580236.
6. Derry HM, **Johnston CD,** Burchett CO, Siegler EL, Glesby MJ. Gait Speed Is Associated with Cognitive Function among Older Adults with HIV. J Aging Health. 2020 Dec;32(10):1510-1515. doi: 10.1177/0898264320943330. Epub 2020 Jul 22. PubMed PMID: 32697615; PubMed Central PMCID: PMC7768797.
7. Wozniak RJ, Cerqueira NB, Dantas MCS, Mahafe B, Barros DAC, Alves de Medeiros E, Soares de Oliveira AC, Sabino T, Roggenbuck A, Avelino-Silva VI, **Johnston CD**, Marston JL, Bidegain SC, Magnus M, Kallas EG, Nixon DF, Donini CS. Factors associated with attitudes towards HIV cure research among transgender women and travestis: a cross-sectional survey in São Paulo, Brazil. BMJ Open. 2020 Nov 11;10(11):e040092. doi: 10.1136/bmjopen-2020-040092. PubMed PMID: 33177141; PubMed Central PMCID: PMC7661370.
8. Stoeckle K*, **Johnston CD*,** Jannat-Khah DP, Williams SC, Ellman TM, Vogler MA, Gulick RM, Glesby MJ, Choi JJ. COVID-19 in Hospitalized Adults With HIV. Open Forum Infect Dis. 2020 Aug;7(8):ofaa327. doi: 10.1093/ofid/ofaa327. eCollection 2020 Aug. PubMed PMID: 32864388; PubMed Central PMCID: PMC7445584. (*= co-first author)
9. **Johnston CD,** Ifeagwu KC, Siegler EL, Derry H, Burchett CO, Rice MC, Gupta SK, Choi ME, Glesby MJ. Elevated cardiac risk score by Atherosclerotic Cardiovascular Disease calculation is associated with albuminuria in older people living with HIV. AIDS. 2020 May 1;34(6):947-949. doi: 10.1097/QAD.0000000000002492. PubMed PMID: 32271253; PubMed Central PMCID: PMC7321911.
10. **Johnston CD,** Hoover DR, Shi Q, Sharma A, Hanna DB, Anastos K, Tien PC, Fischl M, Gustafson D, Spence A, Karim R, French A, Schneider M, Adimora AA, Moran C, Konkle-Parker D, Glesby MJ. White Blood Cell Counts, Lymphocyte Subsets, and Incident Diabetes Mellitus in Women Living With and Without HIV. AIDS Res Hum Retroviruses. 2020 Feb;36(2):131-133. doi: 10.1089/AID.2019.0174. Epub 2019 Dec 17. PubMed PMID: 31709815; PubMed Central PMCID: PMC7044769.
11. Del Carmen T, **Johnston C,** Burchett C, Siegler EL. Special Topics in the Care of Older People with HIV. Curr Treat Options Infect Dis. 2019 Dec;11(4):388-400. doi: 10.1007/s40506-019-00204-6. Epub 2019 Nov 8. PubMed PMID: 33343235; PubMed Central PMCID: PMC7747386.
12. Kapadia SN, **Johnston CD,** Marks KM, Schackman BR, Martin EG. Strategies for Improving Hepatitis C Treatment Access in the United States: State Officials Address High Drug Prices, Stigma, and Building Treatment Capacity. J Public Health Manag Pract. 2019 May/Jun;25(3):245-252. doi: 10.1097/PHH.0000000000000829. PubMed PMID: 29927900; PubMed Central PMCID: PMC6309344.
13. Freedman SF, **Johnston C,** Faragon JJ, Siegler EL, Del Carmen T. Older HIV-infected adults. Complex patients (III): Polypharmacy. Eur Geriatr Med. 2019;10(2):199-211. doi: 10.1007/s41999-018-0139-y. Epub 2018 Dec 6. PubMed PMID: 31983932; PubMed Central PMCID: PMC6980352.
14. Impact of SARS-CoV-2 Viral Load on Risk of Intubation and Mortality Among Hospitalized Patients with Coronavirus Disease 2019.**Magleby R**, Westblade LF, Trzebucki A, Simon MS, Rajan M, Park J, Goyal P, Safford MM, Satlin MJ.Clin Infect Dis. **2020** Jun 30:ciaa851
15. Severe malaria: update on pathophysiology and treatment. **Brejt JA**, Golightly LM.Curr Opin Infect Dis. 2019 Oct;32(5):413-418.
16. Freedman, **Johnston C**, Faragon, J, Siegler E, Del Carmen, T. Older HIV-infected adults: complex patients (III)—polypharmacy. Eur Geriatr Med (**2019**) 10: 199.

17. Kapadia SN, **Johnston CD**, Marks KM, Schackman BR, Martin EG. Strategies for Improving Hepatitis C Treatment Access in the United States: State Officials Address High Drug Prices, Stigma, and Building Treatment Capacity. J Public Health Manag Pract. 2019 May/Jun;25(3):245-252. doi: 10.1097/PHH.0000000000000829. PubMed PMID: 29927900; PubMed Central PMCID: PMC6309344.
18. Del Carmen T, **Johnston C**, Burchett C, Siegler EL. Special topics in the care of older people with HIV. Current Treatment Options in Infectious Diseases (2019)11, 388–400b.
19. Bhagwat P, * **Kapadia SN***, Ribaudo H, Gulick RM, Currier, J. "Racial disparities in virologic failure and tolerability during first line antiretroviral therapy." *Open Forum Infectious Diseases.* 2019; 6(2):ofz022
20. DNA. Kondo **M**, Dalai SC, Venkatasubrahmanyam S, Eisenberg N, Robinson BD, Westblade LF, Marks KM.Open Forum Infect Dis. 2019 Jun 1;6(6):ofz242.
21. Freedman SF, **Johnston C**, Faragon JJ, Siegler EL, Del Carmen T. Older HIV-infected adults. Complex patients (III): Polypharmacy. *Eur Geriatr Med*. 2019;10(2):199-211. doi:10.1007/s41999-018-0139-y
22. **Kapadia SN**, Johnston CD, Marks KM, Schackman BR, Martin EG. Strategies for Improving Hepatitis C Treatment Access in the United States: State Officials Address High Drug Prices, Stigma, and Building Treatment Capacity. *J Public Health Manag Prac*. 2019 May/Jun;25(3):245-52.
23. Satlin, M.J., Goyal, P., Magleby, R., Maldarelli G.A., **Pham, K.**, Kondo, M., Schenck, E.J., Rennert, H., Westblade, L.F., Choi, J.J., Safford, M.M, Gulick, R.M. 2020. Safety, tolerability, and clinical outcomes of hydroxychloroquine for hospitalized patients with coronavirus 2019 disease. *Plos One* 15(7), p. e0236778. https://doi.org/10.1371/journal.pone.0236778
24. **Kondo M**, Dalai S, Venkatasubrahmanyam S, Eisenberg N, Robinson B, Westblade L, Marks K. Diagnosis and Genotyping of Coxiella burnetii Endocarditis in a Patient with Prosthetic Pulmonary Valve Replacement Using Next-Generation Sequencing of Plasma Microbial Cell-Free DNA. 2019 Open Forum Infect Dis. Accepted, In Press
25. **Kondo M**, Simon MS, Westblade LF, Jenkins SG, Babady NE, Loo AS, Calfee DP; SHEA Research Network. Implementation of infectious diseases rapid molecular diagnostic tests and antimicrobial stewardship program involvement in acute-care hospitals. Infect Control Hosp Epidemiol. 2021 May;42(5):609-611. doi: 10.1017/ice.2020.1230. Epub 2020 Oct 16.PMID: 33059776; PMCID: PMC8050139.
26. Cai A, Malhotra A, **Kondo M**, Lantos JE, Dinkin MJ, Sarva H. VZV Presenting as Orbital Apex Disorder in an Immunocompetent Young Man: Neuromuscular Image. J Clin Neuromuscul Dis. 2020 Sep;22(1):42-49. doi: 10.1097/CND.0000000000000296. PMID: 32833723.
27. Satlin MJ, Goyal P, Magleby R, Maldarelli GA, Pham K, **Kondo M**, Schenck EJ, Rennert H, Westblade LF, Choi JJ, Safford MM, Gulick RM. Safety, tolerability, and clinical outcomes of hydroxychloroquine for hospitalized patients with coronavirus 2019 disease. PLoS One. 2020 Jul 23;15(7):e0236778. doi: 10.1371/journal.pone.0236778. PMID: 32701969; PMCID: PMC7377460.
28. **Kondo M**, Dalai S, Westblade L, Venkatasubrahmanyam S, Eisenberg N, Marks KM. 154. Diagnosis and Genotyping of Coxiella burnetii Causing Endocarditis in a Patient With Prosthetic Pulmonary Valve Replacement (PVR) Using Next-Generation Sequencing (NGS) of Plasma. Open Forum Infect Dis. 2018 Nov 26;5(Suppl 1):S11–2. doi: 10.1093/ofid/ofy209.024. PMCID: PMC6253123.
29. First reported human isolation of Staphylococcus delphini. **Magleby R**, Bemis DA, Kim D, Carroll KC, Castanheira M, Kania SA, Jenkins SG, Westblade LF.Diagn Microbiol Infect Dis. 2019 Jul;94(3):274-276.
30. **Sfeir MM**, Hayden JA, Fauntleroy KA, Mazur C, Johnson JK, Simner PJ, Das S, Satlin MJ, Jenkins SG, Westblade LF. J Clin Microbiol 2019; 57(5):e10757-18.
31. Simon MS, **Sfeir MM**, Calfee Dp. Satlin MJ. Cost-effectiveness of ceftazidime-avibactam for treatment of carbapenem-resistant Enterobacteriaceae bacteremia and pneumonia. Antimicrob Agents Chemother 2019; 63:e00897-19.
32. **Wang T,** Costa V, Jenkins SG, Hartman BJ, Westblade LF. Acinetobacter radioresistens infection with bacteremia and pneumonia. IDCases. 2019 Jan 28;15: e00495.
33. **Wang TZ**, Kodiyanplakkal RPL, Calfee DP. Antimicrobial resistance in nephrology. Nat Rev Nephrol. 2019 May 13. doi: 10.1038/s41581-019-0150-7.
34. **Wang TZ**, Kodiyanplakkal RPL, Calfee DP.Nat Rev Nephrol. **2019** Aug;15(8):463-481.
35. Xia Q, **Abraham B**, Shah D, Ramaswamy C, Braunstein SL, Torian LV. Transition from paediatric to adult care among persons with perinatal HIV infection in New York City, 2006-2015. *AIDS*. **2018**;32(13):1821-1828. doi:10.1097/QAD.0000000000001923
36. **Baker TM**, Rogers W, Chavda KD, Westblade LF, Jenkins SG, Nicolau DP, Kreiswirth BN, Calfee DP, Satlin MJ. Epidemiology of Bloodstream Infections Caused by *Escherichia coli* and *Klebsiella pneumoniae* That Are Piperacillin-Tazobactam-Nonsusceptible but Ceftriaxone-Susceptible. Open Forum Infect Dis **2018;** 5:ofy300.

37. Satlin MJ, Chavda KD, **Baker TM**, Chen L, Shashkina E, Soave R, Small CB, Jacobs SE, Shore TB, van Besien K, Westblade LF, Schuetz AN, Fowler VG J, Jenkins SG, Walsh TJ, Kreiswirth BN. Colonization with Levofloxacin-resistant Extendedspectrum β-Lactamase-producing Enterobacteriaceae and Risk of Bacteremia in Hematopoietic Stem Cell Transplant Recipients. Clin Infect Dis 2018
38. Satlin MJ, Chavda KD, **Baker TM**, Chen L, Shashkina E, Soave R, Small CB, Jacobs SE, Shore TB, van Besien K, Westblade LF, Schuetz AN, Fowler VG Jr, Jenkins SG, Walsh TJ, Kreiswrith BN. Clin Infect Dis 2018; 67:1720-28.
39. **Batavia AS,** Severe P, Lee MH, Apollon A, Zhu YS, Dupnik KM, McNairy ML, Pape JW, Fitzgerald DW, Peck RN. Blood pressure and mortality in a prospective cohort of HIV-infected adults in Port-au-Prince, Haiti. J Hypertens 2018;36:1533-1539.
40. **Ellsworth GB**, Lensing SY, Ogilvie CB, Lee JY, Goldstone SE, Berry-Lawhorn JM, Jay N, Stier EA, Logan JS, Einstein MH, Saah A, Mitsuyasu RT, Aboulafia D, Palefsky JM, Wilkin TJ. A delayed dose of quadrivalent human papillomavirus vaccine demonstrates immune memory in HIV-1-infected men. Papillomavirus Res 2018; 6:11-14.
41. **Ellsworth GB**, Wilkin TJ. Preventing HPV in Patients With HIV: New Guidelines. Medscape Infectious Diseases [online]. 2018 Oct 28.
42. **Isa F**, Collins S, Lee MH, et al. Mass Spectrometric Identification of Urinary Biomarkers of Pulmonary Tuberculosis. EBioMedicine 2018; 31:157-65.
43. Kapadia SN, **Johnston CD**, Marks KM, Schackman BR, Martin EG. Strategies for improving hepatitis C treatment access in the united states: state officials address high drug prices, stigma, and building treatment capacity. J Public Health Manag Pract. 2018 Jun 20
44. **Kapadia SN**, Abramson EL, Carter EJ, Loo AS, Kaushal R, Calfee DP, Simon MS. The Expanding Role of Antimicrobial Stewardship Programs in US Hospitals: Lessons Learned from a Multisite Qualitative Study. *Jt Comm J Qual Patient Saf*. 2018 Feb; 44(2), pp 68-74.
45. **Kapadia SN**, Jeng PJ, Schackman BR, Bao Y, State Medicaid hepatitis C treatment eligibility criteria and use of direct acting antivirals. *Clin Infect Dis*. 2018; 66(15 May), pp1618-20.
46. **Kapadia SN**, Wu C, Mayer KH, Wilkin TJ, Amico KR, Landovitz RJ, Andrade A, Chen YQ, Chege W, McCauley M, Gulick RM, Schackman BR. No Change in Health-Related Quality of Life for At-Risk U.S. Women and Men Starting HIV Pre-Exposure Prophylaxis (PrEP): Findings from HPTN 069/ACTG A5305. *PloS One*. 2018 Dec 26; 13(12):e0206577.
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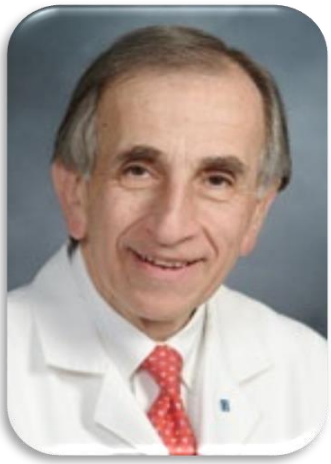
## ID DIVISION CURRENT RESEARCH AND TRAINING GRANTS 2022-2023

*Selected current research and training grants of the faculty and fellows in the Division of Infectious Diseases are listed below. There are opportunities for fellows to participate in these research projects, as well as with investigators at Rockefeller University or Memorial Sloan-Kettering Institute.*

1. Research Training in Infectious Diseases. **RM Gulick; MJ Glesby; K Marks; C Nathan**. NIH T32 AI07613. 1999-2025.
2. CTL-Mediated Elimination of Replication Competent vs. Defective HIV Proviruses from Natural Latent Reservoirs: Roles of Antigen Specificity and Functional Characteristics. **RB Jones**. NIH R01 AI131798. 2017-2022.
3. CTI-mediated elimination of replication competent vs. Defective HIV proviruses from natural latent reservoirs: roles of antigen specificity and functional characteristics **RB Jones** r01ai131798 2018-2022
4. Targeted delivery of cytopathicity enhancing agents, and co-ordination with shock and kill, to reduce HIV reservoirs **RB Jones** r01ai147845 2019-2024
5. Role of translational polymerases in genome diversification of the malaria parasite. NIH/NIAID. **L. Kirkman** NIH RO1 AI 146153. 2019-24.
6. Harnessing single cell epigenome-wide profiling of myeloid cells to compare and contrast Alzheimer's from HIV-associated cognitive dysfunction **L Ndhlovu** NIH r01 ag063846 2020-2025
7. Development of brain organoids to study the impact of hiv-1, drugs of abuse and aging on cognitive impairment N Nixon **L Ndhlovu** NIH r01da052027 2020-2025
8. Effects of human galectin-9 on the CNS HIV reservoir sk pillai, j joseph, **L Ndhlovu** NIH r01mh112457 2016-2021
9. Effects of HIV SIV on unconventional t cells in immunity to m. Tuberculosis in pre adolescents c scanga, j miller, **L Ndhlovu** r01ai142662 2019-2024
10. Host glycomic modulation of HIV-associated neuro-inflammation during viral suppression mm Abdel, M Wong, **L Ndhlovu** r01ns117458 2020-2024
11. Antibacterial Resistance Leadership Group. Co-Investigator **MJ Satlin** (PI: Vance Fowler; Henry Chambers). NIH- NIAID UM1AI104681. 2019-2026.
12. Metagenomic Profiling of Urinary Cell-Free DNA to Monitor Urinary Tract Infections after Kidney Transplantation. Co-Investigator **MJ Satlin** (PI: Iwijn de Vlaminck). NIH-NIAID R01AI151059. 2020-2025.
13. Screening for Resistant Enteric Bacteria to Personalize Infection Prevention Strategies in Neutropenic Patients. PI: **Satlin**. NIH-NIAID R01AI151038. 2020 -2024.
14. Burroughs Wellcome Fund Physician-Scientist Institutional Award)\Weill Cornell Medicine Physician-Scientist Academy1020043 **K. Rhee** 2019 – 2024
15. NIH/NIAID Tri-I Training Program in Metabolomics R25AI140472 **K. Rhee** 2019 - 2024
16. NIH/NIAID Molecular, Biomedical, and In Vivo Analysis of High and Low Transmission Mtb Strains, U19AI111276 **K. Rhee**, subcontract 2019 – 2024
17. NIH/NIAID Omics for TB: Response to Infection and Treatment; U19AI135976 **K. Rhee**, subcontract 2018 – 2023
18. Bill & Melinda Gates Foundation: Metabolomics to Identify Synergistic TB targets: BMGF 204250 **K. Rhee** 2020 - 2023
19. NIH/NIAID Pathway Analysis in Tuberculosis: P01AI143575 **K. Rhee**, Core leader 2020 – 2025

## PROFILES OF FACULTY CONDUCTING RESEARCH

**Barry Brause, MD,** Professor of Clinical Medicine and Chief Emeritus of Infectious Diseases at Hospital for Special Surgery. Dr. Brause' clinical research has focused on musculoskeletal infections and particularly on infections associated with indwelling foreign materials and prostheses. Dr. Brause is a Past President of the Musculoskeletal Infection Society (2018-2019) and has taken part in major national meetings and workshops as an invited participant including the National Institute of Arthritis and Musculoskeletal Disease, the American Dental Association, Council on Dental Therapeutics, the Infectious Diseases Society of America, and the American Society of Microbiology/ Interscience Conference on Antimicrobial Agents and Chemotherapy. He has authored chapters on bone and joint infections in five editions of Principles and Practice of Infectious Diseases and on "Osteomyelitis" in three editions of Cecil Textbook of Medicine. Dr. Brause is a Fellow of the Infectious Diseases Society of America (FIDSA), the American College of Physician (FACP) and a member of the Society for Healthcare Epidemiology of America [SHEA].



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**Adeel Ajwad Butt, MBBS, MS, FACP, FIDSA**, is Professor of Medicine and Population Health Sciences at Weill Cornell Medical College. Dr. Butt held the posts of the inaugural Chief Quality Officer at Hamad Medical Corporation (HMC), the first Director of Hamad Healthcare Quality Institute (HHQI), Vice Chair, Department of Medicine and Director, Clinical Epidemiology Research Unit at HMC. Dr. Butt completed his residency in Internal Medicine in New York and a fellowship in Infectious Diseases in New Orleans. He also holds a master's in science degree in Clinical Research from the University of Pittsburgh School of Medicine. Dr. Butt has been the recipient of numerous national and international awards, including a Fulbright Scholarship, Yale-Johnson and Johnson Award in International Health, a National Talent Pool Scholars Award and IDSA Training Faculty award to Africa, and Excellence in Research Awards from various institutions in the US, UAE, Qatar, and Pakistan. He has lectured extensively around the world and provided consultations to governmental and non-governmental organizations in building research, educational and training capacity in resource-limited settings. He has published over >240 papers in high impact medical journals including >55 key studies on SARS-CoV-2/COVID-19 infection published in the New England Journal of Medicine, JAMA, JAMA Internal Medicine, Annals of Internal Medicine, Journal of Clinical Investigation, Clinical Infectious Diseases, and others. Dr. Butt has been appointed to the Board of Governors of the National Institutes of Health in Pakistan and is also a member of the Qatar Ministry of Public Health Advisory Committee and many other national and international panels and committees.

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**David Calfee, MD, MS,** Professor of Medicine and Population Health Sciences, Chief Hospital Epidemiologist (NYP/WC), and Deputy Medical Director of Infection Prevention and Control (NYPH). Dr. Calfee trained in internal medicine and infectious diseases at the University of Virginia and received his MS in health evaluation sciences (epidemiology) at the University of Virginia. His research and clinical interests focus on the epidemiology and prevention of healthcare-associated infections, including the clinical and molecular epidemiology and prevention of transmission of multidrug-resistant bacteria. He is the Editor-in-Chief of *Infection Control & Hospital Epidemiology* (ICHE), the journal of the Society for Healthcare Epidemiology of America.

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**Jennifer A. Downs, MD, PhD,** Associate Professor of Medicine. Dr. Downs received her M.D. from Weill Cornell Medical College and her Ph.D. in Parasitology from Leiden University (the Netherlands). She completed her Internal Medicine residency training at Columbia University College of Physicians and Surgeons, followed by her Infectious Diseases fellowship at New York-Presbyterian Hospital-Weill Cornell Medical College. Her research focuses on female genital schistosomiasis and viral infections in women of reproductive age in Tanzania, where she has worked since 2007. She also conducts implementation science research to increase the uptake of healthy behaviors, such as utilization of family planning or blood pressure screening and management, among rural Tanzanians. She is deeply committed to mentoring undergraduate, medical, and graduate students with a particular emphasis on promoting the careers of women working in global health research in Tanzania and the U.S.

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**Kathryn M. Dupnik, MD**, Assistant Professor of Medicine. Dr. Dupnik received her M.D. from the University of Virginia and completed her clinical training in Internal Medicine at New York-Presbyterian Hospital – Columbia University Medical Center. She stayed in New York City to complete training in infectious diseases at New York Presbyterian Hospital- Weill Cornell Medical College. Dr. Dupnik completed her fellowship research training in northeastern Brazil, where she conducted research on the pathologic immune reactions associated with *Mycobacterium leprae* infection. Dr. Dupnik' s current research is translational and focuses on host-pathogen response *M. tuberculosis* infections. She also studies the impact of *M. tuberculosis* on people with HIV-TB coinfection.

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**Teresa H. Evering, MD, MS**, Assistant Professor of Medicine. A native New Yorker, Dr. Evering received her M.D. from Weill Cornell Medicine, continued her training as a resident in Internal Medicine at New York-Presbyterian Hospital - Columbia University Medical Center and trained as an Infectious Disease Fellow on Research Track the at Albert Einstein College of Medicine/Montefiore Medical Center. Dr. Evering then joined the Rockefeller University-sponsored Clinical Scholar's Program at the Aaron Diamond AIDS Research Center, where she obtained a master's degree in translational research. Dr. Evering remained at the Aaron Diamond AIDS Research Center and Rockefeller University as an Assistant Professor of Clinical Investigation until joining the Division of Infectious Diseases at Weill Cornell Medicine in 2020. Her NIH-funded translational human immunodeficiency virus-1 (HIV-1)-pathogenesis research program is focused on the use of phylogenetic, molecular and systems biology approaches to study HIV-1 infection of the Central Nervous System and HIV-Associated Neurocognitive Disorders (HAND).

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| **Daniel W. Fitzgerald, MD,** Professor of Medicine, Microbiology and Immunology and Director, Center for Global Health. Dr. Fitzgerald trained in internal medicine and infectious diseases at the Massachusetts General Hospital. He conducts research and training in Haiti and Tanzania. His areas of interest include translational and clinical studies of HIV/AIDS and tuberculosis and studies of HIV induced chronic inflammation. Other interests include improving informed consent and empirical studies to inform ethical guidelines for the conduct of clinical research in resource poor countries. The training of clinician scientists in the United States, Haiti, and Tanzania is an integral part of his research activity. |  <br>**dwf2001@med.cornell.edu** |
| **Marshall J. Glesby, MD, PhD** Professor of Medicine, Professor of Population Health Sciences, and Associate Chief, Division of Infectious Diseases. Dr. Glesby trained in internal medicine and in infectious diseases at Johns Hopkins and received a Ph.D. in clinical investigation from the Johns Hopkins School of Hygiene and Public Health. His research interests include metabolic, cardiopulmonary, and aging-related complications in people with HIV. He has collaborated with colleagues in Brazil on studies of HTLV-I infection and leishmaniasis. Dr. Glesby directs the HIV/AIDS Clinical Trials Unit at Weill Cornell and is the Director of the Participant and Clinical Interactions Component of the Weill Cornell Clinical and Translational Science Center. |  <br>**mag2005@med.cornell.edu** |
| **Linnie M. Golightly, MD,** Associate Professor of Clinical Medicine, and Microbiology. Dr. Golightly trained in internal medicine at Harlem Hospital and in infectious diseases and molecular parasitology at Harvard University. Dr. Golightly's current research interests include: (1) Pathogenesis of cerebral malaria as mediated by microvascular damage/repair. These studies are in collaboration with colleagues at the Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana. (2) Development of a cell phone-imaging probe for diagnosing cerebral malaria. The project is in collaboration with Dr. Alberto Bilenca of the Ben-Gurion University in Israel. (3) Studies of the relationship between hemoglobinopathies and preeclampsia on the African context. These studies are in collaboration with colleagues at the Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana. (4) Factors effecting the success of underrepresented minority researchers in the biomedical sciences. |  <br>**lgolight@med.cornell.edu** |

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| **Roy (Trip) M. Gulick, MD, MPH,** The Rochelle Belfer Professor in Medicine, and Chief of Division of Infectious Diseases. Dr. Gulick trained in internal medicine at Columbia and in infectious diseases at Harvard and received his MPH in clinical trial design from the Harvard School of Public Health. His research focuses on clinical trials of antiretroviral therapies for treatment and prevention of HIV infection and COVID-19. Dr. Gulick currently serves as Principal Investigator of the Weill Cornell Medical College- New Jersey Medical School Clinical Trials Unit of the NIH-sponsored AIDS Clinical Trials Group (ACTG). He also serves as Co-Chair of the U.S. Department of Health and Human Services Panel for Clinical Practices for Treatment of HIV Infection (DHHS Guidelines Panel) and the NIH COVID-19 Treatment Guidelines Panel and is a Board Member of the International Antiviral Society-USA. Current projects include evaluating treatment strategies for both antiretroviral therapy-naïve and experienced people living with HIV, using antiretroviral drugs for prevention (PREP, pre-exposure prophylaxis), and treatment and prevention strategies for COVID-19. |  <br>**rgulick@med.cornell.edu** |
| **Barry J. Hartman, MD,** Clinical Professor of Medicine. Dr. Hartman completed his medicine and infectious disease fellowship training at Cornell. Dr. Hartman did his basic research in the Alexander Tomasz laboratory of the Rockefeller University in New York City studying the mechanism for methicillin-resistance in the Staphylococcus aureus. His current focus is clinical care and education, and his interests include antibiotics and antibiotic resistance, surgical infections, and endocarditis. He has received several teaching awards from students and house staff. He has been the Formulary & Therapeutics Committee Chairman and Co-Chairman at the New York-Presbyterian Hospital for the past 20 years. He is also Co-chairman of the combined Subcommittee on Antibiotic Usage at NYP Hospital. |  <br>**bjh2001@med.cornell.edu** |
| **Michael Henry, M.D,** Assistant Attending Physician in Infectious Diseases and Internal Medicine at the Hospital for Special Surgery and an Assistant Professor of Clinical Medicine at Cornell Medical School. Dr. Henry graduated with a B.Sc. from Haverford College, PA and then attended the NYU School of Medicine. He completed a residency in internal medicine followed by a fellowship in Infectious Disease, both at NYU/Bellevue Hospital. Prior to joining the staff at HSS and NYH in 2012, Dr. Henry was an ID physician at the Bronx-Lebanon Medical Center. Dr. Henry provides consultative ID services at HSS and NYH and participates in the divisional education of the ID fellows. His area of clinical research focuses largely on the prevention, diagnosis, and treatment of orthopedic surgical infections, with a special interest in prosthetic joint infections. |  <br>**henrym@hss.edu** |

**Warren D. Johnson, Jr., MD.,** The B.H. Kean Professor of Tropical Medicine, and the founding Director of the Center for Global Health. Dr. Johnson's career has been committed to research and training in infectious diseases, particularly in resource poor countries. His interests have included studies of AIDS, tuberculosis, schistosomiasis, and leishmaniosis. His research has received uninterrupted NIH and foundation support in Brazil (1969-2022), Haiti (1979-2021), including a NIH Merit Award (1990), and in Tanzania (2006-2021). He has chaired numerous NIH Research Committees and served on the NIH and the NIAID National Advisory Councils. He also served as a Director of the ABIM, Chair of the ABIM Infectious Diseases Subspecialty Board, and as a Councilor of the IDSA. He is a member of the Brazilian National Academy of Science. Dr. Johnson was honored by having the GHESKIO medical center in Haiti named for him. In 2016, Dr. Johnson receives the Columbia University College of Physicians and Surgeons Gold Medal for Excellence in Clinical Medicine.

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**Brad Jones, PhD**, Dr. Jones is a Viral Immunologist and an Associate Professor at Weill Cornell Medicine in the Division of Infectious Diseases with a cross-appointment in the Department of Microbiology and Immunology. His current research is focused on understanding how to effectively harness innate and adaptive cellular immune responses to contribute to the elimination of the HIV reservoirs that persist in individuals on long-term therapy, and thus to inform efforts to cure infection. Work in the Jones lab has led to the discovery of cell-intrinsic resistance to cytotoxic T-cells as a contributor to HIV persistence on long-term antiretroviral therapy; with ongoing research focused on uncovering and overcoming underlying mechanisms. He received his PhD in Immunology from the University of Toronto before beginning a post-doctoral fellowship at the Ragon Institute of MGH, MIT, and Harvard in 2012. He currently serves as Principal Investigator of the Research Enterprise to Advance a Cure for HIV (REACH), one of the NIH's flagships 'Martin Delaney Collaboratory's'. Dr. Jones is on the Steering Committee of the Global Scientific Strategy for an HIV Cure initiative of the International AIDS Society (IAS) and co-Chairs the IAS Advocacy-for-Cure Academy – which focuses on raising awareness on the state of HIV cure research in the global South.


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**Shashi N Kapadia, MD. MS,** Assistant Professor of Medicine, and Population Health Sciences. Dr. Kapadia completed internal medicine training at Rutgers New Jersey Medical School, followed by ID fellowship training and a Public Health and Preventive Medicine Residence at New York-Presbyterian Hospital. Dr Kapadia's research has focused on the equitable delivery of healthcare for people who use drugs and people living with HIV and hepatitis C. He conducts both observational and interventional clinical research related to the uptake of hepatitis C virus treatment for this population. Dr Kapadia holds a secondary appointment in the Department of Population Health Sciences and is affiliated with the Center for Health Economics of Treatment Interventions for Substance Use Disorder, HCV, and HIV (CHERISH) and the Center for Health Equity, both based at Weill Cornell.

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| **Laura A. Kirkman, MD,** Associate Professor of Medicine and Microbiology and Immunology. Dr. Kirkman received her M.D. from Albert Einstein College of Medicine with distinction in research. She completed her clinical training in Internal Medicine at Yale-New Haven Hospital and her Infectious Disease training at the New York-Presbyterian-Weill Cornell Medical Center followed by a postdoctoral fellowship in the laboratory of Dr. Kirk Deitsch in the Department of Microbiology and Immunology. Dr. Kirkman's current research focuses on the the human malaria parasite, *Plasmodium falciparum*. Her lab is working to identify novel drug targets and understand how DNA damage and repair in the parasite relates to pathogenesis. Specifically examining the generation of genetic diversity in genes that encode the key proteins implicated in antigenic variation and the generation of drug resistance. Dr. Kirkman also conducts basic and clinical research on the tickborne parasite that causes babesiosis. |  <br>**lak9015@med.cornell.edu** |
| **Priya Kodiyanplakkal, MD.,** Assistant Professor of Clinical Medicine. Assistant Program Director for ID Fellowship Program. Dr. Kodiyanplakkal received her B.S. degree from Yale University, her medical degree from the Albert Einstein College of Medicine and continued to complete her internal medicine residency at Montefiore Medical Center in New York. She then went on to Columbia University Medical Center for her fellowship training in adult Infectious Diseases, before joining the faculty at Weill Cornell Medicine and an attending physician at New York-Presbyterian Hospital. Dr. Kodiyanplakkal is a member of the Transplant Oncology Infectious Disease Team at Weill Cornell Medicine, and her teaching and clinical responsibilities focus on immunocompromised patient populations. She is interested in the epidemiology of infections in immunocompromised hosts, and conducts clinical research focused on viral and bacterial infections in transplant recipients. |  <br>**rlk9005@med.cornell.edu** |
| **Kristen M. Marks, MD, MS,** Associate Professor of Medicine. Dr. Marks received internal medicine and ID fellowship training at New York-Presbyterian Hospital, where she focused her clinical training and research on HIV and hepatitis virus infections and completed Weill Cornell's Master's Degree in Clinical Investigation. Her current research focuses on improving treatment outcomes in patients with HIV and hepatitis virus co-infections and includes studies in people living with HIV and people who inject drugs. She serves as a co-director of the Cornell HIV/AIDS Clinical Trials Unit, where she conducts several treatment studies related to HIV and hepatitis viruses. She served as co-chair of IDSA/AASLD's joint guidelines panel for "Recommendations for testing, managing and treating hepatitis C" and as a member of New York State's HCV guidelines panel. When the COVID pandemic hit New York City, she led the phase 3 studies of remdesivir at Weill Cornell and continues to lead the phase 3 studies of vaccines for the prevention of COVID at Weill Cornell. |  <br>**markskr@med.cornell.edu** |

**Andy O. Miller, MD,** Chief of Infectious Disease Division, Associate Professor of Clinical Medicine, and Associate Attending Physician at the Hospital for Special Surgery. Dr. Miller received his B.Sc. at Yale College and his M.D. at Harvard Medical School. He then trained in Internal Medicine at Columbia-Presbyterian and in Infectious Diseases at NYU. From 2007 to 2010, he was an ID physician at Bronx-Lebanon Hospital Center. Dr. Miller provides consultative ID services to patients at both HSS and NYPH-Cornell and participates in divisional education of ID fellows. Clinical research interests include prevention, diagnosis, and treatment of orthopedic infections, infection control and antimicrobial stewardship in orthopedics, and perioperative outcomes in the COVID-19 era.

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**Henry W. Murray, MD,** the Arthur R. Ashe Professor of Medicine. He is an expert in macrophage activation; immunopathogenesis of infection caused by intracellular pathogens Leishmania, and the chemo- and immunochemotherapy of leishmaniasis. Dr. Murray's long-term, NIH-supported research was focused on immunoregulation of the host response to antileishmanial chemotherapy in experimental visceral leishmaniasis (kala-azar). This work in part formed the basis of experimental treatment trials in Indian patients at the internationally recognized kala-azar clinical trials unit he previously co-directed in Bihar State, India. Dr. Murray received the Squibb Award (1989) from the Infectious Diseases Society of America for outstanding achievement in Infectious Diseases, and previously was Chief of the Division of Infectious Disease (1983-1995) and Associate Chairman of Medicine for Clinical Research (1995-2007). Dr. Murray is currently Director of the Arthur Ashe Endowment for the Defeat of AIDS, Editor of the travel medicine web site, Tropimed U.S., an expert in Travel Medicine, director of the Medical College's Translational Science course, and co-chairs the Department of Medicine's Quality Assurance and vice-chairs the Medical College's CQI Curriculum Review Committee. Dr. Murray has received a Special Achievement Award from the Medical College's Alumni Association (2016), a Medical Education Innovation Award (2016) and an Excellence in Medical Education award (2019). He is also the Ombudsperson for the Medical College's medical and graduate students.

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**Lishomwa (Lish) Ndhlovu MD, PhD,** Professor of Immunology in Medicine at Weill Cornell Medicine in the Division of Infectious Diseases. After completing MD training, his scientific career began at Tohoku University in Japan where he received his PhD and pursued post-doctoral training at the University of California San Francisco. His research is dedicated to confronting the challenges of HIV and aging and his team is developing specific expertise and strategies to prevent, slow or eliminate complications associated with HIV to ultimately optimize quality of life outcomes. He has specific interests in immunological and virological discoveries for achieving a cure for HIV. He is Co-PI of the NIH supported Martin Delaney Collaboratory HIV Cure grant, 'HOPE" and a member of the International Neuro-HIV Cure Consortium, an alliance comprising several global partners with a mission providing cutting-edge neuro HIV investigation. His group is bringing the same urgency and focus to the COVID-19 pandemic and exploits immuno-epigenetic approaches to resolve molecular mechanisms regulating SARS-CoV-2 infection across tissues and cells. His lab is largely supported by individual, and consortia grants from the NIH and DoD. An elected Fellow of the American Academy of Microbiology, he is also the Editor in Chief of the journal AIDS Research and Human Retroviruses and is committed to teaching students, fellows and mentoring junior faculty.

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**Douglas F. Nixon, MD, PhD**, Professor of Immunology in Medicine, Division of Infectious Diseases. Dr. Nixon trained in medicine at the Westminster Hospital Medical School, London and in pathology and clinical virology in Oxford, and received his PhD in Immunology from the University of Oxford, UK. His research focuses on host pathogen interactions with retroviruses. Dr. Nixon currently serves as Principal Investigator of the NIH-sponsored Martin Delaney Collaboratory for the cure of HIV infection, "Believe", and holds NIH grants on human endogenous retroviruses (HERVs) and cancer. He is a member of the American Society for Clinical Investigation, the Henry Kunkel Society, and a Fellow of the American Academy of Microbiology and the National Academy of Inventors. He is the past Chair of the NIH's AIDS Vaccine Research Subcommittee and was an Elizabeth Glaser Scientist. He has international collaborators in Mexico and Brazil. He has published more than 290 articles in peer-reviewed journals. Current projects include innate and adaptive immunity against HIV and HERVs, transposable elements in cancer, as well as studies on neuro-immune cross talk.

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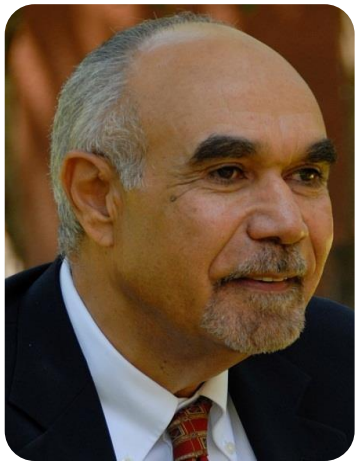
**Jean W. Pape, MD,** Howard and Carol Holtzmann Professor of Clinical Medicine, Center for Global Health, WCMC, USA, and Director, Centres GHESKIO, Haiti. Dr Pape graduated from Columbia (BS, 1971) and WCMC (MD, 1975). After training in internal medicine and infectious diseases, he joined the Cornell Faculty and set-up the Cornell program in Haiti where he developed an effective care model for infants with diarrhea. Expansion of the model nationwide resulted in a 50% decrease in national infantile mortality. Dr Pape is credited with the recognition and 1st comprehensive description of AIDS in the developing world. In 1982, he established GHESKIO (Haitian Study Group on Kaposi Sarcoma and Opportunistic Infections) as one of the 1st AIDS centers in the world. Four decades later, GHESKIO continues as one of the largest AIDS /TB treatment, training, and research centers in the Americas. providing free care to >250,000 patients with HIV, STIs and TB, annually. In 2015 a cardiovascular disease program was put in place. Dr. Pape is a member of many boards including: UNAIDS Expert Panel, Fondation Mérieux, PEPFAR. He received many awards including France's Légion d'Honneur , member of the USA National Academy of Medicine (2003), Christophe Mérieux, Gates Global Health and Haiti's highest honors, "Honneur et Mérite, Grade Commandeur". In 2018, he was the 1st recipient of the new Joan and Sanford Weill Cornell Exemplary award.



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**Robert N. Peck, MD Ph.D DTM&H,** Associate Professor in Medicine, and Pediatrics. Dr. Peck is boarded in medicine and pediatrics with additional training in epidemiology and tropical diseases. Since 2007 he has been working full-time in Mwanza, Tanzania as a faculty member of Weill Cornell and the Weill Bugando School of Medicine (WBSM). He coordinates the collaboration between WCMC and WBSM and works at WBSM as an intensive care physician and medical educator. His research focuses on non-communicable diseases (NCDs), particularly hypertension, and the interactions between NCDs and infectious diseases such as HIV and renal disease and tuberculosis and diabetes mellitus. He also collaborates with the Tanzanian National Institute of Medical Research (NIMR). Current projects include a randomized clinical trial of a case management intervention intended to reduce post-hospitalization mortality in HIV-infected adults and a cohort study of HIV-infected and uninfected adults to compare the incidence and determinants of hypertension and markers of early cardiovascular disease. Dr. Peck is also interested in the root causes of hypertension and cardiovascular disease in childhood and is conducting a cohort study of blood pressure and other cardiovascular risk factors in Tanzanian adolescents.

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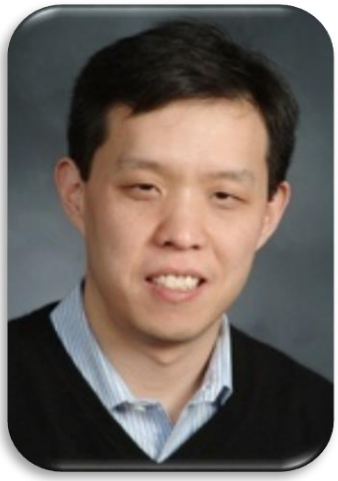
**Kyu Y. Rhee, MD, PhD,** Professor of Medicine and Microbiology and Immunology. He received his M.D. and Ph.D. from the University of California, Irvine through a medical scientist training program. He then received clinical training in internal medicine and infectious diseases at the New York Presbyterian-Weill Cornell Medical Center where he also completed a postdoctoral fellowship in the laboratory of Dr. Carl Nathan (Department of Microbiology and Immunology). Dr. Rhee's research focuses on biochemical approaches to drug target discovery against *M. tuberculosis*, the causative agent of tuberculosis, using mass spectrometry-based tools. Work in his laboratory is currently funded by grants from the NIH and Bill & Melinda Gates Foundation. Dr. Rhee also serves as Director of the Department of Medicine's Physician-Scientist Residency Training program and a Burroughs Wellcome Physician-Scientist Institutional Award for training of MD-only physician-scientists.



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**Mirella Salvatore, MD,** is an Assistant Professor of Medicine at the Sanford I. Weill Medical College of Cornell University and an Attending Physician at the New York-Presbyterian Hospital Cornell campus. She obtained her M.D. degree from the Catholic University in Rome, Italy and completed her Internal Medicine Residency and Fellowship in Infectious Diseases at the Mount Sinai School of Medicine in New York City. At Mount Sinai she also completed a postdoctoral fellowship training studying influenza virus under the supervision of Profs Peter Palese and Adolfo Garcia-Sastre. As a physician scientist, Dr. Salvatore has focused her NIH funded research on the development of novel platforms for influenza vaccines. She is also participating in the study of influenza virus pathogenesis and therapy in the immunocompromised human host and with animal models. Her research has been published in peer-reviewed journals, including Journal of Clinical Microbiology, Vaccine, PLoS One, Human Gene Therapy, Journal of Virology, Journal of Hepatology, Journal of Infectious Diseases, Proceedings of the National Academy of Science among others. She is a member of the International Society for Influenza and other Respiratory Virus Diseases (ISIRV), International Society for Travel Medicine (ISTM) and the Infectious Diseases Society of America (IDSA). Dr. Salvatore has served on NIH study sections and is a reviewer for many scientific journals.

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**Michael J. Satlin, MD, MS, FIDSA,** Associate Professor of Medicine, Associate Professor of Pathology and Laboratory Medicine, and William Randolph Hearst Foundation Clinical Scholar in Microbiology and Infectious Diseases. Dr. Satlin received his M.D. from the University of Virginia School of Medicine. He completed residency training in internal medicine and fellowship training in infectious diseases at Weill Cornell Medicine. He also obtained a master's degree in Clinical and Translational Investigation from Weill Cornell Medicine. He is the Clinical Director of the Transplantation-Oncology Infectious Diseases Program and provides infectious diseases supportive care to immunocompromised hosts. Dr. Satlin's research interests are in the epidemiology, diagnosis, and treatment of multidrug-resistant Gram-negative bacterial infections in immunocompromised hosts. He previously received a K23 Mentored Career Development Award through NIAID and now has independent funding from NIAID to investigate individualized approaches to antibacterial prophylaxis in neutropenic patients. Dr. Satlin is Co-Chair of the Breakpoint Working Group of the Clinical and Laboratory Standards Institute's Subcommittee on Antimicrobial Susceptibility Testing, participates on multiple committees of NIAID's Antibacterial Research Leadership Group, and serves on the Program Committee for ASM Microbe.

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**Bruce R. Schackman, PhD,** Saul P. Steinberg Distinguished Professor and Executive Vice Chair in the Department of Population Health Sciences, and Professor of Population Health Sciences in Medicine in the Division of Infectious Diseases. He holds an MBA and a doctorate in health policy from Harvard University. Dr. Schackman is the Director of the Center for Health Economics of Treatment Interventions for Substance Use Disorder, HCV, and HIV (CHERISH), a multi-institutional Center of Excellence, funded by the National Institute on Drug Abuse. His current research includes economic evaluations of HIV and hepatitis C screening and treatment in substance use treatment settings, and economic evaluations of medication treatment of opioid use disorder. He has taught in cost-effectiveness analysis at Weill Cornell and in Haiti. He has been a member of the AIDS Clinical Trials Group, the National Drug Abuse Clinical Trials Network, and NIH Office of AIDS Research Advisory Council.

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**Matthew S. Simon, MD, MS,** Associate Professor of Medicine, Associate Hospital Epidemiologist and Physician-Leader for Antimicrobial Stewardship. Dr. Simon is thrilled to serve as the ID Fellowship Program Director since 2020. Dr. Simon received his M.D. from Albert Einstein College of Medicine in 2006. He completed his clinical training in internal medicine and infectious disease at New York Presbyterian/Weill Cornell Medical Center in 2013. He received a Master of Science in Clinical and Translational Investigation from Cornell's Clinical and Translational Science Center in 2013. Dr. Simon's research interests include healthcare associated infection, antimicrobial and diagnostic stewardship, and cost-effectiveness analysis.

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**Catherine Butkus Small, MD**, Professor of Clinical Medicine; Co-Director, Transplantation/Oncology Infectious Diseases Program; Director, Clinical Research Unit. She was an Infectious Diseases Research Fellow at Montefiore Hospital/Albert Einstein College of Medicine and was the Medical Director of the HIV Program at Montefiore/North Central Bronx Hospital. She was also the Medical Director of the HIV Program at Westchester Medical Center/New York Medical College until 2014. Dr. Small came to Weill Cornell Medicine in 2014 and aided in the development of the Transplant/Oncology ID Program along with Dr. Thomas Walsh, including the HIV Transplant Program and the evolving Cardiac Transplant Program. Dr. Small has been the Principal Investigator on 50 of 89 clinical research trials, including 10 investigator-initiated clinical research trials. Her major research interests include HIV and transplantation (PI on 2 Hope in Action NIH Trials for HIV-to-HIV Transplantation); viral infections, including respiratory viral infections (RSV, influenza, parainfluenza, COVID-19); and CMV (new treatments for resistant infections; new prophylactic agents) in immunocompromised hosts. She is currently working on 2 new investigator-initiated studies involving drug-drug interactions in HIV-positive renal transplant recipients and COVID-19 infections in renal transplant recipients, including the immunologic aspects of this serious infection in this unique population.

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| **Ole Vielemeyer, MD,** Associate Professor of Clinical Medicine; Medical Director, Division of Infectious Diseases; Associate Program Director (Clinical) ID Fellowship Program. Dr. Vielemeyer obtained his M.D. degree from the University of Leipzig Medical School, Germany. After a few years of postgraduate training in his home country, he moved to the U.S., where, at the University of Rochester in Upstate New York he then completed Internal Medicine residency including a year as chief resident. He subsequently obtained fellowship training in both Infectious Diseases and Medical Microbiology at Yale University. Dr. Vielemeyer was recruited to Weill Cornell as the Medical Director of ID Associates & Travel Medicine and has been seeing patients with a very broad range of infectious problems. In 2020 he was promoted to be the Medical Director in the division, overseeing and coordinating all in- and outpatient clinical activities. Dr. Vielemeyer loves patient care and equally cherishes training the next generation of physicians at all levels from medical students to internal medicine residents to ID fellows. |  <br>**olv9006@med.cornell.edu** |
| **Mary A. Vogler, MD,** Associate Professor of Clinical Medicine. Dr. Vogler trained in internal medicine at the University of Connecticut School of Medicine and in infectious diseases at New York University School of Medicine where she served on the faculty prior to coming to Weill Cornell in 2004. Dr. Vogler serves as an HIV/AIDS primary care provider in the Center for Special Studies for both HIV infected adults and adolescents. She also participates actively as an investigator in the NIH-funded Cornell HIV/AIDS Clinical Trials Unit (CCTU). Her area of expertise is in the care of HIV-infected women, including pregnancy and prevention of mother-to-child transmission. She received the AIDS Clinical Trials Group (ACTG) Women's Health Investigator award in 2007. She has recently joined the NYP Antimicrobial Stewardship Program as a clinical representative. She is an active member of the NYP Hospital Quality Improvement and Patient Safety Committee, and the WCMC Dept of Medicine Well-Being Committee. |  <br>**mav9046@med.cornell.edu** |
| **Lars F. Westblade, PhD, D(ABMM),** Associate Professor of Pathology and Laboratory Medicine and Medicine (Infectious Diseases). Dr. Westblade received his PhD in Biochemistry from the University of Birmingham in the UK. He completed postdoctoral studies at The Rockefeller University in New York and pursued a postdoctoral Fellowship in Medical and Public Health Laboratory Microbiology at Washington University School of Medicine in St. Louis. Dr. Westblade' s current research focuses on antimicrobial resistance (AMR), detection and characterization of AMR in immunosuppressed individuals, development of antimicrobial susceptibility testing methods, characterization of the human microbiome in the setting of transplantation and immunosuppression, and implementation and clinical evaluation of novel platforms and tests for infectious diseases diagnostics. |  <br>**law9067@med.cornell.edu** |

**Timothy J. Wilkin, MD, MPH,** Professor of Medicine. Dr. Wilkin received his undergraduate degree in Mathematics at the University of Texas at Austin and attended medical school at Ohio State University. He went on to complete his residency in Internal Medicine at the University of Chicago Hospitals. He received fellowship training in Infectious Diseases at Columbia University where he completed a Master of Public Health with a concentration in Patient-Oriented Research. He was recruited to the faculty of Weill Cornell Medical College in 2002. He received a K23 Grant (Mentored Patient-Oriented Research Career Development Award) from the National Institutes of Health to study human papillomavirus infection and anal dysplasia in men living with HIV. He is an active clinical researcher in the AIDS Clinical Trials Group and the AIDS Malignancy Consortium. His current work focuses on HPV vaccination and prevention of HPV-associated cancers in people living with HIV. He is Principal Investigator for a U54 Consortium funded by the NCI and protocol chair for multiple cooperative group clinical trials. He is also Assistant Dean for Clinical Research Compliance and the Institutional Official for Human Research Protections.

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**T32 RESEARCH TRAINING FACULTY IN OTHER DEPARTMENTS & INSTITUTIONS**

| Faculty Mentor Name | Research Specialty | Web Link |
|---|---|---|
| **Paul Bienasz, PhD**<br>Rockefeller University | Biology and evolution of retroviruses, including HIV-1, and the genetics of host–virus interactions. | https://www.rockefeller.edu/our-scientists/headsof-laboratories/956-paul-bieniasz/ |
| **Jean-Laurent Casanova, MD, PhD**<br>Rockefeller University | Genetic determinants of infectious diseases | https://www.rockefeller.edu/our-scientists/headsof-laboratories/970-jean-laurent-casanova/ |
| **Marina Caskey, MD**<br>Rockefeller University | Immune-based therapies for HIV, including broadly-neutralizing antibodies | https://www.rockefeller.edu/our-scientists/research-affiliates/5615-marina-caskey/ |
| **Ethel Cesarman, MD, PhD**<br>Weill Cornell<br>Dept. of Pathology | KSHV-HHV8 and EBV pathogenesis/ HIV-related malignancies | http://vivo.med.cornell.edu/display/cwid-ecesarm |
| **Kirk W. Deitsch, PhD**<br>Weill Cornell<br>Dept. of Microbiology and Immunology | Malaria gene expression and antigenic variation | http://vivo.med.cornell.edu/display/cwid-kwd2001 |
| **Sabine Ehrt, PhD**<br>Weill Cornell<br>Dept. of Microbiology and Immunology | Molecular mechanisms of M. tuberculosis virulence | http://vivo.med.cornell.edu/display/cwid-sae2004 |
| **Michael Glickman, MD**<br>Memorial Sloan-Kettering Cancer Center | Immunology of M. tuberculosis infection | https://www.mskcc.org/cancer-care/doctors/michael-glickman |
| **Carl F. Nathan, MD**<br>Weill Cornell<br>Dept. of Microbiology and Immunology | Host-pathogen relations and drug discovery for M. tuberculosis | http://vivo.med.cornell.edu/display/cwid-cnathan |
| **Michel Nussenzweig, MD, PhD**<br>Rockefeller University | Molecular aspects of adaptive and innate immune responses | https://www.rockefeller.edu/our-scientists/heads-of-laboratories/875-michel-c-nussenzweig/ |
| **Eric Pamer, MD**<br>Memorial Sloan-Kettering Cancer Center | Listeria; Microbiome | https://www.mskcc.org/research/ski/profile/eric-pamer-01 |
| **Charles Rice, PhD**<br>Rockefeller University | Hepatitis C virus | https://www.rockefeller.edu/our-scientists/heads-of-laboratories/893-charles-m-rice/ |
| **Jeremy Rock, PhD**<br>Rockefeller University | Biology of *Mycobacterium tuberculosis* infection | https://www.rockefeller.edu/our-scientists/heads-of-laboratories/5416-jeremy-m-rock/ |

**DIVISIONAL RESEARCH PROGRAMS**

**COVID-19/SARS-COV-2**

Since the beginning of the COVID-19 pandemic, the Division of Infectious Diseases (ID) has conducted cutting-edge research on SARS-CoV-2/COVID-19 pathogenesis, epidemiology/clinical course/outcomes, vaccine effectiveness in general and special populations, therapeutics, and prevention, including vaccine development.
Highlights and ongoing divisional work include:

Observational Studies: *Butt, Calfee, Craney, Drelick, Ellman, Ellsworth*, *Glesby, Gulick, Henry, Johnston, Kodiyanplakkal, Marks, Mazur, Miller, Plate, Satlin, Salvatore, Singh, Small, Soave, Vogler, Walsh, Westblade, Wilkin*

The Division of General Internal Medicine created a COVID-19 registry with detailed clinical data suitable for epidemiological investigation. Examples of collaborations using this database include:

- Drs. Gulick and Satlin co-authored one of the first observational studies of the clinical characteristics of **COVID-19 in New York City**, noted the prominence of gastrointestinal symptoms, and linked **obesity** to adverse outcomes (published in New England Journal of Medicine).
- ID fellows Drs. Pham and Torres with Drs. Gulick and Satlin examined outcomes in 19 patients with rheumatologic diseases on chronic **hydroxychloroquine** who developed COVID-19 (manuscript submitted).
- Former ID fellows Drs. Magleby and Trzebucki worked with Drs. Satlin, Simon and Westblade to discover an important association between admission **SARS-CoV-2 viral load level** and the risk of intubation and mortality (published in Clinical Infectious Diseases).
- Dr. Satlin collaborated with Dr. Gulick and several ID fellows (Drs. Kondo, Magleby, Maldarelli, and Pham) to describe the safety, tolerability and clinical outcomes of **hydroxychloroquine** for hospitalized patients with COVID-19 (published in PLoS One).
- Dr Salvatore and Dr Satlin collaborated with colleagues in General Internal Medicine and OB-GYN to describe sex differences in symptoms presentation and outcome (published in Open Forum Infectious Diseases)
- Dr Salvatore collaborated to a paper describing the effects of social and clinical determinants on COVID outcomes (pre-print published).

Drs. Calfee, Singh and Westblade contributed to New York City Department of Health **sentinel surveillance** efforts for COVID-19 cases and genetic analyses of viral isolates (published in MMWR).

Drs. Ellsworth and Gulick collaborated with the Department of Pathology on an assessment of **red blood cell transfusion** needs in patients with COVID-19 (manuscript submitted).

Dr. Gulick co-authored a review article on **severe COVID-19** with colleagues in the Division of Pulmonary & Critical Care (published in New England Journal of Medicine).

Dr. Miller and Henry described the clinical experience with COVID-19 at the Hospital for Special Surgery, a specialty orthopedic hospital that was converted to a **pandemic overflow field hospital** (published in HSS J).
Drs. Nixon and Ndhlovu coauthored a letter on vaccine breakthrough Infections with SARS-CoV-2 Variants (published in the New England Journal of Medicine)

Dr. Butt and colleagues have published over 55 papers on COVID-19, including 9 publications in the New England Journal of Medicine detailing vaccine effectiveness in Qatar and in the US among the US Veterans. Additional studies have compared severity of infection caused by specific variants, impact of the pandemic of healthcare utilization in Qatar, risk and outcomes of breakthrough infections, and epidemiology of COVID-19 in specific subgroups of the population. (Publications in the New England Journal of Medicine, Nature Medicine, Annals of Internal Medicine, Journal of Clinical Investigation, Clinical Infectious Diseases, and others)

**Special Populations:**

- **Hepatitis C**
  Dr. Butt assessed rates and characteristics of SARS-CoV-2 infection in persons with Hepatitis C Virus infection (manuscript in press at Liver International).
- **HIV**
  Internal Medicine resident Dr. Stoeckle and former ID fellow (now faculty member) Dr. Johnston collaborated with Drs. Ellman, Glesby, Gulick, and Vogler on a controlled study evaluating clinical presentations and outcomes of inpatients with COVID-19 and HIV co-infection (published in Open Forum Infectious Diseases).
- **Pregnancy**
  ID fellow Dr. Maldarelli and Drs. Marks and Salvatore collaborated with colleagues from the Department of Obstetrics and Gynecology to report remdesivir treatment for severe COVID-19 in third-trimester pregnancy (published in Open Forum Infections Diseases).

Drs. Marks and Mazur contributed to a study of pregnant woman with COVID-19 receiving the investigational antiviral remdesivir on a national compassionate use program (manuscript accepted in Clinical Infectious Diseases).

Dr. Singh and colleagues from the Department of OB/GYN compared pregnancy outcomes in women with and without COVID-19 (published in BJOG).

Dr. Butt and colleagues published a key clinical paper demonstrating vaccine effectiveness of mRNA vaccines in pregnant women (published in Journal of Clinical Investigation)

- **Transplant/Oncology**
  Drs. Kodiyanplakkal, Satlin, Small, and Walsh co-authored a report on COVID-19 in **solid organ transplant** recipients (published in the American Journal of Transplantation).

  Dr. Plate together with Drs. Drelick, Kodiyanplakkal, Satlin, Small, Soave, and Walsh co-authored a study on COVID-19 pneumonia in patients with **hematologic malignancies** (abstract to be presented at ID Week 2020; manuscript in preparation).

  Dr. Satlin, together with Drs. Plate, Small, Walsh and Westblade identified that admission **SARS-CoV-2 viral load** predicts mortality in hospitalized patients with and without cancer and that patients with hematologic malignancies have higher viral loads than patients without cancer (published in Cancer Cell).

  Dr. Small collaborated with colleagues on describing COVID-19 in **transplant recipients with HIV** under the HOPE Act (manuscript submitted).

  Drs. Small and Satlin collaborated with colleagues in hematology and pathology to characterize serologic responses to mRNA COVID-19 vaccines in patients with lymphoid malignancies (accepted for publication in American Journal of Hematology).

**Ongoing/Future Work**

- Drs. Fitzgerald and Peck were awarded an NIH supplement grant to study COVID-19 in Haiti and Tanzania.
- Dr. Peck was awarded a WCM COVID-19 research grant to study "Chronic Kidney Complications of COVID–19 in a Cohort of HIV-infected on HIV-uninfected African Adults" in Tanzania.
- Dr. Miller was awarded a Hospital of Special Surgery research grant to study surgical outcomes in the COVID-19 pandemic era.
- Drs. Satlin, Small, Singh Walsh and Westblade, ICU colleagues, and medical students are studying the patterns of bacterial pneumonia complicating COVID-19.
- Drs. Johnston, Marks, Ellsworth and Vogler are working with colleagues in Pediatrics, Pathology and OB-Gyn to conducts an observational study of SARS-CoV2 vaccination in pregnant women and their neonates.

**Basic and Translational Research Studies** *Brown, Copertino, Corley, Craney, de Mulder Rougvie, Duarte, Ellsworth, Gulick, Iñiguez, Jones, Kapadia, Marin-Hernandez, Morales, Ndhlovu, Nixon, Petraitis, Powell, Saito, Salvatore, Satlin, Singh, Soave, Vorkas, Westblade, Walsh, Wilkin*

Drs. Corley and Ndhlovu collaborated with colleagues from OHSU describe virological and immunological consequences of disruption of the CCR5 pathway in critical COVID-19 (published in International Journal of Infectious Diseases).

Drs. Corley, Evering and Ndhlovu, report on the role of caspases, pyroptosis, the inflammasome and the therapeutic potential of caspase inhibitors in SARS CoV2 infection and long COVID. (published in Allergy)

Mr. Copertino and Drs. de Mulder Rougvie, Duarte, Gulick, Nixon and Wilkin reported on antiretroviral drug activity and potential for pre-exposure prophylaxis against COVID-19 and HIV infection (pre-print published).

Drs. Craney, Salvatore, ad Westblade collaborated with colleagues from the Department of Physiology on the characterization of COVID-19 isolates in NYC and the development of a novel diagnostic method ( published in Cell).

Drs. Craney, Satlin, and Westblade in collaboration with additional colleagues from the Department of Pathology compared two high-throughput reverse transcription-PCR systems for SARS-CoV-2 (published in the Journal of Clinical Microbiology).

Drs. Duarte, Iñiguez, Nixon, and Powell, Mr. Copertino and WCM medical student Jez Marston reported a data-driven approach to repurposing FDA-approved drugs for COVID-19 (pre-print published).

Drs. Ellsworth and Wilkin worked with colleagues in Department of Pathology and the blood bank to determine clinical factors in COVID-19 that were predictive of serologic responses in a convalescent plasma donor screening program (manuscript in preparation).

Dr. Jones co-authored a study that reported suboptimal biological sampling as a probable cause of false-negative COVID-19 diagnostic test results (published in the Journal of Infectious Diseases).

Dr. Jones co-authored a study that reported SARS-CoV-2-specific T-cells can be rapidly expanded for therapeutic use and target conserved regions of the membrane protein, (manuscript under revision in Blood).

Dr. Jones made his BSL-2+ space available as the primary site of processing of blood samples from SARS-CoV2-infected donors, for the WCMC Biobank effort (with Dr. Ross). He also supplied protocols to several other laboratories to establish their BSL-2+ procedures.

Drs. Marín-Hernández and Nixon and colleagues from the Division of Gastroenterology published epidemiological evidence for an association between higher influenza vaccine uptake in the elderly and lower COVID-19 deaths in Italy (published in the Journal of Medical Virology).

Dr. Ndhlovu collaborated with colleagues from the Division of Cardiology on the additive prognostic utility of adverse right ventricular remodeling in relation to conventional risk stratification among patients with COVID-19 (published in Journal of the American College of Cardiology).

Drs. Ndhlovu and Corley worked with colleagues from Mount Sinai and report on the overlap of intestinal inflammation and the pathogenesis of COVID-19 related disease on the SAR-CoV-2 receptors (published in Gastroenterology).

Dr. Nixon with medical students Jez Marston and Robert Wozniak reported on involvement of cisgender and transgender individuals in studies on the impact of hormonal therapy on COVID-19 (published in AIDS Patient Care and STDs).
Drs. Petraitis and Walsh used focal multivector ultraviolet technology (FMUV) for environmental control of SARS-CoV-2 (technical report published).

Dr. Salvatore with colleagues Drs. Brown, Ellsworth, Kapadia, Morales, Saito, Singh, Soave, and Vorkas, working with a broad multi-disciplinary group recruited subjects to develop a biobank of specimens from hospitalized patients with acute COVID-19 as well as from outpatients who recovered (convalescent) to determine virologic and immunologic determinants of disease recovery or progression (published in Life Science Alliance).

Drs. Satlin and Westblade collaborated on a retrospective cohort study of blood culture utilization in COVID-19 and found bacteremia was very rare (published in the Journal of Clinical Microbiology).

Dr. Westblade has also collaborated on a number of SARS-CoV-2 diagnostic related studies published in the Journal of Clinical Microbiology, Biosensors and Bioelectronics and Clinica Chimica Acta

Dr. Walsh in collaboration with Dr. Matt McCarthy received a grant from the Henry Schueler Foundation for translational research for new therapeutics with binary antiviral and anti-inflammatory properties in treatment of COVID-19.

**Ongoing/Future Work**

- Dr. Ellsworth is working with colleagues in the Department of Pathology and Laboratory Medicine to define the specificity of SARS-CoV-2 serology by examining the test those that have recovered from other common coronavirus infections.
- Dr. Evering is the site principal investigator for an NIH ACTG study to investigate SARS-CoV-2 Immune Responses after COVID-19 Therapy and Subsequent Vaccine.
- Dr. Jones was awarded an internal WCM grant as co-I (PI – Julie Blander from Gastroenterology) which aims to study antigen presentation mechanisms of SARS-CoV2.
- Dr. Jones generated a panel of SARS-CoV2-specific CD4+ T-cell clones from a convalescent donor, and has made these available to WCMC investigators, including collaborations with Drs. Robert Schwartz and Melody Zheng.
- Dr. Jones is serving as section editor for a special issue of Current Opinion in HIV & AIDS on intersections between the responses to HIV and COVID.
- Dr. Jones is serving as section editor for an issue of Frontiers in Microbiology on Immune Evasion Mechanisms by RNA Viruses, which will also emphasize intersections between HIV and COVID.
- Dr. Lee with Drs. Gramatica, Jones, and Wilkin are pursuing a Merck COVID-19 research grant, entitled "The LOVE Study: hyperacute and longitudinal dynamics of SARS-CoV-2 viral load and host immune responses in high-risk health care workers."
- Dr. Salvatore is the site principal investigator of the Predictors of Severe Covid-19 Outcome (PRESCO) Study, a longitudinal multi-center, prospective, observational study collecting diverse biological measurements and clinical and epidemiological data to identify early signatures that predict progression to ARDS, mortality, and/or other comorbid conditions.
- Dr. Salvatore and others are conducing additional immune and biomarker development studies.
- Dr. Walsh and colleagues are submitting a grant proposal through the National Institute for Allergy and Infectious Diseases for the study of bacteriophages in treatment of bacterial pneumonia complicating experimental COVID-19.

**Clinical Research Studies** *Butt, Drelick, Ellsworth, Glesby, Gulick, Horowitz, Kapadia, Marks, Singh, Small, Walsh, Wilkin*

**Antivirals**

Drs. Horowitz, Kapadia, Marks, Miller and Singh conducted the expanded access/compassionate use study of remdesivir.

Dr. Marks conducted a Phase 3 randomized study of remdesivir in severe COVID-19 (published in the New England Journal of Medicine).

Dr. Marks also conducted a phase 3 randomized study to evaluate safety and antiviral activity of remdesivir in moderate COVID-19 (published in JAMA).

Drs. Small and Walsh co-led a phase 2 study of selinexor for severe COVID-19 (manuscript in preparation):

- Abstract accepted for Late Breaker session in the International Society for Influenza and Respiratory Virus Diseases (ISIRV). Oct 6-8th, 2020.
- Abstract submitted to IDWeek Late Breaker Session. Oct 22-25th 2020.

Immunomodulators

Dr. Glesby conducted an adaptive Phase 2/3 study of the safety and efficacy of sarilumab, an IL6 antagonist, for severe COVID-19 (manuscript in preparation).

**Antivirals**
Drs. Small and Walsh, in collaboration with colleagues from the Division of Hematology/Oncology are preparing a manuscripton the mechanisms, in vitro, and in vivo properties of **selinexor** against SARS CoV-2 and experimental COVID-19.
Dr. Walsh and his Laboratory will study the cytokine, chemokines, and proteomic profiles of patients in the Phase 2 randomized study to evaluate the activity and safety of selinexor for severe COVID-19. Dr. Wilkin conducted a study of hydroxychloroquine for the prevention of COVID-19 in healthcare workers.

**Cellular Therapies**
Dr. Walsh is serving as Associate Investigator on a protocol for cellular therapy using iNKT cells in patients with severe COVID-19 led by oncology colleague, von Biesen.

**Environmental Control**
Drs. Petraitis and Walsh in collaboration with colleagues at Hackensack Meridian Health, University Medical Center, Center for Discovery and Innovation and Purple Sun are conducting a study of focal multivector ultraviolet (FMUV) technology against COVID-19 coronavirus in *vitro* in the hospital environment.

**Monoclonal Antibodies and other therapies**
Dr. Evering is the site principal investigator for an NIH sponsored Phase II/III adaptive platform trial of interventions for outpatients with COVID-19 that is investigating several putative therapies for COVID-19 including monoclonal antibodies, a polyclonal antibody, an oral and an inhaled agent.

**Passive Antibodies**
Drs. Glesby and Singh are enrolling a phase 3 Canadian-sponsored randomized study of **convalescent plasma** for hospitalized patients with COVID-19.

**Vaccine**
Dr. Marks is the site principal investigator enrolling the NIH sponsored phase 3 randomized controlled trial of mRNA-1273 SARS-CoV-2 vaccine.

**Committee and Guidelines Panels:**

Dr. Butt is a member of the Scientific Review and Reference Team and the Policy, Planning and Performance Team of the Ministry of Public Health in Qatar**.**

Dr. Gulick co-chairs the U.S. NIH COVID 19 Treatment Guidelines Panel.

Dr. Butt is a member of the Hamad Medical Center, Qatar Ad Hoc COVID-19 Research Prioritization Committee**.**

Dr. Pape coordinated COVID-19 efforts in Haiti.

Dr. Westblade is a member of a Steering Committee for the American Association for Cancer Research for the AACR Report on the Impact of the COVID-19 Pandemic on Cancer Science and Medicine

Weill Cornell COVID-19 Clinical Research Task Force**: Dr**. Gulick, chair; Drs. Glesby, Marks, Walsh, members.

**HEPATITIS:**

**Clinical Studies of Viral Hepatitis:** *Butt, Kapadia, Marks, Schackman*

Hepatitis C infection is the leading cause of end stage liver disease and need for liver transplantation in this country. Current studies focus on treatment of HCV infection in special populations including people living with HIV, people who inject drugs (PWID), and veterans. This includes an R01-funded study of a randomized trial investigating a community-based strategy of HCV treatment in PWID as well as an ongoing cohort study, ERCHIVES (Electronically Retrieved Cohort of HCV Infected Veterans). CCTU investigators also conduct ACTG studies of direct-acting antivirals for acute and chronic HCV infection. The Center for the Study of Hepatitis C, a multidisciplinary center involving Rockefeller University, Weill Cornell Medical College, and NewYork-Presbyterian Hospital, provides additional opportunities for translational research, access to a serum and tissue bank, and collaboration with experts in the field of virology and hepatitis treatment (e.g. 2000 Nobel laureate Dr. Charlie Rice). Additionally, Bruce Schackman, Ph.D., directs the Center for Health Economics of Treatment Interventions for Substance Use Disorder, HCV, and HIV (CHERISH), a multi-institutional center of excellence funded by the National Institute on Drug Abuse. In addition to research and mentorship opportunities, CHERISH supports methodological consultation for researchers with an interest in hepatitis and substance use, a pilot grant program for early investigators, and health economics training opportunities.

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**Kapadia SN**, Johnson P, **Marks KM, Schackman BR**, Bao Y. Hepatitis C treatment by nonspecialist providers in the direct-acting antiviral era. Med Care. 2021 Sep 1;59(9):795-800.

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Gutkind S, **Schackman BR**, Morgan JR, Leff JA, Agyemang L, Murphy SM, Akiyama MJ, Norton BL, Litwin AH, Linas BP. Cost-effectiveness of Hepatitis C Virus treatment models for people who inject drugs in opioid agonist treatment programs**.** Clin Infect Dis. 2020 Mar 17;70(7):1397-1405

**Butt AA**, Yan P, Shaikh OS, Lo Re V 3rd, Abou-Samra AB, Sherman KE. Treatment of HCV reduces viral hepatitis-associated liver-related mortality in patients: An ERCHIVES study. *J Hepatol*. 2020;73(2):277-284.
**Butt AA**, Yan P, Aslam S, Sherman KE, Siraj D, Safdar N, Hameed B. Hepatitis C virologic response in hepatitis B and C coinfected persons treated with directly acting antiviral agents: Results from ERCHIVES. Int J Infect Dis. 2020 Mar;92:184-188.

**HIV/AIDS:**

**Observational Studies.** *Evering, Glesby, Gulick, Jacobs, Johnston, Kapadia, Marks, Merrick, Siegler, Singh, Vaamonde, Vogler, Wilkin*

The Center for Special Studies (HIV clinic) at NewYork-Presbyterian/Weill Cornell Medical Center uses an electronic medical records system that is an invaluable resource for clinical research. Over 10,000 records of patients with HIV dating back to 1991 are available. Completed projects include case-control studies of osteonecrosis, diabetes mellitus, and polycythemia in people with HIV; a retrospective review of the safety and efficacy of antiretroviral regimens containing three protease inhibitors; temporal trends in hospital admission diagnoses; hepatic steatosis; clinical use of the HIV tropism assay; and an archived genotypic resistance test. Ongoing studies are focusing on aging-related issues in people living with HIV (in collaboration with Dr. Eugenia Siegler, Division of Geriatrics and Palliative Medicine (https://glesby-siegler-lab.weill.cornell.edu/ ). Other projects utilize data from the Multicenter AIDS Cohort Study-Women's Interagency HIV Study Combined Cohort Study (a cohort study of men and women with or at risk for HIV infection). Fellows have the opportunity to design, conduct, and analyze studies using the databases.

**Johnston CD**, Hoover DR, Shi Q, Sharma A, Hanna DB, Anastos K, Tien PC, Fischl M, Gustafson D, Spence A, Karim R, French A Schneider M, Adimora A, Moran C, Konkle-Parker D, **Glesby MJ**. White blood cell counts, lymphocyte subsets, and incident diabetes mellitus in women living with and without HIV. AIDS Res Hum Retro 2020; 36:131-133. PMID: 31709815

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**Clinical Trials of HIV/AIDS.** *Caskey, Ellsworth, Caskey, Ellsworth, Evering, Glesby, Gulick, Johnston, Kapadia, Marks, Schackman, Vogler, Wilkin*

The Cornell HIV/AIDS Clinical Trials Unit (CCTU) designs and conducts clinical trials in people with and at risk for HIV. The CCTU participates actively in studies sponsored by four NIH-funded networks: the AIDS Clinical Trials Group (ACTG), the HIV Prevention Network (HPTN), the International Network for Strategic Initiatives in Global HIV Trials (INSIGHT), and the NCI-funded AIDS Malignancy Consortium (AMC). Other studies are sponsored by the pharmaceutical industry. Current clinical investigation centers on three broad areas:

1. antiretroviral agents and strategies for treatment and prevention.
2. treatment and prevention of HIV-related complications, including co-infections, anal dysplasia/cancer, and complications of antiretroviral therapy; and early studies of HIV cure.

Additional areas of investigation are pharmacokinetics of HIV drugs and health issues in women with HIV. Current specific projects include novel interventions to reduce the size of the HIV reservoir (A5386);; long-acting injectable antiretrovirals or novel monoclonal antibodies (ACTG A5357, A5359, A5377); observational study of HIV reservoirs (ACTG 5321); novel pre-exposure prophylaxis (PrEP) regimens (HPTN 083); treatment of HPV-associated anal dysplasia (AMC 088, AMC 103, ANCHOR); novel HBV immunization strategies (ACTG A5379); observational study of aging in HIV (ACTG A5322); primary prevention of cardiovascular disease (REPRIEVE study).

There are opportunities for fellows to participate in all aspects of HIV/AIDS clinical trials. Fellows may spend their fellowship research years conducting HIV/AIDS clinical research as part of the clinical trials unit under the mentorship of one of the HIV clinical trials investigators and participate in the K30 program (Master's Degree Program in Clinical and Translational Investigation).

**Ellsworth GB**, Burke LA, Wells MT, Mishra S, Caffrey M, Liddle D, Madhava M, O'Neal C, Anderson PL, Bushman L, Ellison L, Stein J, **Gulick RM**. Randomized Pilot Study of an Advanced Smart-Pill Bottle as an Adherence Intervention in Patients with HIV on Antiretroviral Treatment. J Acquir Immune Defic Syndr. 2021 Jan 1;86(1):73-80. PMID: 33306564

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**HIV and Other Retroviruses:**

**Jones Laboratory:**

Modern therapies can dramatically improve the health of people living with HIV who have access to care but cannot cure infection. The Jones Lab is committed to harnessing cellular immune responses—T-cells and natural killer cells—to improve upon this status quo, by developing therapies that are able to either cure infection or to further restore health by reducing viral reservoirs. We approach this challenge by seeking to understand the factors that prevent these immune responses from naturally eradicating infection and devising potential solutions to these obstacles that can be tested in our preclinical models. With the help of our collaborators, the solutions that we are exploring span a broad and multidisciplinary spectrum ranging from: the enhancement of immune cell function through genetic or materials science engineering, the identification and characterization of latency reversal and immunotherapeutic drugs or biologics that are able to synergize with T-cells or NK cells, and the development of strategies to target T-cells against non-escaped viral epitopes.

**Overview of Research Foci:**

**Resistance to CTL Killing**

A key paradigm in HIV cure research is that the long-lived cells that harbor the HIV reservoir (and drive viral rebound if medication is stopped) are hidden from the immune system due to viral latency. Therapeutic strategies aimed at curing infection have thus focused on reversing latency, in order to expose these cells to the immune system, along with boosting immune cells (CTL and/or NK cells) to kill these exposed targets. This approach - termed "kick and kill" or "shock and kill" – is effective in model systems, but clinical trial results have thus far been disappointing. Results from our lab led us to posit that hiding from the immune system may not be the only way that reservoir-harboring cells can persist. Rather, we propose that some rare cells may have the intrinsic ability to resist being killed by CTL or NK cells - even when they are seen - and that these would selectively survive to form the persistent reservoir. Although largely unstudied in the context of HIV-infected CD4+ T-cells, mechanisms of CTL resistance are known in other settings. Particularly in oncology, novel immunotherapy strategies have uncovered tumor cell resistance to CTL as a key factor limiting efficacy. Our studies thus far have identified over-expression of the pro-survival factor BCL-2 as one mechanism by which reservoir cells can resist killing, and that this can be counter-acted using BCL-2 antagonist drugs. We hypothesize, however, that BCL-2 expression is likely to be only one of many factors that determine an infected cell's intrinsic vulnerability to killing. Thus, a key focus of our research involves combining advanced CTL killing assays with cutting edge techniques, including transcriptomics, CRISPR screens, CITE-seq, CyTOF, and T-cell receptor/clonality profiling to both move us towards a comprehensive understanding of CTL resistance/susceptibility in HIV-infected CD4+ T-cells, and to identify potential therapeutic targets for testing against *ex vivo* reservoirs, in pre-clinical models, and potentially in clinical trials.

**Humanized Mice**

An important component of the translational nature of our research program is the ability to bridge results from our *in vitro* experiments with clinical studies. To this end, we work extensively with a novel type of humanized mouse model which we have developed to be uniquely well suited to testing T- and NK-cell based immunotherapies. In recent work, we have demonstrated the utility of this model for testing the *in vivo* antiviral activity of clinically relevant T-cell therapy products, as well as of innovative drug-delivery approaches designed to enhance these therapies. An exciting aspect of this model is that it robustly recapitulates CTL escape mutation profiles known to occur in humans, allowing us to also explore approaches for overcoming this critical limitation of CTL activity. In addition to serving as a preclinical model for evaluating therapies, we are exploring the potential of this model to address fundamental questions, such as the roles of CTL in shaping the landscape of proviral reservoirs.

**Clinical Studies**

One of the more rewarding aspects of our research program is the ability to take the most promising therapeutic strategies that emerge from our pre-clinical experimental platforms through to testing in phase I clinical trials. Our status as a member of the Infectious Diseases Clinical Division at Weill Cornell Medicine positions us to initiate such interventions, along with our clinical collaborators. Currently, we are contributing to four such trials – all in the setting of HIV cure research. We are eagerly working towards completing these ongoing trials and interpreting the results – with our ultimate hope being a signal that one or more of these interventions puts us on a path towards HIV remission. We are working with other academic and industry partners to evaluate potential therapeutic candidates in our in vitro and pre-clinical systems – towards the next generation of these critical studies.

**T-Cell Effector Mechanisms**

Canonically, HIV-specific CD8+ T-cells are thought to achieve partial suppression of viremia by directly recognizing and killing infected cells; with recognition occurring via TCR engagement of peptide-MHC-I and killing driven by the release of the cytotoxic molecules perforin and granzyme or by the engagement of 'death receptors' such as Fas. However, this is not the full story. Human and animal studies support the existence of populations of CD8+ T-cells that recognize infected cells independently of MHC-I, using innate immune receptors. Furthermore, many studies over the years have pointed to the existence of CD8-mediated mechanisms of HIV suppression that are independent of cytolysis (killing). Ongoing work in our lab aims to both test methods of enhancing the potency of canonical infected-cell killing, as well as to delineate the mechanisms of non-canonical CD8+ T-cell activity described above. These aims are generally pursued separately, but each leverage a similar set of unique assets and resources of our lab, including clinical samples and our PDX mouse models for assessing *in vivo* antiviral activity of CD8+ T-cells. Regarding canonical CD8+ T-cell killing, a key goal is determining whether this can be sufficiently enhanced to enable consistent elimination of HIV reservoir-harboring cells from *ex vivo* CD4+ T-cells of individuals on long-term ARV therapy in HIVE assays– which may also require methods to suppress mechanisms of resistance to killing in target cells. One highlight of current efforts on the innate/non-cytolytic front is assessing whether our clinical trial of IL-15 will show expansion/enhancement of these populations, and whether this will have an impact on viral rebound.

**Ndhlovu Laboratory of HIV Pathogenesis**

**HIV Translational Research Program:**

Our mission is to understand the complex pathogenic processes and pathways by which HIV infection leads to immune damage and age-related complications particularly among those receiving virally suppressive antiretroviral therapy across a spectrum of ages. Using multiple immunological, virological, and molecular epigenetic and genetic modalities combined with machine learning analyses we aim to exploit this knowledge in developing novel approaches and effective therapeutics to improving quality of life outcomes while in parallel pioneering discoveries for achieving a cure for HIV. We are actively engaged in pre-clinical and clinical studies nationally and internationally to achieve these goals.

**Research Foci**:

**HIV Neuroinflammation, substance use and CNS Reservoirs:**

*(Ndhlovu):* Since immunological functions are shaped by the host glycome, it is not surprising that inflammation is associated with aberrant glycosylation. Neuro-inflammation during HIV infection involves complex interactions. Dr Ndhlovu co-leads a study investigating glycomic alterations and neuroinflammatory mechanisms of brain health in HIV in a collaboration with investigators at the Wistar Institute and Mount Sinai. (NIH/NINDS R01 funded study)

*(Ndhlovu):* We are evaluating several strategies in persons with early HIV infection or after long-term antiretroviral therapy to better understand HIV related cognitive deficits. One such approach investigates an immunomodulatory glycoprotein and its ability to reactivate and disable the virus particularly in the central nervous system, an important hiding place for HIV (NIH/NIMH R01 funded studies) [US, Thailand]

*(Ndhlovu/Tilgner/Milner):* Advancements of single cell technologies in immunology has permitted the unprecedented opportunity to map individual features at single cell resolution to inform and identify causal inferences of diseases and elucidate underlying biological mechanisms to facilitate effective therapeutic interventions The brain represents a challenging compartment and we have developed novel integrated methods to map single-cell and cell-type specific transcriptome and epigenome signatures to further our understanding of the molecular mechanisms in HIV and opioid use disorders in distinct brain regions. NIH/NIDA U01 funded study)

**Geriatric Neuro HIV:**

*(Ndhlovu, Corley, Evering*): Because up to one-half of people living with HIV experience cognitive impairment from HIV or related factors, the likelihood for masking and thus delaying the diagnosis of early and Alzhemier's disease is substantial. Our lab has uncovered epigenetic imprints of HIV associated cognitive impairment and are currently using combinatorial omics tools at single cell resolution to define signatures of HIV associated neurocognitive disorders and Alzhemier's in the hope this would facilitate clinically relevant diagnostic sorting (NIH/NIA R01 funded study)

*(Ndhlovu, Nixon)* New developments in stem cell technologies have permitted the differentiation of "cerebral organoids" from induced pluripotent stem cells. Research using cerebral organoids can facilitate advances in host–microbe research and thus provide an unprecedented new opportunity to study underlying mechanisms of HIV-1 mediated brain dysfunction. In a new study our research team is providing novel insights into the pathogenesis of HIV-1 mediated brain dysfunction, the effects of cocaine and HIV-1 latency in the brain and the compounding effects of age. (NIH/NIDA R01 funded study)

**HIV/Co-infection:**

*HIV/Mtb:* Children living with HIV even if they are on antiretroviral therapy are much more susceptible to *Mycobacterium tuberculosis* (Mtb) for reasons that are not well understood. We know little about the specific immune defects caused by HIV that are responsible for the increased susceptibility to Mtb, especially in children. Our group is using nonhuman primates to model HIV/*Mtb* coinfection of preadolescent children and determine how HIV affects a subset of innate immune cells, and test whether the ability of immunocompromised animals to fight TB is improved if we boost those cells. Building on an established collaboration in Myanmar in southeast Asia, our lab is intently focused on examining these innate invariant T lymphocytes in children who are (co)infected with HIV and *Mtb*. (NIH/NIAID R01 funded study)

**Nixon Laboratory**

The Nixon lab, which includes Assistant Professor Robert Furler-O'Brien and Assistant Research Professor Matthew Bendall, is interested in understanding the interaction between retroviruses and their host, including mechanisms that human host cells employ to control HIV-1 replication, and to use this knowledge towards HIV-1 cure studies, largely funded by grants from the NIH, under the program called Martin Delaney Collaboratory's for the Cure of HIV. Our collaboratory is called "Believe", and we participate in the new MDC grants, "Reach" led by Brad Jones and Marina Caskey, and 'Hope", led by Melanie Ott, Susana Valente and Lish Ndhlovu. Ongoing studies investigate the HIV-1 microenvironment in lymph nodes and how the HIV-1 reservoir is established and can be removed. Other projects how HIV-1 induced transcription of human endogenous retroviruses (HERVs) might affect HIV-1 latency, including in the brain, immunometabolism and HIV latency, and how host genetics might affect HIV-1 acquisition. Finally, we are interested in how the human immune, human endogenous retroviruses, microbiota and nervous systems interact in viral infections, cancer, psychiatric diseases, and in Alzheimer's Disease. Fellows have the opportunity to design, conduct, and analyze basic research science studies, and to develop collaborative projects in basic science with collaborators in Mexico and Brazil.

Specific human endogenous retroviruses predict metastatic potential in uveal melanoma. Bendall ML, Francis JH, Shoushtari AN, Nixon DF. JCI Insight. 2022 May 9;7(9):e147172. doi: 10.1172/jci.insight.147172.

Heterologous vaccination interventions to reduce pandemic morbidity and mortality: Modeling the US winter 2020 COVID-19 wave. Hupert N, Marín-Hernández D, Gao B, Águas R, Nixon DF. Proc Natl Acad Sci U S A. 2022 Jan 18;119(3):e2025448119. doi: 10.1073/pnas.2025448119.

SARS-CoV-2 infection mediates differential expression of human endogenous retroviruses and long interspersed nuclear elements. Marston JL, Greenig M, Singh M, Bendall ML, Duarte RRR, Feschotte C, Iñiguez LP, Nixon DF. JCI Insight. 2021 Dec 22;6(24):e147170. doi: 10.1172/jci.insight.147170.

Genetic risk for severe COVID-19 correlates with lower inflammatory marker levels in a SARS-CoV-2-negative cohort. Powell TR, Hotopf M, Hatch SL, Breen G, Duarte RRR, Nixon DF. Clin Transl Immunology. 2021 Jun 6;10(6):e1292. doi: 10.1002/cti2.1292. eCollection 2021.PMID: 34141432

**HOSPITAL EPIDEMIOLOGY, INFECTION CONTROL AND ANTIMICROBIAL STEWARDSHIP:**

**Healthcare-Associated Infections:** *Calfee, Simon, Singh, Torres.* The Infection Prevention & Control Department at NewYork-Presbyterian Hospital/Weill Cornell Medical Center has research activities ranging from traditional epidemiologic studies of infection risk factors and outcomes to intervention trials of infection control protocols and procedures. The primary goal of the research program is to improve patient safety by reducing the risk of healthcare-associated infections and antimicrobial resistance. Observational studies can be carried out utilizing infection control surveillance data, clinical microbiology data, and a robust hospital-based clinical database, which can be queried electronically. Previous and ongoing projects have studied patient-oriented and systems-based factors associated with transmission of multidrug-resistant organisms, device-related infections, procedure-related infections, and antimicrobial stewardship. In addition, the program has the potential for performing individual and cluster randomized trials of infection control interventions at Weill Cornell and in collaboration with Columbia University Medical Center and other NewYork-Presbyterian Hospitals. Fellows, residents, and students interested in epidemiologic research can choose from a wide variety of large or small projects depending on their needs.

For fellows interested in a career in hospital epidemiology and/or antimicrobial stewardship, there is opportunity to receive intensive training in this exciting field by participating in the Master of Science in Clinical and Translational Investigation Program, or the Graduate Program in Clinical Epidemiology and Health Services and through direct participation in the Hospital Epidemiology Program in years 2 and 3 of fellowship.

Examples of recent fellow research and other scholarly projects include:

**Trzebucki AM**, **Westblade LF**, **Loo A, Mazur S**, Jenkins SG, **Calfee DP**, Satlin MJ, **Simon MS**. Real-world implementation of a rapid carbapenemase detection test in an area endemic for carbapenem-resistant Enterobacterales. Infect Control Hosp Epidemiol 2022;43:92-95. https://pubmed.ncbi.nlm.nih.gov/33583476/

**Wang TZ**, **Simon MS**, Westblade LF, Saiman L, Furuya EY, **Calfee DP**. Quantitative characterization of high-touch surfaces in emergency departments and hemodialysis facilities. Infect Control Hosp Epidemiol 2021;42:474-476. https://pubmed.ncbi.nlm.nih.gov/33021193/

**Kondo M**, **Simon MS**, Westblade LF, Jenkins SG, Babady NE, Loo AS, **Calfee DP**. Implementation of infectious diseases rapid molecular diagnostic tests and antimicrobial stewardship program involvement in acute care hospitals. Infect Control Hosp Epidemiol 2021;42:609-611 https://pubmed.ncbi.nlm.nih.gov/33059776/

**Wang TZ**, White KN, Scarr JV, **Simon MS**, **Calfee DP**. Preparing your healthcare facility for the new fungus among us: An infection preventionist's guide to *Candida auris*. Am J Infect Control. 2020 Jul;48(7):825-827. https://pubmed.ncbi.nlm.nih.gov/32591096/

**Antimicrobial Stewardship**

NewYork-Presbyterian Hospital has a long-standing antimicrobial stewardship program (ASP). The ASP is a joint effort between the Divisions of Infectious Diseases, the Departments of Pharmacy and the Departments of Microbiology across NYP/Weill Cornell, NYP/Columbia and other NYPH campuses. In 2018, the IDSA recognized NYPH's as an Antimicrobial Stewardship Center of Excellence for exceeding the CDC's Core Elements for hospital ASPs.
The program aims to:

1. Optimize antimicrobial use through promoting judicious and effective antimicrobial prescribing, and
2. Improve patient outcomes by reducing antimicrobial resistance, the likelihood of adverse drug reactions, the risk of *Clostridium difficile* infection (CDI), and healthcare costs.
3. Assist in hospital-wide response to emerging infectious disease threats, such as COVID-19, through institutional guideline development, management of potential drug shortages and optimizing evidence-based delivery of therapeutic interventions such as antimicrobials, monoclonal antibodies, and immunomodulatory agents.

Two outstanding ID-trained clinical pharmacists, Angela Loo, PharmD and Shawn Mazur, PharmD are pharmacy leaders for the ASP, provide in-person pharmacist support for the ID consult service rounds and educate fellows on antimicrobial prescribing. There is ample opportunity for fellows to participate in ASP-related activities and research at Cornell and collaborate across all NYPH campuses.

Examples of recent ASP-related research include:

Berger RE, **Singh HK**, **Loo AS**, Cooley V, Osorio SN, Lee JI, **Simon MS**. Improving antibiotic stewardship for inpatients with reported beta-lactam allergies and limited access to penicillin skin testing. Jt Comm J Qual Patient Saf 2022;48:147-153. https://pubmed.ncbi.nlm.nih.gov/35031256/

Kubin CJ, Loo AS, Cheng J, Nelson B, Mehta M, Mazur S, So W, **Calfee DP**, **Singh H**, Greendyke WG, **Simon MS**, Furuya EY. Antimicrobial stewardship perspectives from a New York City hospital during the COVID-19 pandemic: challenges and opportunities. Am J Health-Syst Pharm 2021;78:743-750 https://pubmed.ncbi.nlm.nih.gov/33543233/

Tang SJ, Gupta R, Lee JI, Majid AM, Patel P, Efird L, **Loo A**, **Mazur S**, **Calfee DP**, Archambault A, Jannat-Khah D, Dargar SK, **Simon MS**. Impact of hospitalist-led interdisciplinary antimicrobial stewardship interventions at an academic medical center. Jt Comm J Qual Patient Saf. 2019 Mar;45(3):207-216. https://pubmed.ncbi.nlm.nih.gov/30482662/

**Simon MS**, **Sfeir MM**, **Calfee DP, Satlin MJ**. Cost-effectiveness of ceftazidime-avibactam for treatment of carbapenem-resistant Enterobacteriaceae bacteremia and pneumonia. Antimicrob Agents Chemother. 2019 Sep 23;63(12). https://pubmed.ncbi.nlm.nih.gov/31548187/
**Kapadia S**, Abramson E, Carter E, **Loo A**, Kaushal R, **Calfee DP**, **Simon MS**. The expanding role of antimicrobial stewardship programs in US hospitals: lessons learned from a multisite qualitative study. Jt Comm J Qual Patient Saf. 2018 Feb;44(2):68-74. https://pubmed.ncbi.nlm.nih.gov/29389462/

**Salsgiver E**, Bernstein D, **Simon MS**, Eiras D, Greendyke W, Kubin CJ, Mehta M, Nelson B, **Loo A,** Ramos LG, Saiman L, Furuya EY, **Calfee DP**. Knowledge, attitudes, and practices regarding antimicrobial stewardship among antimicrobial prescribers at five acute care hospitals. Infect Control Hosp Epidemiol. 2018 Mar;39(3):316-322. https://pubmed.ncbi.nlm.nih.gov/29402339/

Greendyke WG, Carter EJ, **Salsgiver E**, Bernstein D, **Simon MS**, Saiman L, **Calfee DP**, Furuya EY. Exploring the role of the bedside nurse in antimicrobial stewardship: survey results from five acute-care hospitals. Infect Control Hosp Epidemiol. 2018 Mar;39(3):360-362. https://pubmed.ncbi.nlm.nih.gov/29382409/

**HUMAN PAPILLOMAVIRUS (HPV):**

**HPV clinical trials** *Wilkin, Ellsworth.* HPV is the most common sexually transmitted disease and is associated with premalignant lesions of the cervix and anus (squamous intraepithelial lesions or SIL). Anal carcinoma is increased among HIV-infected people. Our prior work has assessed the safety, immunogenicity, and efficacy of the quadrivalent HPV vaccine in people living with HIV. Other clinical trials are assessing the efficacy of ablative and topical therapies for the treatment anal cancer precursors. The ANCHOR study is an NCI-sponsored clinical trial assessing whether treatment of anal cancer precursors prevent invasive anal cancer. Cervical cancer is a major cause of morbidity and mortality in areas of the world without access to cervical cancer screening. Dr. Wilkin has completed a multisite, randomized clinical trial investigating a novel HPV test-and-treat strategy with immediate cryotherapy for those women detected with HPV. Dr. Wilkin has collaborated with South African investigators on studies of the novel point-of-care diagnostics for HPV infection, and a clinical trial investigating the role of HPV vaccination as an adjunct to treatment of cervical cancer precursors. Future trials include trials of the 9-valent HPV vaccine to prevent oropharyngeal cancer and novel treatments for cervical cancer precursors in people living with HIV. Dr. Ellsworth is investigating novel HPV tests for cervical cancer and anal cancer precursors.

**Ellsworth GB**, Lensing SY, Ogilvie CB, Lee JY, Goldstone SE, Berry-Lawhorn JM, Jay N, Stier EA, Logan JS, Einstein MH, Saah A, Mitsuyasu RT, Aboulafia D, Palefsky JM, **Wilkin TJ**. A delayed dose of quadrivalent human papillomavirus vaccine demonstrates immune memory in HIV-1-infected men. Papillomavirus Res. 2018 May 26;6:11-14

Pinto LA, **Wilkin T**, Kemp TJ, Abrahamsen M, Isaacs-Soriano K, Pan Y, Webster-Cyriaque J, Palefsky J, Giuliano AR. Oral and systemic HPV antibody kinetics post-vaccination among HIV-positive and HIV-negative men. Vaccine. 2019

Goldstone SE, Lensing SY, Stier EA, Darragh T, Lee JY, van Zante A, Naomi J, Berry-Lawhorn JM, Cranston RD, Mitsuyasu R, Palefsky JM, **Wilkin TJ.** A randomized clinical trial of infrared coagulation ablation versus active monitoring of intra-anal high-grade dysplasia in HIV-infected adults: An AIDS Malignancy Consortium trial. Clinical Infectious Diseases 2018 Jul 27.

**Wilkin TJ**, Chen H, Cespedes MS, Leon-Cruz JT, Godfrey C, Chiao EY, Bastow B Webster-Cyriaque J, Feng Q, Dragavon J, Coombs RW, Presti RM, Saah A, Cranston RD. A randomized, placebo-controlled trial of the quadrivalent HPV vaccine in HIV-infected adult's age 27 years or older: AIDS Clinical Trials Group protocol A5298. Clin Infect Dis. 2018 Apr 5.

Cranston RD, Cespedes MS, Paczuski P, Yang M, Coombs RW, Dragavon J, Saah A, Godfrey C, Webster-Cyriaque JY, Chiao EY, Bastow B, **Wilkin T;** ACTG 5298 Study Team. High Baseline Anal Human Papillomavirus and Abnormal Anal Cytology in a Phase 3 Trial of the Quadrivalent Human Papillomavirus Vaccine in Human Immunodeficiency Virus-Infected Individuals Older Than 26 Years: ACTG 5298. Sex Transm Dis. 2018 Apr;45(4):266-271.

**INFLUENZA BASIC AND CLINICAL RESEARCH STUDIES.**

*Salvatore, Glesby, Gulick, Kaner,* Dr. Salvatore is involved in clinical and translational studies of influenza in the immunocompromised hosts. She is also conducting basic research studies on the use of integrase-defective lentiviral vectors for immunization and antibody delivery against influenza. The CCTU is a site for observational studies of influenza in outpatients conducted through the NIH-funded INSIGHT network and has participated in NIH-funded interventional trials of influenza in collaboration with Robert Kaner and David Berlin in the Pulmonary and Critical Care Medicine division.

Rendeiro AF, Casano J, Vorkas CK, Singh H, Morales A, DeSimone RA, Ellsworth GB, Soave R, Kapadia SN, Saito K, Brown CD, Hsu J, Kyriakides C, Chiu S, Cappelli LV, Cacciapuoti MT, Tam W, Galluzzi L, Simonson PD, Elemento O, **Salvatore M***, Inghirami G*. Profiling of immune dysfunction in COVID-19 patients allows early prediction of disease progression. Life Sci Alliance. 2021 Feb;4(2). Print 2021 Feb. PubMed PMID: 33361110. *Co-senior, co-corresponding author

Butler D, Mozsary C, Meydan C, Foox J, Rosiene J, Shaiber A, Danko D, Afshinnekoo E, MacKay M, Sedlazeck FJ, Ivanov NA, Sierra M, Pohle D, Zietz M, Gisladottir U, Ramlall V, Sholle ET, Schenck EJ, Westover CD, Hassan C, Ryon K, Young B, Bhattacharya C, Ng DL, Granados AC, Santos YA, Servellita V, Federman S, Ruggiero P, Fungtammasan A, Chin CS, Pearson NM, Langhorst BW, Tanner NA, Kim Y, Reeves JW, Hether TD, Warren SE, Bailey M, Gawrys J, Meleshko D, Xu D, Couto-Rodriguez M, Nagy-Szakal D, Barrows J, Wells H, O'Hara NB, Rosenfeld JA, Chen Y, Steel PAD, Shemesh AJ, Xiang J, Thierry-Mieg J, Thierry-Mieg D, Iftner A, Bezdan D, Sanchez E, Campion TR Jr, Sipley J, Cong L, Craney A, Velu P, Melnick AM, Shapira S, Hajirasouliha I, Borczuk A, Iftner T, **Salvatore M**, Loda M, Westblade LF, Cushing M, Wu S, Levy S, Chiu C, Schwartz RE, Tatonetti N, Rennert H, Imielinski M, Mason CE. Shotgun transcriptome, spatial omics, and isothermal profiling of SARS-CoV-2 infection reveals unique host responses, viral diversification, and drug interactions. Nat Commun. 2021 Mar 12;12(1):1660. PubMed PMID: 33712587.

Mathad JS, Lee MH, Chalem A, Frey MK, Chapman-Davis E, Kopparam RV, Dayal AK, Wald G, Pinheiro LC, Satlin MJ, Goyal P, Safford MM, **Salvatore M***, Holcomb K*. Sex differences in Covid-19 presentation and outcomes in New York City: A cohort study. Open Forum Infect Dis. 2021 Jul 9;8(8): ofab370. PMID: 34381847*****Equal contribution

Rathnasinghe R, **Salvatore M**, Zheng H, Jangra S, Kehrer T, Mena I, Schotsaert M, Muster T, Palese P, García-Sastre A. Interferon mediated prophylactic protection against respiratory viruses conferred by a prototype live attenuated influenza virus vaccine lacking non-structural protein 1. 2021 Sci Rep 11, 22164. PMID 34401874 https://doi.org/10.1038/s41598-021-01780-8

Rendeiro AF, Vorkas CK, Krumsiek J, Singh H,Shashi Kapatia S, Cappelli LV, Cacciapuoti MT, Inghirami G, Elemento E, **Salvatore M.** Metabolic and immune markers for precise monitoring of COVID-19 severity and treatment. Front. Immunol., 12 January 2022 | https://doi.org/10.3389/fimmu.2021.809937

Park J, Foox J, Hether T,[…] **Salvatore M**, Loda M, Westblade LF, Cushing M, Rennert H, Kriegel AJ, Elemento O, Imielinski M, Borczuk AC, Meydan C, Schwartz RE, Mason CE. System-wide loss of tissue identity in COVID-19 patients. Cell Reports Medicine, Feb 15, 2022 https://www.cell.com/cell-reports-medicine/fulltext/S2666-3791(22)00022-2

Mzava O, Pellan Cheng A, Chang A, Smalling S, Djomnang Kounatse L-A, Lenz J, Longman R, Steadman A, Salvatore M, Suthanthiran M, Lee, Mason CE, Dadhania D, De Vlaminck I. A metagenomic DNA sequencing assay that is robust against environmental DNA contamination. doi: https://doi.org/10.1101/2021.11.22.469599

Wang C, Honce R, Salvatore M, Yang J, Twells NM, Mahal LK, Schultz-Cherry S and Ghedin E. Reduced inflammatory response and promoted multiciliated cell differentiation in mice protected by defective interfering influenza virus **doi:** https://doi.org/10.1101/2022.01.25.477719

Manohar J, Abedian S, Martini R, Kulm S, Salvatore M, Ho K, Christos P, Campion T, Imperato-McGinley J, Ibrahim S, Evering TH, Phillips E, Tamimi R, Bea V, D Balogun O, Sboner A, Elemento O, Davis MB. Social and Clinical Determinants of COVID-19 Outcomes: Modeling Real-World Data from a Pandemic Epicenter. medRxiv. 2021 Apr 7. doi: 10.1101/2021.04.06.21254728. PubMed PMID: 33851193.

**MALARIA/BABESIA:**

**Malaria.** *Golightly, Bilenca, Gyan, Lis, Lyden*
Despite its virulence, the pathophysiologic basis of *P. falciparum* disease and cerebral malaria is poorly understood. Sequestration of infected red blood cells (iRBCs) in the microvasculature is a major pathologic finding in *P. falciparum* infections with consequent endothelial cell damage. Our studies have focused on mechanisms of microvascular repair and associated healthy or aberrant healing of cerebral tissues. Current studies include the use of a BBB-on-a-chip *in vitro* model to define mechanisms of exosome mediated intercellular signaling. These studies are being performed in collaboration with the Noguchi Memorial Institute for Medical Research in Accra, Ghana, and colleagues at WCM.

In collaboration with investigators at the University of the Negev in Israel, a cell phone imaging system that can non-invasively detect malaria parasites in the blood is being developed. This project was funded as part of a Bill and Melinda Gates Foundation Grand Challenges Explorations to Create Low-Cost Cell Phone-Based Applications for Priority Global Health Conditions.

Women and ethnic minorities are underrepresented in biomedical science. Studies that define the factors that affect retention in the academic pipeline provide validated guidance to permit the full inclusion of all and diversification of the workforce.

Aashiq H. Mirza, Sanchita Das, Maneesh R. Pingle, Mark S. Rundell, George Armah, Ben Gyan, Richard L. Hodinka, Davise H. Larone, Eric D. Spitzer, Francis Barany & **Linnie M. Golightly.** A Multiplex PCR/LDR Assay for Viral Agents of Diarrhea with the Capacity to Genotype Rotavirus. *Scientific Reports* 8, Article number: 13215 (2018)

Remer I, Pierre-Destine LF, Tay D**, Golightly LM***, Bilenca A*. In vivo noninvasive visualization of retinal perfusion dysfunction in murine cerebral malaria by camera phone laser speckle imaging. J Biophotonics. 2019 Jan;12(1):e201800098. doi: 10.1002/jbio.201800098.

Brejt JA, **Golightly LM**. Severe Malaria: Update on Pathophysiology and Treatment. 2019. Curr Opin Infect Dis. 2019 Oct;32(5):413-418. PMID:31369419, DOI: 10.1097/QCO.0000000000000584

Ayman Ahmed, Johanna P. Daily, Andres G. Lescano, **Linnie M. Golightly**, Abiola Fasina Challenges and Strategies for Biomedical Researchers Returning to Low- and Middle- Income Countries after Training. Am J Trop Med Hyg. 2020;102(3):494-496. doi:10.4269/ajtmh.19-0674

Lambert WM, Wells MT, Cipriano MF, Sneva JN, Morris JA, **Golightly LM**. Career choices of underrepresented and female postdocs in the biomedical sciences. Elife. 2020 Jan 3;9. pii: e48774. doi: 10.7554/eLife.48774.

**Genetic variation and drug resistance of *Plasmodium falciparum*.** *Kirkman.* Malaria, a vector borne disease, causes great morbidity and mortality in tropical and subtropical regions of the world. The parasite has the ability to evade clearance in the host by developing resistance to antimalarial drugs and through antigenic variation by changing parasite proteins exported to the host red blood cell surface. Important to both of these parasite adaptations is the capacity of this eukaryotic pathogen, with a haploid genome for most of its lifecycle, to generate and incorporate DNA mutations. We aim to study malaria DNA recombination and repair in the context of disease pathogenesis, focusing on antigenic variation and the development of drug resistance.

To better understand the generation of genetic diversity, we are manipulating the parasite genome by knocking out key enzymes for different repair pathways to determine what mechanisms the parasite uses to repair damaged DNA. Using genetically modified parasites we are studying the ability of the parasite to generate point mutations and gene duplications that have been previously associated with drug resistance in the field.

Heinberg A, **Kirkman, L**. The molecular basis of anitfolate resistance in Plasmodium falciparum: looking beyond point mutations. Ann N Y Acad Sci. 2015 ;1342:10-18..

**Kirkman LA,** Deitsch KW. Recombination and Diversification of the Variant Antigen Encoding Genes in the Malaria Parasite Plasmodium falciparum. Microbiol Spectr 2014;2; doi: 10.1128/microbiolspec.

**Kirkman L**, Lawrence B and Deitsch K. Malaria parasites utilize both homologous recombination and alternative end joining pathways to maintain genome integrity**.** *Nucleic Acids Research.* 2014; 42:370-9.

Kümpornsin K, Modchang C, Heinberg A, Ekland EH, Jirawatcharadech P, Chobson P, Suwanakitti N, Chaotheing S, Wilairat P, Deitsch KW, Kamchonwongpaisan S, Fidock DA, **Kirkman** LA, Yuthavong Y, Chookajorn T. Origin of Robustness in Generating Drug-Resistant Malaria Parasites. Mol Biol Evol. 2014;31:1649-1660.

Calhoun S, Reed J, Alexander N, Mason C, Deitsch K, **Kirkman L.** Chromosome End Repair and Genome Stability in *Plasmodium falciparum*. MBio. 2017.

Zhang Z, Alexander N, Leonardi I, Mason C, **Kirkman LA**, Deitsch KW. Rapid antigen diversification through mitotic recombination in the human malaria parasite *Plasmodium falciparum.* Plos Biology 2019.

Siao, MC, Borner J, Perkins SL, Deitsch KD, **Kirkman LA**. Evolution of Host Specifity by Malaria Parasites through altered mechanisms controlling genome maintenance. M Bio 11:e03272-19. 2020.

**Development of novel antimalarials targeting the *Plasmodium* proteasome.** *Kirkman***.** There are confirmed *P. falciparum* parasites resistant to every available antimalarial, and thus an urgent need to identify novel parasite targets for the next generation of therapeutics. My lab, in collaboration with the Tri- Institutional Therapeutics Discovery Institute and Dr. Gang Lin in Microbiology and Immunology, designed specific inhibitors of a novel drug target; the *Plasmodium* proteasome. In addition to developing potent and selective proteasome inhibitors that can kill the parasite in vitro an in vivo models, we identified unique aspects of proteasome inhibition in the parasite. We found synergistic parasite killing when two of the catalytically active proteasome, subunits termed β2 and β5, are targeted at the same time. Interestingly, there is also collateral sensitivity in β5 inhibitor resistant parasite lines, which are hypersensitive to β2 inhibitors. Synergistic activity between inhibitors and collateral sensitivity serve as important mechanisms in the prevention of the emergence of resistant parasites. We are pursuing compounds with improved drug like qualities that target the parasite proteasome. In addition to providing potential compounds for use as therapeutics, this project is significant in its investigation of basic biology of the proteasome and the ubiquitin proteasome system in the malaria parasite.

**Kirkman LA***, Zhan W, Visone J, Dziedziech A, Singh PK, Fan H, Tong X, Bruzual I, Hara R, Kawasaki M, Imaeda T, Okamoto R, Sato K, Michino M, Alvaro EF, Guiang LF, Sanz L, Mota DJ, Govindasamy K, Wang R, Ling Y, Tumwebaze PK, Sukenick G, Shi L, Vendome J, Bhanot P, Rosenthal PJ, Aso K, Foley MA, Cooper RA, Kafsack B, Doggett JS, Nathan CF, Lin G. Antimalarial proteasome inhibitor reveals collateral sensitivity from intersubunit interactions and fitness cost of resistance. Proc Natl Acad Sci U S A. 2018 Jul 2.

Zhan W, Visone J, Ouellette T, Harris J, Wang R, Zhang H, Singh P, Ginn J, Sukenick G, Wong T, Okoro J, Scales R, Tumwebaze P, Rosenthal P, Kafsack BJ, 1 Cooper RA, Meinke PT, **Kirkman LA*,** Lin G*. (co-corresponding author) Improvement of asparagine ethylenediamines as antimalarial *Plasmodium*-selective proteasome inhibitors. J Med Chem 2019 Jun 9.

Zhan W, Zhang H, Ginn J, Leung A, Liu YJ, Michino M, Toita A, Wong TT, Imaeda T, Hara R, Yukawa T, Chelebieva S, Tumwebaze PK, Lafuente-Monasterio MJ, Vendome J, Martinez-Martinez MS, Beuming T, Sato K, Aso K, Rosenthal PJ, Cooper RA, Meinke PT, Nathan CF, **Kirkman LA***, Lin G.* Development of a highly selective Plasmodium falciparum proteasome inhibitor with anti-malaria activity in humanized mice. **Angew Chem Int Ed Engl**. 2021 Jan 12.

**Babesiosis.** *Kirkman***.** Babesiosis is a tickborne zoonotic disease found worldwide. This once relatively obscure disease has been gaining recognition in the New York region as "the local malaria." We are collaborating with other institutions to study the clinical manifestations, potential biomarkers and potential for drug resistance in *Babesia microti*, the local babesia parasite. In addition, we are using a lab strain of *Babesia divergens* for drug screening and drug resistance studies.

**Simon M**, Westblade L, Dziedziech A, **Visone J, Furman R, Jenkins S, Schuetz A, Kirkman L.** Clinical and Molecular Evidence of Atovaquone and Azithromycin Resistance in Relapsed Babesia microti infection associated with Rituximab and Chronic Lymphocytic Leukemia. CID. 2017. May 24**.**

**Westblade L, Simon M**, Mathison B, **Kirkman L**. *Babesia microti*: From Mice to Ticks to an Increasing Number of Highly-Susceptible Humans. JCM. 2017.

**Rosenblatt J**, Leung A, Baneman E, Fuller R, Taimur S, Paniz-Mondolfi AE, Malone AK, **Kirkman LA**, Jacobs SE. Relapsed *Babesia microti* Infection following Allogeneic Hematopoietic Cell Transplantation in a Patient with B-Cell Acute Lymphoblastic Leukemia: Case Report and Review of the Literature. Open Forum Infectious Diseases, 2021; ofab323.

**Musculoskeletal Infections:**

The care of patients with diverse musculoskeletal infections has constituted a critical part of the subspecialty of Infectious Diseases since the development of antibiotics and remains so today. As populations of the aged and immunocompromised expand, as the microbiological and surgical complexities of patients increase, and as the indications for and popularity of orthopedic interventions continue to grow, the role of infectious disease-trained physicians in the prevention, diagnosis and therapy of these infections has grown. Hospital for Special Surgery (HSS), across the street from New York Presbyterian Hospital / Weill Cornell campus, specializes in the Orthopedic and Rheumatologic needs of patients. HSS is nationally ranked as #1 for Orthopedics and #4 in Rheumatology (US News & World Report; 2020-2021 and has the highest volume of orthopedic surgery in the United States. Infectious diseases at HSS are likely to involve patients with infections of prosthetic joints or other orthopedic grafts and hardware, and patients with infectious complications of a variety of rheumatologic diseases. They may be immunosuppressed by their underlying collagen vascular disease or by their immunomodulatory therapy. The Infectious Diseases Fellowship rotation includes a substantial clinical exposure to our patient population, and the clinical problem-solving process we have developed to analyze, diagnose, and treat these patients.

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**TRANSPLANTATION-ONCOLOGY INFECTIOUS DISEASES:**

Translational Research: Walsh (retired), Small, Satlin, Petraitiene, Petraitis, Kodiyanplakkal, Plate, Drelick, Soave, Helfgott. Infectious diseases are important causes of morbidity and mortality in immunocompromised patients with cancer and those undergoing transplantation. The research mission of the Transplantation-Oncology Infectious Diseases Program is to develop new strategies for diagnosis, treatment, and prevention of life-threatening infections in immunocompromised patients with transplantation and neoplastic diseases through multidisciplinary translational research. The tools of this research include epidemiology, pathogenesis, host defenses, antimicrobial pharmacology, immunopharmacology, molecular diagnostic microbiology, and clinical trials. Although Dr. Walsh recently retired, Drs. Petraitiene and Petraitis are still completing research studies in his former laboratory and work closely with our Clinical Research Unit (CRU).

Our group works systematically through in vitro systems, laboratory animal models, clinical trials, and multicenter clinical trials in the CRU. Clinical trials are led by clinical investigators with expertise in immunocompromised patients. Among the patient populations studied are those with hematological malignancies, hematopoietic stem cell transplantation, and solid organ transplantation, including kidney, liver, and pancreas. These studies are conducted in collaboration with our colleagues in Oncology, Hematology, Nephrology, Hepatobiliary Transplantation Surgery, Pediatrics, Clinical Microbiology, Pharmacology, Microbiology & Immunology, Critical Care Medicine, and Ophthalmology. We have a long and successful tradition of mentoring future leaders in the field of infections in immunocompromised patients. We are also currently developing a Weill Cornell-Columbia University NYPH-wide Transplantation-Oncology Infectious Diseases Fellowship, which will combine the strengths of both programs.

Multidrug Resistant Bacterial Infections: The Translational Research Laboratory develops new strategies for pharmacodynamically rational methods for administration of existing antibacterial agents, development of new and repurposing of FDA-approved antimicrobial and antifungal compounds against multidrug resistant bacterial and fungal pathogens, particularly Pseudomonas aeruginosa, carbapenem-resistant Enterobacteriaceae, Stenotrophomonas maltophilia, MRSA, Aspergillus fumigatus, and Candida spp. Dr. Satlin is currently investigating how screening neutropenic patients for colonization with fluoroquinolone- and beta-lactam-resistant enteric bacteria can be used to personalize and optimize strategies for antibacterial prophylaxis and empirical therapy. Drs. Petraitis and Petraitiene are conducting laboratory studies of the pharmacokinetics and pharmacodynamics of ceftazidime/avibactam and polymyxin B in the treatment of experimental pneumonia caused by carbapenemase-producing Klebsiella pneumoniae in immunocompromised and immunocompetent rabbits. Studies of rabbit animal models of ventilator-associated bacterial pneumonia produced by carbapenem-resistant Pseudomonas aeruginosa and Acinetobacter baumannii. In addition, studies of the novel liposomal AmB formulations against fungal keratitis in mice. We are harnessing bacteriophage technology for treatment and prevention of experimental sepsis caused by KPC and Stenotrophomonas maltophilia. As a logical extension of these preclinical studies, we have started an investigator-initiated study led by Dr. Small and the CRU team. We also conducted a study evaluating the Karius Test for detection of undiagnosed pathogens in immunocompromised patients with pneumonia.

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Invasive Fungal Infections: Recognizing the severe morbidity and mortality caused by invasive mycoses, the study of invasive fungal infections with specific emphasis on Candida spp., Aspergillus spp., the Mucorales, and emerging pathogens such as Candida auris, Fusarium spp., and Scedosporium spp., remains important.

Advances in our program include the identification of the development and validation of the first multispecies PCR system for Aspergillus spp. and Mucorales to be made available in a U.S. reference laboratory, rapid molecular diagnosis of invasive candidiasis with T2 technology, plasma pharmacokinetics of posaconazole, in vitro and in vivo interspecies analysis of virulence in experimental pulmonary mucormycosis: correlation with circulating molecular biomarkers, sporangiospore germination and hyphal metabolism, in vitro and in vivo antifungal combination studies against medically important fungi, and epidemiology and treatment of osteoarticular mycoses.

Ongoing clinical trials include ibrexafungerp (SCY-078) for treatment of refractory and resistant fungal infections including Candida auris (Drs. Drelick and Kodiyanplakkal); olorofim (F901318) for treatment of invasive fungal infections due to Lomentospora prolificans, Scedosporium spp., Aspergillus spp., and other resistant fungi (Dr. Plate); and diagnostic biomarkers in immunocompromised children and adults (Dr. Petraitiene). These studies are run in collaboration with Drs. Drelick, Kodiyanplakkal, Petraitiene, and Plate with support from our CRU.

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Viral Infections: Dr. Small and other members of the CRU are conducting clinical trials with novel antiviral agents against viral respiratory tract infections. These studies include respiratory syncytial virus (RSV), influenza, parainfluenza, CMV, and COVID-19 infections. These trials provide our patients with new agents that may improve outcomes from these serious infections in our immunocompromised population. The epidemiology of respiratory viral infections in these patients continues to evolve and will be the subject of further study. Immunization is an important adjunct to the management of viral infections in immunocompromised patients and Dr. Small is on the Respiratory Viral Panel at Janssen, which is also addresses vaccines. We are currently involved in CMV treatment trials in immunocompromised hosts including letermovir and maribavir, in which Dr. Small is the Principal Investigator.

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HIV: Dr. Small is leading an innovative research effort for development of novel approaches to the management of HIV infection in patients with neoplastic diseases and in those undergoing HSCT, as well as in solid organ transplantation. Dr. Small developed the HIV Transplantation Program at Weill Cornell and is currently the PI on 2 NIH-funded studies in HIV to HIV solid organ transplantation (kidney and liver). She has participated in 22 clinical research trials evaluating antiretroviral agents for the

treatment of HIV infection, and has been the PI/Co-Investigator on 8 HIV-related investigator-initiated trials. She is currently the PI on a groundbreaking investigator-initiated study in HIV+ renal transplant recipients, investigating the ideal ARV regimen to use in this population and the drug-drug interaction with immunosuppressive agents in this unique population.

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**RENAL HOPE COVID STUDY**

Wohl D, Bhatti L, Small CB, et al: HIV-1 Suppression is Maintained with Bone and Renal Biomarker Improvement 48 Weeks after Ritonavir Discontinuation and Randomized Switch to Abacavir/Lamivudine + Atazanavir. HIV Medicine 17: 106-117, 2016.

COVID-19 Infections: We have been studying the clinical course and outcomes as well as the immunologic effects of COVID-19 infection, especially in immunocompromised hosts. Dr. Small has been the Principal Investigator or Co-investigator on 4 major COVID-19 treatment or vaccination trials in addition to 1 COVID-19 investigator-initiated retrospective chart review study. Dr. Small also collaborated on the development of 3 clinical research trials on COVID-19 infection in the solid organ transplant population and patients with hematologic malignancies. Drs. Plate, Small, Walsh, and Satlin have investigated the relationships between SARS-CoV-2 viral load and clinical outcomes in patients with and without cancer who are hospitalized with COVID-19.

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**TUBERCULOSIS:**

**TB Drug Development.** *Rhee*. A defining interest of our laboratory is the identification of new antibiotic targets and mechanisms. Unlike virtually every other field of medicine, infectious diseases are the only discipline to become progressively less and less effective over time. The reasons for this are multifactorial. However, a commonly overlooked fact is that virtually all antibiotics in clinical use were discovered serendipitously with little foresight. As a result, we lack sufficient knowledge of what defines a good drug target and how to reverse engineer such knowledge into new antibiotics. We aim to address this deficiency by applying novel mass spectrometry-based metabolomics approaches to gain insight into the underlying biology of Mycobacterium tuberculosis (i.e., what makes TB TB) and its response to perturbation at the pharmacologically relevant level of metabolites. Recent work has expanded to include studies of drug resistance, biomarkers of TB treatment efficacy and the microbiology of transmission.

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**INTERNATIONAL PROGRAMS**

The Division of Infectious Diseases collaborates closely with the Weill Cornell Center for Global Health (CGH), with nine faculty members shared between the two groups, including full-time faculty who travel frequently to programs in Brazil, Haiti, India, and Tanzania.

**BRAZIL:** *Carvalho, Dupnik, Glesby, Johnson*

The collaboration between Cornell University and the Federal University of Bahia started in 1964 and is the longest collaboration of its type in the world today. To date, over 20 Cornell faculty members and ~120 students and fellows have participated in the program, and over 250 peer reviewed journal publications have emerged from the research. The program has been funded by the Commonwealth Fund and the Rockefeller Foundation, and since 1979, by the NIH. A second program collaborates with the Federal University of Rio Grande do Norte (UFRN) in Natal; Rio Grande do Norte. Active areas of research include the pathogenesis, diagnosis, complications, and management of HTLV-1, leprosy and leishmaniasis.


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**HAITI:** Dupnik, Fitzgerald, Johnson, Mathad, McNairy, Pape, Reif, Rhee, Rouzier, Schackman, Walsh

The Weill Cornell Medicine program in Haiti conducts research in HIV, tuberculosis, and other communicable diseases, and provides care for these diseases and trains Haitian healthcare workers and investigators. The Weill Cornell program in Haiti began in 1980 with the establishment of a unit for the study and treatment of infantile diarrhea at the State University Hospital in Port au Prince. The Weill Cornell team began its AIDS research in 1982 and was instrumental in the formation of Groupe Haitien d'Etude du Sarcome de Kaposi et des Infections Opportunistes (GHESKIO). Since 1983, Weill Cornell and GHESKIO have had uninterrupted NIH support resulting in over 200 publications. Weill Cornell-GHESKIO conducts NIH-sponsored HIV and tuberculosis clinical trials. With support from the U.S. President's Emergency Program for AIDS Relief (PEPFAR), GHESKIO provides services to ~100,000 persons annually. Current areas of research are HIV/AIDS, tuberculosis, and non-communicable disease.


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**TANZANIA:** *Downs, Fitzgerald, Johnson, Peck*

In 2006, a formal affiliation was established between WCMC and the Weill Bugando School of Medicine (WBSM) / Bugando Medical Center (BMC) in Mwanza, Tanzania. BMC is a 900-bed tertiary care center serving a population of approximately 15 million Tanzanians. WBSM admits approximately 250 medical students per class, per year. The goal of the Weill Cornell collaboration is to aid in the development of the WBSM/BMC infrastructure and training programs by the exchange of faculty, fellows, residents, and students. Long-term goals are to create a platform for self-sustaining research programs and clinical knowledge transfer. WCMC rotates approximately 40 senior teaching residents and fellows in medicine, pediatrics, surgery, and obstetrics and gynecology to Tanzania and brings 10 Tanzanian physicians to New York for clinical and research training. Active areas of research are HIV/AIDS, schistosomiasis, women's health, and non-communicable diseases, such as hypertension and cardiovascular disease.


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