Members
UVA Global Infectious Diseases Institute

Director
1. **Alison Criss** is an Associate Professor in the Department of Microbiology, Immunology, and Cancer Biology in the School of Medicine. Dr. Criss’s laboratory investigates how pathogenic microorganisms manipulate the immune system in order to cause disease, focusing on the bacterium *Neisseria gonorrhoeae*, a “superbug” that infects hundreds of millions of people worldwide each year. The ultimate goal of this research is to identify targets in the host or pathogen for developing vaccines and new antimicrobial drugs. This research has been supported by the Fogarty International Center (K99/R00 Career Transitional Award) and National Institute of Allergy and Infectious Diseases of NIH. Dr. Criss’ honors include the 2011 American Society for Microbiology / Interscience Conference for Antimicrobial Agents and Chemotherapy Young Investigator Award, the School of Medicine Dean’s Awards for Excellence in Research and in Teaching, and election to the UVA Academy of Distinguished Educators. At UVA, Dr. Criss serves on the Executive Committee of the NIH-sponsored Infectious Diseases Training Grant and the Advisory Committees for the Medical Scientist Training Program and the Biomedical Data Sciences Training Grant. She serves on the editorial boards of several journals and is editor of the Thematic Issue on Pathogenic *Neisseria in Pathogens and Disease* (2017), and she has served on the organizing committees of international scientific conferences.

Associate Director
2. **Linda Columbus** is an Associate Professor in the Department of Chemistry in the College of Arts & Sciences. Dr. Columbus’ laboratory uses biophysical methods to investigate bacterial membrane proteins that hijack human cell function. These proteins are novel drug targets and have functions that are desirable to engineer in therapeutic delivery systems. Currently, her group focuses on cellular uptake of *Neisseria gonorrhoeae* and trafficking of the *Chlamydia trachomatis* inclusion. Dr. Columbus’ honors include an NSF CAREER Award, a Cottrell Scholar Award, Virginia Outstanding Faculty Award, and several teaching awards. She serves on many national committees including AAU STEM Undergraduate Education Initiative Advisory Committee and the Research Corporation for Scientific Advancement Cottrell Scholar Advisory Board. She also is a charter member of the NIH Biochemistry and Biophysics of Membranes Panel. At UVa, she is the department’s Director of Undergraduate Studies and serves on many committees including the Advisory Committee for the Medical Scientist Training Program, the Executive Committee for the Biotechnology Training Grant, the Executive Committee of the Biophysics Training Grant, and Provost’s Academic Strategy Committee.

Steering Committee
3. **Roseanne Ford** is a Professor in Chemical Engineering and holds a courtesy appointment in Civil & Environmental Engineering. Her research interests focus on the role of bacterial chemotaxis in a wide array of applications including the formation of biofilms on surfaces. A
focus of her research is on the design of experimental systems that range from videomicroscopy of the trajectories of individual swimming bacteria to microfluidic devices with pore networks to bench-scale microcosms to field-scale evaluations. Dr. Ford is a faculty mentor in the NIH-sponsored Biotechnology Training Program. She has also served in administrative roles at the University as the Associate Vice President for Research & Graduate Studies and as Department Chair.

4. **Eric Houpt** is the Jack Gwaltney Professor of Infectious Diseases at the University of Virginia and is Vice-Chair for Research in the Department of Medicine. He and his group lead studies on the burden of infectious diseases, drug resistance, and emerging infections all over the world. He previously trained at Emory and the University of Chicago, and has worked as a physician and researcher in Papua New Guinea and at the Kilimanjaro Medical Centre in Tanzania. He was awarded the Bailey Ashford Medal by the American Society of Tropical Medicine, the Oswald Award for Mid-Career Achievement by the Infectious Diseases Society of America, and is an elected member of the American Society for Clinical Investigation. He is a member of the CDC Advisory Council for the Elimination of Tuberculosis and has been the tuberculosis consultant for the Virginia Department of Health since 2009.

5. **David Leblang** is Professor of Politics in the College of Arts and Sciences at the University of Virginia and is a Faculty Associate at the Miller Center where he is the J. Wilson Newman Professor of Governance. He is also a Professor of Public Policy at the University’s Batten School for Leadership and Public Policy where he is Director of the Global Policy Center. Since 2010 he has served as Department Chair of the Department of Politics. His research is in the area of global migration, focusing on the causes and consequences of labor migration and global refugee flows. Currently he is directing a Department of Homeland Security grant examining the social, environmental, economic, and political factors associated with legal and illegal migration into the United States; this project will develop forecasting models which can be used to assess the efficacy of policy tools used to deter unwanted migration. Part of that project examines the role that migration plays in the transmission of infectious disease.

6. **Jason Papin** is a Professor in the Department of Biomedical Engineering. His lab works on problems in systems biology of infectious disease. They develop computational approaches for integrating high-throughput data into predictive computational models of prominent microbial pathogens such as *Clostridium difficile*, *Pseudomonas aeruginosa*, and *Plasmodium falciparum*, as well as host response to infection. They develop experimental methods to validate the computational predictions. Dr. Papin is an elected member of the Board of Directors of the Biomedical Engineering Society, an elected Fellow of the American Institute of Biological and Medical Engineering, an NSF CAREER awardee, and Deputy Editor-in-Chief of PLOS Computational Biology.

7. **Rebecca Dillingham** is the Harrison Distinguished Teaching Associate Professor of Medicine, the Director of the University of Virginia’s Center for Global Health and co-founder of UVa’s
Global Health Leadership Track, a program that provides global health training for residents from eight clinical departments in the School of Medicine. Dr. Dillingham has led the development of global health training across the schools at UVa since 2006 through the UVa Framework Program in Global Health, an initiative supported by the National Institute of Health’s Fogarty International Center. In addition to competing successfully for sustained funding through the Framework program, Dr. Dillingham developed and leads 2 other NIH-funded international research training grants. In addition to her leadership of global health training, through which many students explore topics related to infectious disease, Dr. Dillingham has substantial experience in the development of international research collaborations. For example, in 2008, she co-founded and now continues to lead the Water and Health in Limpopo (WHIL) program in collaboration with colleagues at the University of Venda in rural South Africa. This community-engaged project has garnered over $6 million in funding over the past 8 years from federal funders, foundations, and private donors and includes faculty collaborators from five schools at UVa. The program currently focuses on reduction of diarrheal disease through the elimination of water-borne pathogens from drinking water at the point-of-use and the enhancement of health care delivery and health care outcomes for people living with chronic disease in the region, including those with HIV. The WHIL program has created research opportunities for over 150 students, including providing the platform for 3 completed dissertations and two that are in course. Dr. Dillingham’s experience in trans-disciplinary collaboration extends across the international infectious disease implementation research spectrum, and it ranges from community-engaged problem definition, to descriptive epidemiology, to intervention testing, and program evaluation. With this experience, she will contribute meaningfully to the Institute through her own continued research and her capacity to mentor others.

8. **Lukas Tamm** is the Harrison Distinguished Professor in Molecular Physiology and Biological Physics and the Director of the Center for Membrane and Cell Physiology. His lab studies virus entry into cells and bacterial antibiotic resistance using structural, biophysical, and cell biological approaches. Specifically, Dr. Tamm’s lab has solved the fusion peptide structures of the surface glycoproteins of influenza virus, HIV, and Ebola virus allowing them to uncover their involvement in viral entry into animal and human cells. The work opens opportunities to block viral infections at the level of cell entry of these membrane enveloped viruses. The lab has also solved the structures of 4 bacterial outer membrane porins, namely those of OmpA and OmpG from Escherichia coli and OprH and OprG from *Pseudomonas aeruginosa*. OmpA was one of the first two structures of larger membrane proteins that were ever solved by magnetic resonance spectroscopy by any research team world-wide. Its folding and function as an ion channel were extensively studied. OmpG is pursued as a target for biosensor development. The outer shell proteins OprH and OprG are studied to understand and overcome the notorious antibiotic resistance of *Pseudomonas aeruginosa* at the level of outer membrane transport of this serious human pathogen.
Executive Advisory Board

9. **Susan Barker** serves as the Senior Director of Research Advancement for UVA School of Engineering and Applied Science (SEAS). In this position, she facilitates business development and programmatic support for new research programs. The scope of her position covers all research opportunities and SEAS corporate partnerships. She provides expertise in strategic planning, business development, program and personnel management, and research and development, drawing from a 20+ year career spanning government contracting organizations, industry, federal laboratories, and academia. Immediately prior to joining UVA, she supported Department of Defense funding agencies in mission-driven program planning, review of proposed research, and oversight of a ~$50-70M/yr portfolio of research from top universities, national labs and industry. Her DoD portfolio included diagnostics device for infectious disease and required interactions across the spectrum of government agencies working in infectious disease and pathogen detection. She holds a doctorate in analytical chemistry with expertise in the areas of chemical and biological analyses and medical diagnostics, including chromatography, spectroscopy/spectrometry, immuno- and nucleic acid assays, sensors, and microfluidics.

10. **Ruth Gaare Bernheim** is the William Hobson Professor and Chair of the Department of Public Health Sciences, School of Medicine, and Co-Director of the Institute for Practical Ethics and Public Life at the University of Virginia. She holds joint appointments in the Batten School of Leadership and Public Policy and the School of Law. Bernheim is the director of the Research Methods Core for the Translational Health Research Institute of Virginia (THRIV) where she leads the program to provide high quality biostatistics and regulatory support for clinical and translational research at UVA. She is the founding director of the Master of Public Health Program at the University of Virginia. Bernheim teaches courses in the medical, law, and engineering schools on public health law and policy and ethics, including in the required fourth-year medical school course on health policy. She is director of the Certificate Program in Public Health Sciences for Graduate Medical Education and led university-wide efforts to develop the undergraduate Global Public Health Minor and Global Public Health Major programs. Bernheim served recently as chair of the Center for Disease Control and Prevention’s (CDC) Ethics Subcommittee; as a member of the CDC Board of Scientific Counselors, Office of Public Health Preparedness and Response (OPHP), and the National Board of Public Health Examiners; and as president of the Virginia Public Health Association. Bernheim currently serves on the 10-member Board of Councilors of the Council of Education for Public Health (CEPH), the official independent agency recognized by the US Department of Education to accredit schools and programs of public health. Her research interests focus on ethics, law and public health policy, health disparities and public-health community needs assessment.

11. **Catherine Bradshaw** is a Professor and the Associate Dean for Research and Faculty Development at the Curry School of Education at the University of Virginia (U.Va.). Prior to her current appointment at UVa, she was an Associate Professor and the Associate Chair of the Department of Mental Health at the Johns Hopkins Bloomberg School of Public Health.
She holds a doctorate in developmental psychology from Cornell University and a master’s of education in counseling and guidance from the University of Georgia. She is the editor of Prevention Science and formerly Associate Editor for the Journal of Research on Adolescence. She organizes Curry’s efforts in globally-themed research. Her primary research interests focus on youth development, bullying, and school-based prevention programs. Her expertise will benefit the ongoing and planned research in the Institute of Global Infectious Diseases on the effect of pediatric infectious diseases on child and adolescent health and development, and frame positive interventions in light of what works most effectively in this population.

12. Frederick Hayden is the Stuart S Richardson Professor Emeritus of Clinical Virology and Professor Emeritus of Medicine in the Division of Infectious Diseases and International Health. Since joining the faculty in 1978 he has undertaken extensive clinical and laboratory-based research studies in therapeutics and vaccines for influenza and other respiratory viral infections. He continues to serve as consultant to multiple pharmaceutical and biotech companies on these topics. In recent years Dr. Hayden has become involved increasingly in international public health activities. During 2006-2008 he served as a medical officer in the Global Influenza Programme at the World Health Organization, Geneva and during 2008-2012 as influenza research coordinator within International Activities at the Wellcome Trust, London. Dr. Hayden chaired the writing committees for two WHO clinical consultations on avian H5N1 and one on pandemic 2009 H1N1 influenza and continues to serve as a consultant to WHO on emerging viral infections including avian H7N9 influenza and continues to serve as a consultant to WHO on emerging viral infections including avian H7N9 influenza, MERS-CoV, and Ebola. In 2012-13 he worked with WHO colleagues to develop a new initiative, the Battle against Respiratory Viruses (BRAVE), to foster research on this important public health problem. During his work at the Wellcome Trust he also helped to establish a new federation of clinical research networks called the International Severe Acute Respiratory and Emerging Infection Consortium (ISARIC) to improve the clinical research response to respiratory and other emerging infectious disease threats. ISARIC encompasses over 40 academic clinical research networks from 6 continents and has its Coordinating Center at Oxford University. After leaving the Trust he served as the interim chair of ISARIC and remains a member of its Executive Board. He has published over 350 peer-reviewed articles, chapters, and reviews, and co-edits the textbook Clinical Virology, the fourth edition will be published by the American Society for Microbiology later this year.

13. Michael King is a professor of practice in the Department of Chemical Engineering. Dr. King is retired from Merck and Co., Inc. as Senior Vice President, Science and Technology after a 32 year career. A major portion of his work at Merck was in the process development/commercialization of new pharmaceuticals and vaccines. At Merck Dr. King chaired Merck’s Biological Process Council for over a decade. Currently he is teaching the course “Bioproduct and Bioprocess Development” in SEAS which focuses on the commercialization of new vaccines and biologics. He is also a consultant with the Bill and Melinda Gates Foundation helping de-risk their investment in a new vaccine technology. Dr. King served on the board of directors of the biotechnology company Medivation, Inc. in San
Francisco, CA, until its acquisition by Pfizer in 2016. Dr. King’s role with the Institute would include education (integration of immunology, product technology, biochemical process engineering, regulatory, etc.) as well as subject matter expert on areas of opportunity in vaccine technology, adjuvants, vaccine delivery challenges, etc.

14. **Michael Timko** is Professor of Biology and the Director of the Echols Scholars. Dr. Timko’s research interests are broadly instituted in understanding the molecular and biochemical processes governing host-pathogen/parasite interactions across organisms. His lab’s work involves analysis of both plant and human pathogens and seeks to not only understand the biology of the process of their interactions but to develop prophylactics to prevent or disrupt host invasion, to identify therapeutics to treat the host to support re-establishment of normal physiological states, and to understand how to prevent re-occurrence. They have worked on the development of small molecules and probiotics to treat enteric diseases and prevent illness, and they are currently working on questions related to the role of the microbiome in disease progression. Finally, they are looking at plant and microbial based therapeutics for prevention and treatment of disease and illness created by pathogen and parasite attack. Dr. Timko’s work has impact on plant health, food security, nutritional balance and human health.

15. **Sankaran Venkataraman** ("Venkat") is the MasterCard Professor of Business Administration and Senior Associate Dean for Faculty and Research at the Darden Graduate School of Business Administration, University of Virginia. He is a member of the Strategy, Entrepreneurship and Ethics area at Darden and teaches MBA and executive level courses in strategy, entrepreneurship, and ethics. He is a faculty in numerous executive education programs at Darden and the Indian School of Business, and is on the faculty team of The Executive Program. He is an internationally renowned scholar and educator in the field of entrepreneurship. He has published extensively and has lectured around the world. The Academy of Management, the largest professional body of management educators in the world, has recognized his research by awarding him the inaugural IDEA award for Foundational Research in entrepreneurship and, in 2010, the Academy of Management Review (a leading journal of the Academy) cited one of his papers as the most influential in the past decade from among the papers published in that journal. He consults with Fortune 500 firms as well as several small companies. He facilitates strategy discussion for firms and is an advisor to firms, universities and government organizations. He has been a speaker for and advisor to the Entrepreneurial Forum, a program of the International Trade Administration of the U.S. Department of Commerce aimed at promoting trade through entrepreneurship around the world.

**Members**

16. **Hervé Agaisse** is an Associate Professor in the Department of Microbiology, Immunology, and Cancer Biology. His laboratory investigates the mechanisms supporting the development and propagation of the intracellular pathogens, *Shigella flexneri* and *Listeria monocytogenes*, in the human intestine. These unrelated bacterial pathogens invade
intestinal cells and gain access to the cytosolic compartment, where they manipulate the host cell actin cytoskeleton and display actin-based motility. As they reach the cell periphery, motile pathogens form plasma membrane protrusion that project into adjacent epithelial cells, where protrusions resolve into vacuoles. As the pathogens escape from the formed vacuoles, they gain access to the cytosol of adjacent cells, thereby achieving cell-to-cell spread. In the past few years, using RNAi-based genetic approaches, Dr. Agaisse’s group has systematically explored the host cell genes supporting pathogen spread from cell to cell. In addition to the genes coding for the factors required for reconstitution of actin-based motility in vitro, his genetic studies in intestinal cells led to the identification of genes required for efficient intracellular motility in vivo. Moreover, Dr. Agaisse uncovered host cell genes that are not required for actin-based motility, but are essential for efficient cell-to-cell spread. These newly identified genes support the formation and resolution of plasma membrane protrusions at the cell periphery. Altogether, these comparative studies with *Shigella flexneri* and *Listeria monocytogenes* uncovered the previously unappreciated notion that, although displaying similar strategies of actin-based motility in the cytosol of infected cells, these intestinal pathogens have evolved strikingly different mechanisms of formation and resolution of membrane protrusions. In addition to the study of bacterial pathogens, his group also explores the mechanisms supporting action-based motility of viral pathogens, such as vaccinia virus. These mechanistic investigations are critical to understanding how pathogens of global infectious potential survive and replicate in their hosts.

17. **Laura E. Barnes** is an Assistant Professor in the Department of Systems and Information Engineering. Dr. Barnes has a research background in medical informatics and the design of tailored health information technology. Her work fuses computational methodologies, analytics, and systems engineering approaches for the design of improved tools for the management and analysis of biomedical data. She is currently designing and evaluating systems for predicting and managing treatment for sepsis as well as developing risk scores for resources-limited settings in Sub-Saharan Africa. Dr. Barnes is also interested in the design of patient-centered mobile technologies for infectious disease surveillance in low and middle-income countries.

18. **Samuel C. Bodily** is the John Tyler Professor of Business Administration at the University of Virginia’s Darden School. His publications relate to decision and risk analysis, multiattribute utility, forecasting, strategy modeling, revenue management, and eStrategy. For the Institute of Global Infectious Diseases, his expertise can be applied to collaborations with those creating interventions in responding to an epidemic or outbreak, to help evaluate and weigh interventional options, and to make the development and disbursal of new therapeutics against global infectious diseases more palatable to manufacturers, government agencies, and NGOs. He has published textbooks and more than forty articles in top journals in the field.

19. **Thomas Braciale** is a Professor in the Department of Pathology. The Braciale laboratory has had a long-standing interest (over 30 years) in understanding the host response to
respiratory viral infection and the role of the host innate and adaptive immune response in controlling virus infection and in producing tissue injury. His research has focused primarily on Influenza A Virus infection and infection with Respiratory Syncytial Virus but has in the past also explored bio defense issues relating to poxvirus infection. The Institute of Global Infectious Diseases represents a novel particularly exciting approach to dealing with the many issues relating to Infectious Diseases including human health, economic development and political instability. The 2009 influenza swine flu pandemic, the emergence of the MERS virus, the outbreak of Ebola in West Africa and more recently the spread of Zika virus infection in South and Central America highlight the importance of this global problem. The approaches envisioned in this initiative represent the appropriate multipronged strategy to deal with Global Infectious Diseases. Dr. Braciale is most enthusiastic about the prospect of this Institute and his participation in its activities.

20. Michael Brown is a Professor in the Department of Medicine. Dr. Brown’s primary research interest centers on the genetics of host resistance to viral infection and the role of NK cells in virus immunity. This stems from his early work with MHC-linked proteasome subunits and MHC class I antigen processing. His main research goals now are to understand (1) how genetic diversity shapes and regulates both innate and adaptive immune cells/ responsiveness to infection, (2) how NK cell features and effector functionality are acquired and programmed by both genetic and environmental influences, and (3) how NK cells/responses to immune stimuli/target cells specifically affects and regulates adaptive immunity. His laboratory has learned that the MHC exerts substantial control over NK cells, and they have developed several valuable mouse models to examine this effect in much greater depth. They recently found that NK cell licensing, which is controlled by cellular MHC I expression patterns, can profoundly affect NK effector functions and their capacity to mediate virus resistance. While the molecular basis of NK cell licensing has not be delineated, this model system provides an outstanding resource and opportunity to identify and characterize the essential molecular determinants required to license NK cells. Thus, Dr. Brown’s research program provides an outstanding opportunity to establish international collaborations and for training future scientists, medical personnel, educators and policymakers. It also adds to the University’s integrated portfolio of research in infectious diseases which can lead to additional multi-PI collaborations and grant awards.

21. Timothy Bullock is an Associate Professor in the Department of Pathology. Dr. Bullock’s lab has a long-standing history of defining the mechanisms by which cytotoxic cells of the immune system, known as CD8+ T cells, are activated and differentiates. This is done with the intent to leverage this knowledge to develop molecules that augment the efficacy of vaccines, particular therapeutic vaccines that depend upon effector T cell activity. This knowledge and expertise will fit with intent of the Institute of Global Infectious Diseases to develop and deploy interventions that will be rapidly available to acute outbreaks of infectious disease. Dr. Bullock has managed grants from federal and philanthropic sources, and has a robust relationship with various entities in the biotechnological industries.
22. **James Casanova** is a Professor in the Department of Cell Biology. Dr. Casanova has been studying the relationships between bacterial pathogens and their hosts for many years. Much of this work has been focused on the enteric pathogen *Salmonella*, and the mechanisms through which it infects and survives within host cells. Using a combination of in vitro (cell culture) and in vivo (animal) models, these studies have identified host processes that are actively manipulated by the bacterium for its own survival, and characterized them at the molecular level. The laboratory is also actively pursuing the mechanisms of bacterial recognition by the innate immune system, and how the innate immune response is generated in response to that recognition. As a cell biologist, Dr. Casanova will contribute his expertise in the host response to infectious disease at the cellular and molecular level.

23. **Dr. Anna Cliffe** is an Assistant Professor in the Department of Microbiology, Immunology and Cancer Biology. Dr. Cliffe investigates the mechanisms of Herpes Simplex Virus type 1 (HSV-1) and HSV-2 persistence in neurons. Approximately 90% of the world’s population is infected with either HSV-1 or HSV-2. The viruses persist for life in the form a latent infection in peripheral neurons. Periodically the viruses can reactivate to cause disease including genital lesions, keratoconjunctivitis and encephalitis. The Cliffe lab is interested in the unique properties of neurons that permit a latent infection with HSV-1 and HSV-2. Using primary and differentiated neurons along with animal models, they are investigating how neurons sense and respond to HSV infection. In particular, how neurons sense incoming virus at the natural site of infection on the axon and how signals are transmitted to the neuronal nucleus to result in silencing of the viral genome. Although cell stress is associated with reactivation from latency, the mechanism by which viral gene expression is initiated following stress is not understood. The Cliffe lab is investigating the molecular pathways that trigger HSV-1 and HSV-2 to reactivate from latent infection. Neonatal HSV infection is a major public health concern as the risk of encephalitis following transmission of the viruses to the newborn can be as high as 30%. To understand whether changes during maturation of neurons alters their susceptibility to virus infection, the Cliffe lab is examining differences in innate immune responses and HSV infection in neonatal, mature and aged neurons. This work has relevance to other neurotropic viruses, many of which show different outcomes following infection of neonates compared to adults. The long-term goals are to understand how neurons respond to viral infection and how HSV latency is maintained and reactivated. Ultimately, the Cliffe lab aims to develop new therapies to prevent reactivation of HSV-1 and HSV-2.

24. **Cristian Danna** is an Assistant Professor who joined the Department of Biology in the College of Arts & Sciences in 2014. During his postdoctoral training at Harvard University, Dr. Danna acquired extensive experience in plant innate immunity, plant defense and the genetics and chemistry of plant-made small compounds with antimicrobial properties. The Danna lab studies the antimicrobial defense responses associated with the production of plant-made small compounds. Most of these small compounds are produced in large amounts only after the onset of defense. The Danna lab has assembled a large collection of mutants of the model plant *Arabidopsis thaliana* in which the synthesis of some of these
small compounds is compromised. The Danna lab uses this collection of mutants to screen for compounds that suppress the growth of human pathogenic bacterial and/or interfere with virulence mechanisms associated with bacterial pathogenesis in humans. The rational supporting the use of Arabidopsis mutants is based in the fact that organic extracts obtained from wild type plants have antimicrobial properties against *Staphylococcus aureus* and *Pseudomonas aeruginosa*, an activity that is missing in the organic extracts of mutants in which the synthesis of a particular class of small compounds is compromised. This information is used to narrow down the final identification of small compounds with antimicrobial activity.

25. **Ashley Deeks** is an Associate Professor in the Law School, and a Senior Fellow at the Center for National Security Law. Her primary research and teaching interests are in the areas of international law, national security, intelligence, and the laws of war. She has written articles on the use of force, the intersection of national security and international law, and the laws of war. She is a member of the State Department's Advisory Committee on International Law and serves as a senior contributor to the Lawfare blog, one of the leading blogs addressing hard national security issues. She has written extensively about the role of non-state terrorist groups and international efforts to counter terrorist threats. These threats include efforts to obtain nuclear materials and chemical and biological weapons for use against civilian populations.

26. **Zygmunt Derewenda** is a Professor in the Department of Molecular Physiology and Biological Physics. Dr. Derewenda is a structural biologist with expertise in protein structure/function studies, with specific emphasis on high-resolution investigations using X-ray crystallography. Several of his projects have been focused on proteins derived from pathogenic bacteria and viruses, and contributed to either better understanding of molecular mechanisms of pathogenicity, or drug discovery efforts. The proteins that were studied include the *Yersinia pestis* V-antigen, an essential virulence factor in cholera, and the C-terminal domain of the nucleoprotein from the Ebola virus.

27. **Isabelle Derré** is an Assistant Professor in the Department of Microbiology, Immunology, and Cancer Biology. Dr. Derré uses microbiology, cellular biology and experimental approaches to study molecular mechanisms underlying the interaction between pathogens and their mammalian host. Her laboratory studies *Chlamydia trachomatis*, a gram-negative bacterial pathogen of tremendous public health concern. Ocular serovars lead to trachoma and genital serovars are the leading cause of bacterial sexually transmitted disease in developed countries. In women, *Chlamydia* genital infections are often asymptomatic and if left untreated sequelae range from damage of the fallopian tubes, long term pelvic and abdominal pain, ectopic pregnancy and infertility. Since case rates are not declining and reinfection rates are increasing, and since a vaccine is not available, Chlamydia infections remain therefore a global health concern. The Derré group investigates how *Chlamydia trachomatis* has evolved to manipulate the eukaryotic cell and establish an intracellular niche favorable for survival and replication. Her approaches combine cell biology, molecular biology, microbiology and confocal microscopy techniques together with the newly
developed genetic tools for Chlamydia. Overall, the Derré laboratory seeks to further the understanding of the molecular mechanisms involved in the infection process to reveal novel drug targets and facilitate the translational research development of tools to prevent, treat and control *Chlamydia* infection.

28. **Joshua C. Eby** is Assistant Professor in the Division of Infectious Diseases. His research focuses on the *Bordetella pertussis*, host-pathogen interaction. He studies the effect of adenylate cyclase toxin on cells of the innate immunodefense system, with particular interest in neutrophils. Most recently, his group has been taking a fresh look at pertussis pathogenesis using in vivo transposon sequencing and in vivo RNA sequencing. The studies are also lending novel insight into B. pertussis metabolism. Dr. Eby is an Infectious Diseases clinician which informs his research and collaborations.

29. **Edward H. Egelman** is the Harrison Distinguished Professor in the Department of Biochemistry and Molecular Genetics. He has been widely recognized for his development of methods to determine the structure of helical polymers using electron microscopy. He is a Fellow of the American Academy of Microbiology and of the Biophysical Society, and has served as Editor-in-Chief of Biophysical Journal and as President of the Biophysical Society. A large part of his research involves studying bacterial polymers (adhesion and conjugation pili, flagellar filaments, Type VI Secretion System sheaths, Type III Secretion System needles and plasmid segregation filaments) that are essential for bacterial pathogenesis. He has played a leading role in the current revolution in cryo-EM where polymers that can never be crystallized can be solved at near-atomic resolution using microscopic methods.

30. **Daniel Engel** is Professor in the Department of Microbiology, Immunology, and Cancer Biology. Dr. Engel’s research focuses on drug discovery for four viruses that are well known global infectious disease agents. Influenza, dengue fever, Zika fever and Ebola hemorrhagic fever are diseases caused by highly pathogenic RNA viruses that have proven difficult to target for drug discovery. For influenza, the yearly "seasonal" vaccine does not keep up with the constant genetic drift of the virus, or with new pandemic strains. For dengue virus, there are no vaccines or drugs available despite approximately 100 million cases per year worldwide. Ebola virus and Zika virus remain unchallenged by pharmaceuticals. His laboratory has developed new approaches to identifying chemical inhibitors for these viruses, using the budding yeast *Saccharomyces cerevisiae* as a test tube. They genetically modify yeast to express specific viral proteins or mammalian host factors. The cells are then challenged with large chemical libraries to identify novel compounds that can inhibit the function of the viral protein or host factor within the yeast cell, and also block virus replication in mammalian cell culture. The mechanisms of action of the compounds are studied using a combination of molecular, genetic, medicinal chemistry and structural biology methods.

31. **Sarah Ewald** is an Assistant Professor in Microbiology, Immunology and Cancer in the Carter Immunology Center. Dr. Ewald studies how the immune system balances the need to clear infection with the risk of damage to self. The protozoan parasite Toxoplasma gondii is a
master at manipulating this relationship with the immune system to promote persistence. A close relative of Plasmodium sp., the causative agent of malaria, Toxoplasma is possibly the most successful protozoan parasite. Infection is life-long and between 10-30% of the US is infected while the rate of infection in South America and France exceed 80%. Detection of Toxoplasma gondii and other eukaryotic pathogens poses a special problem for the innate immune system since their biology is much more similar to our own than viruses and bacteria. We are also interested in understanding the long-term implications of Toxoplasma infection which includes damage to the fetus during pregnancy, an increasing prevalence of ocular disease in Central and South America, and, in immune suppressed individuals damage to the brain. To complement these studies, Dr. Ewald is developing a micro proteomics technology to study inflammation in primary human cells and tissue biopsies.

32. **Mary Margaret Frank** is an Associate Professor of Business Administration and Academic Director of the Institute for Business in Society at the University of Virginia Darden School of Business. Frank currently serves on the board of directors and as chairperson of the Audit Committee of the Female Health Company/Veru Healthcare (FHC). Professor Frank’s research, teaching and curriculum development involve the intersection of private, government and public sector engagement on societal issues in order to affect change. In order to best accomplish this broader objective, she has initiated a cross-disciplinary agenda at the University of Virginia including a seminar titled the National Debt, a course and pan-university student initiative to address HIV/AIDS, the creation of the P3 Impact Award to recognize outstanding global public-private partnerships, and the Tri-Sector Leadership Fellows program featuring business, law and public policy speakers and issues. These initiatives and her outstanding teaching, innovative curriculum design and leading research have led Frank and her students to receive accolades from leading political figures as well as numerous awards. She believes that solving society’s most complicated problems require talented people from a variety of backgrounds who want to work together for a common goal.

33. **Brent A. French** is a Professor of Biomedical Engineering with joint appointments in Radiology and Cardiovascular Medicine. He currently serves the University as a member of the IACUC and SOM as a member of the Promotion and Tenure Committee. In addition, Dr. French serves as Faculty Advisor to the Molecular Imaging Center Core facility administered by the SOM through the Office of Research Core Administration. Dr. French has a longstanding record of accomplishment in a number of fields ranging from ischemic heart disease to gene therapy to preclinical imaging. Each of these fields relate directly to the goals of the institute, given that the pro-inflammatory component of ischemic heart disease is aggravated by infection (particularly periodontitis), that gene therapy shows great promise against infectious disease, and that the longitudinal assessment of most any animal model of infectious disease can be enhanced by preclinical imaging. Among Dr. French’s many collaborations at UVA, the one that synergizes best with this Pan-University Initiative is his collaboration with Kevin Janes (BME) aimed at developing AAV9-mediated gene therapies to treat both the acute and chronic forms of coxsackievirus infection in children and young adults. Among Dr. French’s external collaborations, perhaps the most relevant is
the collaboration with Dr. Jurgen Schrader at the University of Dusseldorf aimed at developing novel MRI methods for the early assessment of pneumonia. Other external collaborations of note include close ties (and recent publications) with the R&D arm of AstraZeneca located in Molndal, Sweden.

34. Andreas Gahlmann is an Assistant Professor in the Department of Chemistry. Dr. Gahlmann leads an interdisciplinary research lab that focuses on two primary objectives: (i) Development of new quantitative 3D super-resolution microscopy methods for live cell imaging and (ii) Application of these methods to analyze molecular and cellular interactions inside intact cells and cellular communities. The Gahlmann lab has recently constructed a high-throughput 3D microscope capable of providing quantitative insights about spatial and temporal processes in living systems. One particular application of this microscope is the determination of the in-situ architectures of macromolecular assemblies in bacterial pathogens. Future work using a second microscope which is currently under construction will investigate the competition and cooperativity in mixes-species bacterial communities.

35. Kirsten Gelsdorf is the Director of Global Humanitarian Policy and senior lecturer at the Batten School of Leadership and Public Policy. Kirsten brings 19 years of experience working in the humanitarian sector; most recently serving as the Chief of the Policy Analysis and Innovation section at the United Nations Office of Coordination of Humanitarian Affairs. Her career includes long-term field postings and operational deployments to numerous emergencies including the international responses where she helped coordinate responses to health crises. She also helped develop and promote the policies to link the response to HIV/AIDS, food insecurity, and poverty during the 6-country southern Africa crisis. She has led major policy processes and authored numerous high-profile policy reports documents that have been implemented by Member States and adopted in key UN resolutions. She has been the guest editor of Journal special editions and a Senior Researcher for Tufts University.

36. Jorge Girón is an Associate Professor and Principal Investigator in the Department of Pediatrics. Dr. Girón has over 20 years of experience in the field of bacterial pathogenesis, specifically in the discovery, structural, molecular and functional characterization of fimbrial adhesins in the different *Escherichia coli* pathogroups and other bacterial pathogens including *Vibrio cholera*, *Mycobacterium tuberculosis*, *Mycoplasma penetrans*, *Shigella spp.*, *Stenotrophomonas maltophilia*, *Klebsiella pneumoniae*, and *Brucella abortus*. His work has contributed significantly to the understanding of the mechanisms of adherence and pathogenicity of several diarrheagenic *E. coli* groups and his papers are highly cited by many investigators in the field. In the role of PI, he established the groundwork for the research projects, managed staff, trained students and postdocs, wrote papers, presented data at national and international meetings, and managed timelines and budgets. Throughout his career Dr. Girón has collaborated and continues to collaborate, with many other researchers in the USA and overseas enriching the quality of his research as documented in his peer-reviewed publications.
37. **Gianluca Guadagni** is a Lecturer in Applied Math in the Department of Engineering and Society in SEAS and affiliated with the Data Sciences Institute. Dr. Guadagni’s expertise is in mathematical modeling of [apparently] non-deterministic dynamics and randomness, which is typical of complex systems such as the evolution and spread of pandemic infectious diseases. He uses cutting-edge computational methods and data analysis tools to provide key insights into the analytical techniques of statistical mechanics.

38. **Richard L. Guerrant**, Thomas H. Hunter Professor of International Medicine, is Founding Director of the Center for Global Health at UVA, one of the first trans-University Centers for Global Health in the country in 2001, having chaired the Division of Geographic Medicine from 1979 before that. His longstanding research interest is in enteric infectious diseases. Dr. Guerrant has lived and worked in the Congo, Bangladesh and Brazil. Guerrant edits the major textbook on Tropical Infectious Diseases, among 5 other books, and is author of over 600 original scientific papers, major textbook chapters and reviews, including some 18 coauthored scientific publications with UVA’s 3 Nobel laureates, Gilman, Murad and Marshall. His work is focused on the recognition, diagnosis, pathogenesis, impact and treatment of enteric infections. With colleagues in Brazil, Guerrant’s research documents the effects of and potential solutions for diarrhea and enteric parasitic infections on the long-term physical and cognitive development in malnourished children. He is past president of the American Society of Tropical Medicine and Hygiene and recipient of its Walter Reed Medal, recipient of the Mentor Award of IDSA (2009), the University’s Distinguished Scientist Award (2009) and its highest honor, the Thomas Jefferson Award in 2010, was named Outstanding Scientist of Virginia in 2012 and was honored by the NFID with the Maxwell Finland Award in 2014. Elected to the Institute of Medicine/National Academy of Medicine of the National Academies in 2003, Guerrant chaired its Board on Global Health (2007-2013) and currently serves on its Forum on Public-Private Partnerships for Global Health and Safety.

39. **William Guilford** is an Associate Professor of Biomedical Engineering in the School of Medicine, and Director of Educational Innovation in the School of Engineering and Applied Science. His expertise is historically in the field of molecular biomechanics, including the mechanics of intermolecular bonds and molecular motors, and also the design of novel instrumentation and software. He recently began studying the mechanics of motility in the pathogenic parasite Toxoplasma gondii. Motility is vital to the lifecycle of this and related organisms, such as the causative agent of malaria, as it allows parasites to invade host cells. Dr. Guilford is using a laser trap to directly measure force generation by the motile apparatus of a living parasite, providing a fundamentally new viewpoint on this poorly understood mechanism. He is also working with clinicians in Infectious Disease (esp. Dr. Amy Mathers, and collaborators at the Centers for Disease Control) to understand and mitigate the spread of infectious diseases in clinical settings, and to more easily and effectively treat Clostridium difficile infections by fecal microbiota transplantation (Dr. Glynis Kolling). Finally, Dr. Guilford directs the undergraduate program in Biomedical Engineering, as well as the new Educational Innovation Awards program in the School of
Engineering. Much of his scholarship has been in the domain of educational research, most recently on psychometrics for assessing non-cognitive learning.

40. **Jennifer Guler** is an Assistant Professor in the Department of Biology. The Guler lab studies the human infective malaria parasite, *Plasmodium falciparum*. Dr. Guler has a strong background in molecular and biochemical parasitology from her training in some of the premier parasitology labs in the country. The Guler Malaria Lab broadly investigates the mechanisms of antimalarial resistance; they use a variety of innovative tools to understand both genetic and metabolic adaptation by the parasite. This work is highly collaborative, involving partnerships that span the UVA grounds (Departments of Biomedical Engineering and Biochemistry and Molecular Genetics and the Division of Infectious Disease) and beyond (Mbarara University of Science and Technology in Uganda). The lab attracts students from across grounds, generating a vibrant mix of biology, biomedical engineering, and biomedical science backgrounds.

41. **Young Hahn** is a Professor in the Department of Microbiology, Immunology, and Cancer Biology. Her research program has been focused on studying the immunoregulatory mechanism(s) during hepatitis C virus (HCV) infection. HCV in humans is highly efficient in establishing viral persistent infection leading to chronic hepatitis, which in turn predisposes to the development of cirrhosis and hepatocellular carcinoma. Persistent HCV infection is a worldwide health problem with an estimated 3% of the world population (>180 million people) affected by chronic liver disease. Despite a successful anti-HCV therapy, there is an urgent need to develop vaccines to reduce the global burden of HCV-mediated severe liver disease. Extensive studies on host immune responses to HCV reveal that control of viral infection depends on robust T cell and B cell responses. In exploring the possible evasion mechanism(s), Hahn’s lab studies indicate that interaction of HCV-infected hepatocytes with monocytes/macrophages and dendritic cells of the innate immune system inhibited their ability to produce proinflammatory cytokines. During the last decade, Dr. Hahn has been studying the immunoregulatory mechanism employed by HCV and its impact on controlling hepatic inflammatory responses and tissue damage using both human and murine systems. Dr. Hahn has a broad background in viral immunology and pathogenesis with outstanding training. Recently, Dr. Hahn serves as a mentor for a graduate student from South Africa through the Global Infectious Diseases Program.

42. **Marie-Louise Hammarskjöld** is the Charles H. Ross Professor and Professor in the Department of Microbiology, Immunology and Cancer Biology. She is also the Associate Director of the Myles H. Center for AIDS and Human Retroviruses. She has been working on HIV for more than 30 years, especially in the area of molecular genetics of HIV and host cell interactions. Her work has been continuously funded by NIH and she has made many original contributions to the field and mentored many graduate and post-graduate students. For many years, she was Chair of the UVA Institutional Biosafety Committee and she is now a member of National Science Advisory Board on Biosecurity (NSABB) that advises the federal government on regulation of infectious disease research. During her many years in virology, she has also worked and published on other viruses of global
importance, such as EBV and HTLV. Since 2009, she has been involved in a partnership with University of Venda (UNIVEN) in Limpopo, South Africa. This includes collaborative HIV research with the group of Professor Pascal Bessong (a former postdoctoral trainee in the Thaler Center), as well as substantial educational efforts that are aimed at building human capital and research capacity at this historically disadvantaged university. This program is currently funded by a grant from the South African Department of Science & Technology and supports the teaching of a yearly hands-on 2 week workshop for about 30 students at UNIVEN, as well as participation of 2-4 UNIVEN students in the Summer Research Internship Program in the UVA Medical School. In addition, the Thaler Center hosts graduate students from UNIVEN for 12-18 month periods for mentoring and research on joint collaborative projects. In addition to this, Dr. Hammarskjöld is involved in outreach programs with high school students in the Limpopo region. This has included a Jefferson Public Citizen project in 2013, where a team of UVA undergraduates implemented a Molecular Biology/Genetics program at the Vuwani Center, a UNIVEN led outreach center for high school science education.

43. Rachel Harmon teaches in the areas of criminal law, criminal procedure and civil rights. Her scholarship focuses on policing and its regulation, and her work has appeared recently in the NYU, Michigan and Stanford law reviews, among others. She serves as associate reporter on the American Law Institute’s project on policing. From 1998 to 2006, Harmon served as a prosecutor at the U.S. Department of Justice. After a brief stint at the U.S. Attorney’s Office in the Eastern District of Virginia, Harmon worked in the Civil Rights Division, Criminal Section, prosecuting hate crimes and official misconduct cases, many of which involved excessive force or sexual abuse by police officers. She left the Justice Department to join the law faculty as an associate professor of law in the fall of 2006. Harmon received her law degree at Yale Law School, where she was articles editor for the Yale Law Journal and the Yale Journal of Law and the Humanities. Before law school, as a British Marshall Scholar, she earned an M.Sc. in political theory and an M.Sc. in political sociology, both with distinction, from the London School of Economics. After law school, she clerked for Judge Guido Calabresi of the U.S. Court of Appeals for the Second Circuit and Justice Stephen Breyer of the U.S. Supreme Court.

44. Tajie Harris is an Assistant Professor of Neuroscience. Dr. Harris’ research focuses on how the immune system detects and controls parasitic pathogens that infect the central nervous system, with a focus on Toxoplasma gondii. Her research group uses multiphoton microscopy and other approaches to visualize host-pathogen interactions in the brains of living animals. In 2013, Dr. Harris was recruited to the Department of Neuroscience and the center for Brain Immunology and Glia, a group of investigators from across Grounds that studies the interface between the immune and nervous systems. Dr. Harris is currently performing interdisciplinary research to understand how protective immune responses are coordinated within the brain. Dr. Harris is a member of the Carter Immunology Center and numerous training programs including the Neuroscience Graduate Program, Immunology Training Grant, Infectious Disease Training Grant, Medical Scientist Training Program, and
Biotechnology Training Program. Dr. Harris’ research is currently supported by the National Institutes of Health.

45. **Farzad Farnoud Hassanzadeh** is an Assistant Professor in the Electrical and Computer Engineering Department and the Computer Science Department. His research interests include mathematical modeling and analysis of mutations and genomic sequence evolution; and data fusion methods for ordinal data. Applications of his research relevant to the Global Infectious Diseases initiative may include modeling and prediction of mutation-driven antibiotic resistance; and epidemic threat detection based on data fusion. His teaching is focused on computational data analysis and statistical machine learning. He is the recipient of the 2013 Robert T. Chien Memorial Award from the University of Illinois for demonstrating excellence in research in electrical engineering and the recipient of the 2014 IEEE Data Storage Best Student Paper Award.

46. **Brian Helmke** is an Associate Professor in the Department of Biomedical Engineering. Dr. Helmke worked studies the fundamental mechanisms of force generation in the glideosomes of the parasite *Toxoplasma gondii*. His research strategy uses a laser trap transducer to position a microsphere in contact with immobilized parasites and their surface exposed adhesion proteins. Motion of the microsphere within the trap reflects the activity of the actin-myosin complex (and any other force generating components) in the glideosome. His laboratory has exposed a number of exciting features of the glideosome. First and foremost, the glideosome is not intrinsically polar in its force generation; rather, force generation becomes aligned to the long axis of the cell approximately one minute after receptor ligation. They have also shown the reliance of this apparatus on dynamic actin filaments, cytoplasmic calcium, and a lysine methyltransferase identified by Dr. Ke Hu at Indiana University. An important aspect of the research is to identify phenotypic physical behaviors of *T. gondii* that are associated with actomyosin-based motility and host cell invasion. In particular, cell motility and shape change are being investigated as primary determinants of the ability to invade host tissue. His lab specializes in cellular mechanobiology, with an emphasis on cell mechanics, cell motility, and signaling. Their core technical expertise is in areas of quantitative live-cell microscopy and image analysis.

47. **Erik Hewlett** is Professor of Medicine in the Division of Infectious Diseases and International Health, Department of Medicine and Professor of Microbiology, Immunology and Cancer Biology. He is research program is focused on bacterial toxins, their roles in bacterial pathogenesis and their uses as research tools. His primary work is on pertussis and on the mechanisms of action of adenylate cyclase toxin and pertussis toxin, both of which he has studied for more than 40 years. Dr. Hewlett is director of the UVA Traveler's Clinic and served as Associate Dean for Research for the School of Medicine from 1992-2010. He is an Innovation Associate in the office of the Vice President for Research and is chair of the board of directors of the UVA Licensing and Ventures Group.

48. **Scott K. Heysell** is an Assistant Professor in the Division of Infectious Diseases and International Health with prior field experience living and working in HIV and drug-resistant
tuberculosis (TB) endemic areas including rural South Africa, Tanzania, and Siberia. Dr. Heysell has focused research efforts in TB because it is the leading killer from an infectious disease worldwide, and drug-resistant TB and the emerging syndemic of diabetes/TB threaten to erode all prior gains in global TB control. Dr. Heysell's research focuses on optimizing pharmacokinetics and field-applicable drug-susceptibility tests for TB in populations at high risk of treatment failure. Dr. Heysell’s work has contributed to the paradigm shift that TB treatment failure is significantly driven by individual pharmacokinetic variability and M. tuberculosis quantitative susceptibility differences rather than a patient's non-adherence to medication or other programmatic deficits. He now leads a NIH supported multinational cohort to establish pharmacokinetic/pharmacodynamic targets for the severe forms of TB (across sites in Tanzania, Bangladesh, Uganda and Siberia), and to build capacity for infectious diseases research more broadly at these locations. He additionally has successfully mentored Tanzanian Master's and PhD students in a range of TB science.

49. James Howe is Professor and Director of the Nanoscale Materials Characterization Facility in the Materials Science & Engineering Department at UVA. He has longstanding research expertise in the areas of material interfaces, including the solid-liquid interface, as well as expertise utilizing static and in-situ high-resolution and analytical transmission electron microscopy techniques to study the structure, chemistry and dynamics of material interfaces at the sub-nanometer level. Prof. Howe is interested in understanding detailed mechanisms of biofilm formation and mitigation, using in-situ microscopy techniques and various engineering aspects of materials selection and surface design. He is particularly interested in understanding how bacteria/biofilms respond to electro-potential/chemical gradients and how these might be used to kill bacteria and control the spread of disease.

50. Ku-Lung (Ken) Hsu is an Assistant Professor in the Departments of Chemistry and Pharmacology. Dr. Hsu’s research program is focused on developing chemical methods and probes to study the enzymatic, metabolic, and cellular mechanisms underlying immune function in mammalian physiology and disease. His long-term goal is to discover new lipid pathways that can be pharmacologically targeted for boosting host immune responses to infectious diseases and cancer and for treating chronic inflammation. To achieve these goals, Dr. Hsu’s group aims to bridge state-of-the-art chemical biology and quantitative mass spectrometry to enable enzyme, inhibitor, and metabolic pathway discovery in vivo.

51. Molly Hughes is an Associate Professor in the Division of Infectious Diseases and International Health, Department of Medicine. The Hughes laboratory investigates a select family of host interferon-inducible CXC chemokines known as CXCL9, CXCL10, and CXCL11 as novel antimicrobial agents to combat bacterial pathogens that cause pulmonary infections. They have demonstrated that CXCL9, CXCL10, and CXCL11 exhibit antimicrobial effects against both the spore and vegetative bacillus form of B. anthracis. They have identified the putative target of CXCL11 as an FtsX permease component of an ATP-binding cassette (ABC) transporter, which is widely conserved across Gram-negative and Gram-positive bacterial species and thus, may be a “druggable target”. While the Hughes laboratory’s longstanding
focus has been on determining the mechanism(s) by which CXCL10 kills *Bacillus anthracis* spores and vegetative cells, they expanded the focus to include studying the mechanism(s) by which CXCL10, and its related chemokines, kill Gram-negative bacterial pathogens since the initially identified bacterial target, FtsX, is so highly conserved amongst bacterial species and because these chemokines were \ effectively kill Gram-negative bacteria as well.

**52. Donald Hunt** is the University Professor of Chemistry and Pathology. He has received numerous accolades including three distinguished awards from the American Chemical Society, The Thompson Medal, and Protein Society’s Christian B. Anfinsen Award. In 2014, he was inducted into the America Academy of Arts and Sciences. Professor Hunt pioneered efforts to develop methods and instrumentation that set the standard for ultrasensitive detection and characterization of proteins and peptides by mass spectrometry. These contributions continue to underpin the whole field of proteomics and have had a dramatic impact on research in immunology, cell signaling, cell migration, epigenetics and cancer. The ability to characterize complex mixtures of proteins, antibody structures, or MHC peptides during infections is essential to many future research collaborations in the Institute.

**53. Brant Isakson** is an Associate Professor in Molecular Physiology and Biological Physics and Resident Faculty member of the Robert M. Berne Cardiovascular Research Center. His area of research has focused on the microvasculature, and how cells in the blood vessel wall communicate in both health and disease. Recent work performed in collaboration with Dr. Tony Wang demonstrated that ZIKA virus can infect human endothelium, especially endothelial cells derived from umbilical cord (*Circ Res*, 2016). Our current work is focused on the mechanism and degree of endothelial cell ZIKA infection, using blood transfusions as a model system. We will be determining the extent of endothelial cell infection after blood cell infusion with ZIKA in multiple blood and mouse models. These findings may be translatable to other bloodborne pathogens of global relevance.

**54. Kevin Janes** is an Associate Professor in the Department of Biomedical Engineering. Dr. Janes’ expertise lies in experimental and computational approaches for dissecting the systems biology of host-cell responses. Of his many research foci, the one most relevant to the institute is investigation of the cellular signaling that is rewired in cardiac cells following infection by coxsackie B3 virus. Dr. Janes has been recognized as a Pew Scholar, a Packard Fellow, a Kavli Fellow, and recipient of the NIH Director’s New Innovator Award. He is currently a member of the Board of Reviewing Editors for *Science Signaling*.

**55. Peter Kasson** is Associate Professor of Molecular Physiology and Biological Physics and also of Biomedical Engineering. His research focuses on physical mechanism in infectious disease, with active projects on basic mechanism, robust identification of drug targets, and improvement of rapid diagnostics. Pathogens currently studied are influenza virus, antibiotic-resistant gram negative bacteria, and a new program on Zika virus. He is an active member of the RAPIDD consortium on predicting pandemic influenza (a BARDA- and NIH-funded international initiative with participants from the US, Europe, and Asia).
major national and international collaborations include with Stanford on novel platforms for measuring viral fusion and screening inhibitors, with Google on large-scale computation and machine learning, with Stockholm University on high-performance molecular simulation, and with Uppsala University and the University of Wisconsin on drug-resistant bacteria. He is also an early tester of Oxford Nanopore Technologies’ point-of-care sequencing devices (used successfully in the European Mobile Laboratory for Ebola sequencing in West Africa).

56. Dean Kedes is a Professor in the Department of Microbiology, Immunology, and Cancer Biology. Dr. Kedes is a physician-scientist with subspecialty clinical training in infectious diseases. His basic research program focuses on the human oncogenic pathogen, Kaposi’s sarcoma-associated herpesvirus (KSHV/HHV8). KSHV is the pathogen underlying the most common AIDS-associated malignancy worldwide, Kaposi’s sarcoma KS) as well as two other B cell lymphoma-like diseases. KS is a global health concern, ranking as the single most common cancer in a number of African nations. Dr. Kedes’ ongoing research program ranges from very basic work, including the determination of the function of individual KSHV encoded proteins and the use of super resolution microscopy (in collaboration with UVA investigator, M. Mitchell Smith) to elucidate the supra structure of the tether linking the viral genome to the human chromatin during latent infection. In addition, his research interests include projects aimed at characterizing primary infection of human tissue with KSHV and the identification of novel potential therapeutics. Over the last 16 years, the Kedes laboratory has pursued basic, translational and applied research projects and has made significant contributions to the field of KSHV biology and pathogenesis. Dr. Kedes is the Director of the University’s Medical Scientist Program, with an average enrollment of over 50 MD/PhD students and requiring the participation and coordination of over 150 faculty members and various members of the University’s upper and middle administration.

57. Kimberly Kelly is an Associate Professor in the Department of Biomedical Engineering. The Kelly Laboratory is interested in analyzing how the various biological scales such as molecules, proteins, cells, and structures interact in both normal and abnormal states. They utilize a multidisciplinary approach with expertise in chemical biology, physiology, proteomics, molecular imaging, and nanotechnology to make fundamental discoveries that are linked to the diagnosis and treatment of disease. The Kelly laboratory has been genetically engineering viruses to produce novel nanomaterials, identify pathogenic viruses, diagnose and treat cancer, and develop a method to identify drug resistant mycobacterium tuberculosis. In addition, Dr. Kelly teaches an undergraduate course entitled Nanomedicine (BME 4890), which incorporates focuses of the Institute, specifically therapeutic design and vaccines.

58. Melissa Kendall is an Associate Professor in the Department of Microbiology, Immunology, and Cancer Biology. Dr. Kendall’s expertise focuses on host bacterial interactions. Specifically, Kendall’s lab examines signaling pathways important for bacterial pathogens to sense and adapt to distinct host niches and cause disease. For this, they study enterohemorrhagic *Escherichia coli* O157:H7 and *Salmonella*. These pathogens cause outbreaks of deadly disease throughout the world. Importantly, antibiotics are not
recommended to treat EHEC infections, as antibiotics are thought to worsen the clinical manifestations of disease. Moreover, studies from around the world indicate that *Salmonella* has become increasingly resistant to conventional antibiotics, which can complicate treatment for systemic infections and, indeed, the mortality rate for these types of infections remains high. These issues underscore the urgent need to develop novel treatments for infectious diseases. A promising strategy is to prevent or limit infection by targeting signaling pathways responsible for expression of virulence traits. Thus, Kendall lab’s work studying signaling systems in EHEC and *Salmonella* may lead to the development of novel therapeutics to treat infectious diseases. Their research is in line with the goals of the Institute of Global Infectious Diseases, to enable treatment, and distribution of care for the most prominent and urgent global infectious disease threats.

59. **Mark Kester** is a Professor in the Department of Pharmacology and Co-director of the NanoSTAR Institute. His laboratory has evaluated nanoliposomes, nanodendrimers and nanocolloids as effective drug delivery vehicles for pharmacological and molecular agents. Relevant to the proposed Institute of Global Infectious Disease, his laboratory focuses on the relationship between sphingolipids and human viruses. By altering the sphingolipid composition of a host cell, viral infectivity is often reduced or eliminated altogether. Dr. Kester has begun to study the mechanistic relationship between influenza virus and the sphingolipid composition of human cells. Preliminary data indicate that specific sphingolipids may serve as promising targets to halting the viral infection. Their goal is to formulate a sphingolipid based nanoliposome that works synergistically with current anti-flu medications, such as Tamiflu.

60. **Glynis Kolling** is an Assistant Professor in the Division of Infectious Diseases and International Health, Department of Medicine, and is also a member of the Center for Global Health, the Institutional Biosafety Committee, and the UVA Fecal Microbiota Transplant Program. As part of the Center for Global Health, she has helped to mentor trainees from Brazil and Africa on projects related to enteric infections. She has extensive expertise in microbiology, bacterial pathogenesis (i.e., enterohemorrhagic *E. coli*, enterocaggregative *E. coli*, and *Clostridium difficile*), microbial communities, and applying host systems for understanding the host-microbial interface. Dr. Kolling maintains trans-disciplinary and cross-Grounds collaborations with academic and clinical faculty in Biomedical Engineering, Biology, Geriatrics, and Gastroenterology.

61. **Susan Kools** is the Madge M. Jones Professor in Nursing and the Director of Inclusion, Diversity and Excellence. Working with research partners at the Mbarara University of Science and Technology in Uganda, she is engaged in community-based participatory research that focuses on developing strengths-based, culturally and developmentally appropriate interventions to promote healthy development and sexual and reproductive health (SRH) in very young adolescents (VYAs, ages 10-14) in Uganda. This work will include prevention of HIV and other sexually transmitted infections, which are urgent global infectious diseases issues.
62. Gerard P. Learmonth Sr. is Research Professor in the Frank Batten School of Leadership and Public Policy. He is the founding director of the Center for Leadership Simulation and Gaming and the Center for Large-Scale Computational Modeling, a Data Science Institute Center of Excellence. His work involves the modeling and simulation of large, global environmental, economic, and social challenges. These comprehensive, data-driven simulation models may be linked with role-playing interfaces to create serious games for learning. His current effort is the design and development of a Global Food Security Game. In conjunction with the UVA Center for Global Health, Dr. Learmonth conducted in-country research on the effects of poor water quality on the growth and development of children in Limpopo Province, South Africa. The research involved a mobile phone-based census of several villages in Limpopo and the subsequent development of a simulation model used to test the efficacy of proposed water quality interventions using a virtual population developed from the census data. He holds a secondary appointment in the Department of Public Health Sciences in the School of Medicine and a courtesy appoint in the Department of Systems and Information Engineering in the School of Engineering and Applied Science.

63. Manuel Lerdau is a Professor in the Environmental Sciences Department with a joint appointment in the Biology Department. He specializes in evolutionary and community ecology, with a special interest in competitive, mutualistic, and reproductive relationships among organisms and how these relationships mediate population and community dynamics. He has used both evolutionary and ecological models to explore the links among diversity and functional traits. His recent efforts include studies of reproductive flexibility, population dynamics and biodiversity; genome-scale evolutionary change and the origin of functional traits; and competitive interactions in the face of environmental stress. These approaches are relevant for studies of competition and community dynamics among pathogenic and non-pathogenic microbes, the maintenance (or degradation) of microbial community diversity, and the evolution of novel traits (e.g., hyper-pathogenicity) among microbes. Lerdau is particularly interested in examining how two types of ecological interactions, competition and mutualism, affect community structure. For example, in the case of gut communities, how might some taxa compete for similar resources while others use degradation products as energy sources. Lerdau’s initial theoretical work in this area suggested that secondary metabolic products would be the loci of interesting interactions at the community and system scale, and this idea could be relevant also for microbial systems. In terms of infectious diseases, those that emerge from complex communities such as gut-based illnesses will be very amenable to the above ideas.

64. Garrick Loui is an Associate Professor of Systems & Information Engineering, with courtesy appointments in the Departments of Civil & Environmental Engineering and Engineering and Society, in the School of Engineering and Applied Sciences. His research goal is to assure safe, reliable, and affordable sanitation services to underserved communities worldwide. These services consist of drinking water, wastewater and sewage treatment, and solid waste management. The work develops methods for needs assessment, performance evaluation/gap analysis, and strategic resource allocation for sustainable sanitation service capacity assurance and disseminates examples of best practice in these methods. The work
is pursued through a consortium of collaborators from the service industries, government agencies, grassroots organizations and funding agencies.

65. Jennie Ma is a Professor of Biostatistics in the Department of Public Health Sciences and Department of Medicine at the University of Virginia. Trained in biostatistics and health informatics, Dr. Ma has engaged to biostatistical research in clinical and translational applications for more than 20 years. Her research interests focus on clinical outcomes research, survival analysis, longitudinal data analysis, clinical trials, and genetic epidemiology. She has served as PI or co-Investigator for various projects, and collaborated with numerous basic researchers and clinical investigators in a wide range of clinical applications with cutting-edge statistical methods, including nephrology, infectious diseases, cardiology, oncology, anesthesiology, diabetes and endocrinology, and drug addictions. She has provided sustaining biostatistical support in every stage of the clinical and translational research, such as study conception and design, data acquisition, decision of appropriate analytical methods, analysis and interpretation of data, and scientific reporting. She has served on a T32 training grant in Department of Medicine at the University of Virginia and mentored/co- mentored many graduate students, postdocs, residents and medical fellows, as well as junior faculties in quantitative clinical/biomedical research. In this proposed institute, she will work with the investigators in the unified Global Infectious Diseases community and contribute her biostatistical expertise to the research and training activities.

66. Barbara Mann is an Associate Professor in the Division of Infectious Diseases and International Health, Department of Medicine. Dr. Mann’s research expertise is in the pathogenicity of bacteria and parasitic diseases. Dr. Mann has worked extensively on the virulence mechanisms of the tropical enteric parasite Entamoeba histolytica. Her work on this parasite has included characterization of the major adhesin that mediates host attachment, vaccine studies, and work that led to the development of a diagnostic test. Dr. Mann, along with Dr. William Petri, received UVA’s Inventor of the year award for the invention that led to the production of a commercially available diagnostic kit for E. histolytica infection. Dr. Mann is co-director of two NIH training grants, Infectious Diseases and Biodefense and Emerging Infections, which support predoctoral and post-doctoral trainees. Dr. Mann is also chair of the Institutional Biosafety Committee, which is responsible for approving all research involving biohazardous material at UVA and has expertise in biosafety level three protocols and containment.

67. Amy Mathers is an Assistant Professor in the Department of Medicine. The urgent clinical problem of increasing carbapenem resistance in Enterobacteriaceae threatens the health of vulnerable patients around the world. The Mathers laboratory has been evaluating detection methods in clinical microbiology, nosocomial transmission dynamics and molecular transfer of carbapenemase genes in the hospital for the last eight years. Following a sabbatical at Oxford University, ongoing collaboration efforts have focused applying whole genome sequencing approach to disentangling horizontal gene transfer in nosocomial settings. Dr. Mathers has funded effort through formal collaboration with the
US Centers for Disease Control and Prevention evaluating the role of the hospital environment on contributing to acquisition of drug resistant gram negative bacteria in a simulated laboratory setting. She has been acting as a consultant to Public Health England for similar efforts. She has also written and received grants for cross campus collaboration with an active Coulter award software development for modeling hospital transmission of carbapenemase genes from the environment to patients. For this research Dr. Mathers collaborates with colleagues in Biomedical Engineering (Will Guilford and Jason Papin) and Systems Engineering (Laura Barnes), as well as other cross-ground collaborations.

68. Joann M. McDermid is an Assistant Professor in the Division of Infectious Diseases and International Health in the School of Medicine. As a registered dietitian, Dr. McDermid’s research interests are focused on understanding complex relationships between malnutrition and infection diseases in a global context. Dr. McDermid has lived in The Gambia where she conducted research on host iron metabolism as a determinant of HIV-1 and HIV-2 mortality and tuberculosis susceptibility. She maintains active research collaborations with the Tuberculosis Immunology group at the Medical Research Council in The Gambia. Dr. McDermid has led studies characterizing the evolution of mature breast milk immunology, the consequences of maternal and fetal inflammation on growth outcomes, as well as identifying nutrition-related and other risk factors for maternal and early infancy Cryptosporidium infection using a maternal-infant mixed HIV-status cohort she established in the Kisesa region of northwestern Tanzania in conjunction with collaborators at the Mwanza Research Centre of the Tanzanian National Institute for Medical Research and the London School of Hygiene & Tropical Medicine. Since joining UVA in 2015, Dr. McDermid has expanded her research directions towards further investigation of the role of breast milk immunology in shaping infant immunology and infectious disease outcomes.

69. Christian McMillen is professor of history and the author of three books, Making Indian Law, Discovering Tuberculosis: A Global History, 1900 to the Present, and Pandemics: A Very Short Introduction. He regularly offers classes on the history of epidemics and pandemics, as well as American Indian history. He is currently working on a book on the history of global efforts to provide clean water and sanitation to the billions without either.

70. Wladek Minor is a Professor in the Department of Molecular Physiology and Biological Physics. Dr. Minor’s laboratory investigates the structures of many protein targets that are important in infectious diseases. Their long-standing experience in developing tools for macromolecular crystallography tremendously benefits this endeavor. Dr. Minor is a member of NIAID Center for Structural Genomics of Infectious Diseases (CSGID) http://www.csgid.org/. Dr. Minor has developed and commercialized multiple large software packages for processing x-ray diffraction data and managing molecular structural databases, which have become the most frequently used software systems in protein crystallography. The papers describing these methods have now been cited over 30,000 times and the 1997 Methods in Enzymology paper is the 23rd most cited paper of all time, and the 7th most cited publication of the last 20 years. The data management systems LabDB and Unitrack, which track experimental details of protein production, structure
determination and biochemical characterization pipelines from clone to refinement, may have tremendous long-term impacts on structural biology. Both systems may play a critical role in improving experimental reproducibility—the cornerstone of scientific research upon which all progress rests. The system tracks millions of experiments on tens of thousands of targets and uses methodologies that have more recently become known as “Big Data” techniques. Metal coordination in protein structures are analyzed in “CheckMyMetal”, which validates metal identification and refinement.

71. Emma Mitchell is an Assistant Professor in the School of Nursing, and Director of the CNL/MSN Program, as well as the Assistant Director for Graduate Global Initiatives. Dr. Mitchell’s program of research centers on: global health disparities; women’s health; and the prevention, screening, and early detection of Human Papillomavirus-related cervical cancer in under- and never-screened women. She has pilot projects in rural far Southwest Virginia exploring innovative technology and delivery models aimed at increasing access to cervical cancer screening, and has led student research and educational initiatives in Nicaragua since 2008.

72. Christopher C. Moore is an Associate Professor in the Division of Infectious Diseases and International Health, Department of Medicine. Dr. Moore’s research involves studying sepsis pathophysiology with particular interest in the role of the innate immune system and sepsis pathophysiology, management, and outcomes of HIV infected patients in sub-Saharan Africa. He has written recently about the outcomes of patients with severe sepsis in Uganda as well as the immune response to experimental sepsis. In addition, he studies meningitis, tuberculosis, and malaria with partners in Uganda at the Mbarara University of Science and Technology (MUST). He is a co-investigator on an NIH supported grant for work in tuberculosis and a training grant that includes work in malaria that both take place in Uganda. He has created a memorandum of understanding between UVa and MUST which allows for students, trainees, and faculty to collaborate freely between both universities.

73. Sean R. Moore is an Associate Professor of Pediatrics and Director of Research for the Division of Pediatric Gastroenterology. Dr. Moore returns to the University of Virginia following 7 years on faculty at the University of Cincinnati, where he served as Associate Director for the Global Research Office at Cincinnati Children’s Hospital Medical Center, the largest pediatric research facility in the nation. The long-term goals of Dr. Moore’s research are to uncover underlying mechanisms of child undernutrition and enteric infections in developing countries and improve therapies to break their vicious cycle. Current global projects include: 1) IMAGINE, a collaboration with Dr. Aldo Lima of the Federal University of Ceará in Fortaleza, Brazil to define the dosing, efficacy, and mechanisms of a glutamine-based therapy for undernutrition in at risk children and 2) SEEM a collaboration with Dr. Asad Ali at the Aga Khan University in Karachi, Pakistan to define the etiologies and histopathology of environmental enteropathy among a birth cohort in Matiari, Pakistan. In complementary work, Dr. Moore’s laboratory is developing murine models of environmental enteropathy and human intestinal organoid models of host-microbe interactions.
74. Cameron Mura is an Assistant Professor of Chemistry, where his laboratory explores the structure, function, and evolution of the RNA-associated ‘Sm’ protein family. Bacterial Sm systems play key roles in virulence factor production, as well as quorum sensing and biofilm formation by opportunistic pathogens; thus, Sm systems are quite germane to the goals of this Institute. The Mura lab takes a multidisciplinary approach to Sm biology, motivated by the belief that a coherent and integrated understanding of Sm-based systems requires both experiment (biochemistry and structural biology) and modeling (computational biology), which enables him to significantly contribute to the transdisciplinary goals of this Institute. Highlights of Mura’s work prior to UVa include two ‘firsts’: the first crystal structure of an intact Sm ring, and the first µsec-scale computer simulation of DNA dynamics. The Mura lab’s recent efforts, recognized by a 2014 NSF Career award, include the crystal structure of a novel Sm protein assembly and the discovery of tiny RNAs bound to Sm rings from an evolutionarily ancient bacterial species.

75. Noah Myung is an Assistant Professor of Public Policy and Director of the Center for Leadership Simulation and Gaming in the Frank Batten School of Leadership and Public Policy. His research interests include game theory, organizational economics, and financial economics, often utilizing tools from experimental economics and behavioral economics. His Department of Defense research interests include market design, focusing on issues in retention, compensation, and assignment. Dr. Myung is coordinating the creation of the Pandemic Student Simulation Competition in conjunction with the Network of Schools of Public Policy, Affairs, and Administration (NASPAA), Spring 2018.

76. Robert Nakamoto is a Professor in the Department of Molecular Physiology and Biological Physics. The Nakamoto laboratory uses biochemical, kinetic, thermodynamic and biophysical approaches to elucidate the structure-function relationships of coupling mechanisms of active transporters. Currently, they are focused on the molecular mechanisms of the P-type ion transporting ATPases, the ABC-type multiple drug resistance transporters, the F0F1 ATP synthase and the TonB-dependent outer membrane iron transporters. They specialize in functional expression of proteins in native membranes and develop methods to measure transport activity in whole cells, membrane vesicles or reconstituted systems. They use mutagenic and chemical modification approaches to modulate reaction steps of transport mechanisms. In particular, they have exploited intramolecular disulfides to stabilize transport active conformations that cannot otherwise be trapped. They also use cysteine scanning for placement of spectroscopic probes to explore protein dynamics and conformational shifts during transport cycles. Of interest to the Institute of Global Infectious Disease are the multiple drug resistance transporter, which also appear in pathogenic bacteria, and the outer membrane transporters which are recognized by host immune responses and act as the receptor and import pathways for colicins and bacterial phages.

77. James Nataro is a Professor and Chair of Pediatrics. His laboratory has a 26-year history of work in global infectious diseases research. The major emphasis of the lab has been enteric
bacterial infections, including diarrhea-causing *E. coli* and *Shigella*, molecular diagnostic methodologies, population genetics, and vaccine development. The Nataro laboratory has discovered a large number of virulence factors present in diarrhea-causing *E. coli* and other gram-negative bacteria, and has, for over two decades, worked to elucidate the structure, function, prevalence, and roles of these factors. In addition, the Nataro lab has worked at field sites in the developing world to understand the burden and etiology of diarrheal diseases in the most impoverished settings and the best means by which to control these important disorders. More recently, the Nataro lab has addressed the role of the intestinal microbiota in health and disease among children in Africa and South Asia. In the course of this work, the Nataro lab has developed deep and long-standing collaborations with investigators in the Gambia, Mali, Kenya, Mozambique, Pakistan, India, and Bangladesh. These collaborations include capacity building and training of scientists from these countries in the Nataro laboratory. The work on enteric bacteria has generated important byproducts, including vaccines for agents of potential biological attack and engineered probiotics to improve intestinal health.

78. **Shayn Peirce-Cottler** is Professor of Biomedical Engineering with secondary appointments in the Department of Ophthalmology and Department of Plastic Surgery at the University of Virginia. She received Bachelors of Science degrees in Biomedical Engineering and Engineering Mechanics from The Johns Hopkins University in 1997. She earned her Ph.D. in the Department of Biomedical Engineering at the University of Virginia in 2002. Dr. Peirce-Cottler develops and uses computational models, in conjunction with novel experimental assays, to study complex, dynamic, and multi-cell biological systems. Her research focuses on understanding how heterogeneous cell behaviors and their interactions enable tissues to adapt over time, during physiological growth and in response to disease. Her multi-scale computational models employ agent-based modeling to bridge protein-level mechanisms with tissue-level, functional outcomes. Her research spans basic science discovery to the design of therapies for regenerative medicine. Specific areas of interest include acute and chronic inflammation, macrophage infection by pathogens, arterio-venous patterning, and the role of stem cells in orchestrating tissue regeneration. Dr. Peirce-Cottler is a past recipient of MIT Technology Review’s “TR100 Young Innovator Award” and the National Biomedical Engineering Society’s “Rita Schaffer Young Investigator Award”. She was recently elected into the American Institute for Medical and Biological Engineering College of Fellows.

79. **Lisa Colosi Peterson** is an Associate Professor of Civil and Environmental Engineering in the School of Engineering and Applied Sciences. Her research pertains to the water-energy nexus, whereby water is required to produce energy, and energy is required to produce water. We seek to develop novel treatment technologies that deliver superior water quality without excessive energy consumption. We are particularly interested in the removal of prescription antibiotics and other antimicrobial agents from treated domestic sewage, with an ultimate goal of slowing the rise of antibiotic resistant bacteria (ARB). Municipal wastewater treatment plants (WWTPs) are key points of entry for antibiotics into the environment, and chronic exposure of downstream microbial populations contributes to
the rise of ARB. We have previously demonstrated the capacity of freshwater algae to remove problematic trace organic contaminants (e.g., estrogens and other hormones) from treated WWTP discharges and shown that the treatment can be made net-energy generating, via digestion of the harvested algae biomass to produce methane-derived bio-electricity. We are now evaluating the capacity of this system to remove potent prescription antibiotics (e.g., ciprofloxacin [CIP] and amoxicillin). Initial results are promising; e.g., 93% CIPRO removal in 145 hours, with concomitant reduction in acute antibiotic potency in assays using E. coli. Observed removal is attributed to photo-degradation and biodegradation. Ongoing and future work will focus on characterizing drug metabolites and assessing the potency of treated wastewaters to stimulate rise of ARB during chronic exposure to model organisms and WWTP-relevant microbial communities. Involvement with the Global Infectious Diseases Institute will allow us the opportunity for collaboration with groups working in complementary research areas as well as enhancing access to resources between labs that may help to further this research.

80. William A. Petri is the Wade Hampton Frost Professor of Medicine. Dr. Petri has pioneered work on enteric infections and their consequences in children in low income countries. His work on amebiasis is seminal: he identified the Gal/GalNAc-binding lectin of the parasite E. histolytica that mediates contact-dependent killing of host cells, and engineered the genetic tools to validate the lectin’s role in pathogenesis and to develop both diagnostics and a potential vaccine. His latest work in Nature describes the “trogocytosis” (biting) mechanism by which amebae invade tissue. His FDA-approved antigen-detection tests now allow sensitive and specific diagnosis of amebiasis, and his 10-year study of 300 children in Bangladesh identified acquired immunity associated with mucosal IgA anti-lectin immune responses. Dr. Petri further discovered that susceptibility in children to amebiasis is due to a mutation in the leptin receptor, linking nutrition to immunity. Dr. Petri’s research additionally includes the pathologic innate immune response to Clostridium difficile and the study of environmental enteropathy and its impact on child health in low income countries. Dr. Petri has mentored 14 PhD students, 20 fellows and 4 visiting professors, many of whom are preeminent Global Infectious Diseases research leaders.

81. James Platts-Mills is an Assistant Professor in the Division of Infectious Diseases and International Health, Department of Medicine. Dr. Platts-Mills’ research focuses on the application of novel quantitative molecular diagnostics for enteropathogens to the epidemiology of enteric diseases in children in developing countries, including 1) revising estimates of pathogen-specific burdens diarrhea; 2) estimating associations between enteropathogen infections, in particular Campylobacter, on long-term growth and development outcomes in children; 3) describing the shifting etiology of diarrhea in settings where rotavirus vaccine has been introduced. This work is done with international collaborators in several countries in African and Asia, including Tanzania, Kenya, The Gambia, Mali, India, Bangladesh, and Pakistan. Dr. Platts-Mills’ role in particular is to develop and deploy analytic approaches in collaboration with Dr. Eric Houpt for developing diagnostics for enteropathogens. They are also expanding their laboratory scope to include
next generation sequencing-based diagnostics, for which they have begun collaboration with the Bioinformatics group.

82. **Owen Pornillos** is an Assistant Professor in the Department of Molecular Physiology and Biological Physics. Dr. Pornillos’ group uses structural biology and biochemistry to study HIV structure and morphogenesis. Two key contributions in this area are structures of the mature HIV capsid, and soon-to-be-published structure of the immature capsid lattice. This work allowed them to define the molecular details of the boundary conditions of HIV maturation, which is a critical step in the viral life cycle and a proven target of anti-HIV/AIDS therapeutics. This is an important step towards the long-term goal of making a “movie” that describes the molecular transformations that drive HIV maturation. Ongoing work explores the mechanism of action of inhibitors, one currently in phase IIb clinical trials, which bind to the immature lattice and prevent the onset of maturation. Another broad area of interest includes the mechanisms by which so-called “pattern recognition receptors” identify and neutralize viral pathogens. Dr. Pornillos has recently defined how a receptor called TRIM5alpha recognizes and disables the incoming capsid of HIV. They are also studying regulatory mechanisms of the RIG-I pathway, which defends the cell against clinically important human pathogens such as influenza virus and dengue virus. This work will therefore contribute to and benefit from the Institute’s goal of enabling trans-disciplinary basic research on globally important infectious diseases.

83. **Philip Potter** is an Associate Professor in the Department of Politics and director of the National Security Policy Center in the Frank Batten School of Leadership and Public Policy at the University of Virginia. His research focuses on foreign policy, international security, and militant violence. He has recently published articles in International Organization, Journal of Politics, International Studies Quarterly, The Journal of Conflict Resolution, and the Annual Review of Political Science, among other journals. His recent book, *War and Democratic Constraint* (with Matthew Baum), a CHOICE outstanding academic title, is available from Princeton University Press. Professor Potter is a principal investigator for a Minerva Initiative project to map and analyze collaborative relationships between terrorist organizations. He regularly consults for the Department of Defense and intelligence community and is a University Expert for the National Ground Intelligence Center. He is on the editorial boards of the Journal of Politics and the Journal of Global Security Studies, and is an Associate Principal Investigator for Time-Sharing Experiments in the Social Sciences (TESS).

84. **Girija Ramakrishnan** is an Assistant Professor in the Department of Medicine. Dr. Ramakrishnan’s interest at the bench is in the molecular mechanisms of bacterial pathogenesis with special regard to nutrient acquisition in the host environment. A major focus of her research is the bacterium *Francisella tularensis*, the causative agent of tularemia or rabbit fever. A more recent research interest is *Mycobacterium tuberculosis*, the causative agent of tuberculosis. Dr. Ramakrishnan seeks to understand the role played by the essential nutrient iron in the infection biology of pathogen and host. She is currently working towards establishing a collaborative study with researchers in The Gambia on the
closely related organism *Mycobacterium africanum*. Dr. Ramakrishnan is involved in an international study aimed at understanding environmental enteropathy and susceptibility to infection in Bangladesh and Pakistan populations; investigating if a metabolomics-based approach can be used to evaluate nutritional status and inflammation in young children.

85. **David Rekosh** is Professor of Microbiology, Immunology and Cancer Biology, the Myles H. Thaler Professor of Medical Science and Director of the Myles H. Thaler Center for AIDS and Human Retrovirus Research. He has been working on HIV molecular biology since 1985, with continuous grant support from NIH and has made many fundamental and important discoveries about HIV and retrovirus gene regulation. Since 2005, he has been involved in work in South Africa in collaboration with Dr. Pascal Bessong, at the University of Venda (UNIVEN). Through this work they have been defining the types of circulating HIV found in Limpopo province and examining emerging drug resistance. This has included work with a study cohort of about 700 HIV infected individuals at an HIV clinic in the Bela-Bela township and developing relationships with other clinics and hospitals in Northern South Africa. This collaborative project has also involved him in the training South African students in his laboratories at UVa and he is also has become an active mentor of students working in Dr. Bessong’s lab at UNIVEN. Additionally, since 2010, he has been involved in capacity building and science education at UNIVEN, where he has annually organized and taught a two-week laboratory workshop and lecture series in molecular biology to honors undergraduate students and graduate students. He also has taught students from the secondary schools of Limpopo province, South Africa, through his work with the Vuwani Science Resource Centre, a science outreach Centre at UNIVEN. This work has included mentoring a University of Virginia Jefferson Public Citizens group consisting of 4 undergraduates and a biochemistry graduate student, who taught at the Centre for 10 weeks in the summer of 2013.

86. **Stephen S. Rich** is Harrison Professor of Public Health Sciences and Director of the Center of Public Health Genomics. Dr. Rich has a background in genetic epidemiology and statistical genetics, genome sciences and applications of genomics to complex human disease. As Director of the Center for Public Health Genomics, he is responsible for the research, education and service of over a dozen resident faculty in the Center, developing their independent research programs in molecular genetics, statistical and population genetics, and computational biology. Dr. Rich also oversees the Center’s Genome Sciences Laboratory, which serves as a focus on modern genomic technology that is used by resident faculty and in collaboration with affiliated faculty and others across the School of Medicine and across Grounds. Dr. Rich’s collaborative research has included a genome-wide association scan for loci contributing to the failure to respond to dietary supplementation in the context of malnutrition. Each of these efforts brings together faculty from across the University as well as national and international consortia for interdisciplinary research, including the Type 1 Diabetes Genetics Consortium, the Exome Sequencing Project, and the Trans-omics for Precision Medicine (TOPMed) program.

87. **Elizabeth Rogawski** is an Assistant Professor in the Department of Public Health Sciences and Department of Medicine, Division of Infectious Diseases and International Health. She
received her PhD in Epidemiology from the University of North Carolina-Chapel Hill with a focus in infectious disease epidemiology and international health. Her research interests are in pediatric enteric disease, and specifically, on the complex interactions between early childhood diarrhea, enteropathogen infections, environmental enteropathy, antibiotic use, and their effects on child health and development. The majority of her fieldwork has been based in South Africa and India. As a faculty fellow in the Center for Global Health, she works with a multidisciplinary team of collaborators and students to study the effectiveness of a point-of-use water treatment technology to prevent child stunting in rural South Africa. She is also interested in developing novel causal inference-based methods to generate epidemiologic evidence that is relevant to public health interventions and policy in the field of global infectious diseases.

88. Melanie Rutkowski is an Assistant Professor in the Department of Microbiology, Immunology, and Cancer Biology. Dr. Rutkowski’s primary research interest is to understand how disruption of commensal homeostasis, or commensal dysbiosis, influences systemic immune function. Age, diet, chronic use of antibiotics, or systemic inflammation due to infection can alter the composition and function of the commensal ecosystem. This can significantly impact the function of the innate and adaptive arms of the immune system. The Rutkowski lab is characterizing how acute changes to commensal equilibrium influence myeloid homeostasis and function, tissue fibrosis, and adaptive immune function in healthy and diseased conditions. The laboratory is also interested in characterizing disease susceptibilities and immune function in individuals that lack the ability to sense microbial products through TLR5, an innate signaling receptor. Approximately 7.5% of individuals harbor a polymorphism in TLR5, reducing the ability to signal through this receptor almost completely. Although this polymorphism is compatible with a healthy lifestyle, we have previously shown that individuals lacking TLR5 have differing susceptibilities to breast and ovarian cancer, compared to individuals with functional TLR5. However, there remains unknown disease etiologies associated with the absence of TLR5. It is the goal of the laboratory to understand how innate cells, primarily dendritic cells, that lack the ability to signal through this receptor develop and function in various pathological/inflammatory contexts.

89. China Scherz is a medical anthropologist who has been conducting ethnographic research in Uganda since 2007. She is especially interested in the impact of infectious diseases on children’s well-being and how infectious diseases outcomes are impacted by risky behaviors. Her first book Having People, Having Heart: Charity, Sustainable Development, and Problems of Dependence in Central Uganda (University of Chicago Press, 2014) focused on the tensions between different approaches to caring for orphaned children, many of whom were orphaned by their parents’ deaths from HIV/AIDS. She is currently leading a collaborative ethnographic study of alcohol use and recovery in Uganda. While high levels of alcohol consumption have been of increasing interest to medical researchers seeking to better understand diseases including HIV, tuberculosis, cancer, and other diseases in Uganda and in sub-Saharan Africa, this study will provide the first extended analysis of contemporary modes of conceptualizing and addressing problem-drinking in an African
context. In addition to her academic work, she also served as a project manager for an anti-retroviral adherence and directly observed therapy program for the Boston based PACT project of Partners In Health from 2002-2004.

90. John R. Shepherd is a social anthropologist with interests in population history, anthropological demography, disease history, Chinese societies, and the social history of Taiwan. His current research with relevance to Global Infectious Diseases includes the impact of the 1918 influenza pandemic in East Asia and the role of smallpox variolation and vaccination in the control of smallpox in late 19th and early 20th century Taiwan. Previous publications include historical demographic studies of trends in and regional variation in causes of death and mortality in early 20th century Taiwan, high fertility and maternal and infant mortality in early 20th century Taiwan, marriage and abortion practices among the Austronesian Siraya of Taiwan in the 17th century, and the impact of sojourning on demographic characteristics of Chinese immigrant populations. Dr. Shepherd’s courses include Anth 3130/7130: Disease, Epidemics and Society, and Forum 1500: Epidemics.

91. Lois Shepherd is the Peter A. Wallenborn, Jr. and Dolly F. Wallenborn Professor of Biomedical Ethics at the University of Virginia, where she directs the programs in law and medicine at the Center for Biomedical Ethics and Humanities. She is also a Professor of Public Health Sciences and Professor of Law at the University of Virginia. She is the co-author of a leading casebook, *Bioethics and the Law* (3rd ed. Wolters Kluwer), as well as the author of *If That Ever Happens to Me: Making Life and Death Decisions After Terri Schiavo* (2009) and numerous law review and medical journal articles on law and medicine, including reproductive medicine, disability, end-of-life decision-making, and research ethics.

92. Costi Sifri is an infectious diseases physician and Hospital Epidemiologist for the UVA Health System (UVAHS). His research program is focused on exploring the molecular and clinical epidemiology of transmission of multidrug resistant organisms (MDROs) in the hospital environment and the development of novel intervention strategies to reduce or halt their spread. Working with Dr. Amy Mathers and multiple UVAHS partners, his group has used a combination of classic epidemiologic investigation and innovative genetic and genomic tools to describe the institutional and regional emergence of CRE. As the UVHS Hospital Epidemiologist, Dr. Sifri is also responsible for lead preparedness and planning effort for the Health System for emerging infectious diseases of significant epidemiologic importance, such as Ebola virus disease. Due to their very nature, emerging infectious diseases such as Ebola and Zika represent numerous opportunities for international research collaboration and training. As one example, Hospital Epidemiology worked with the UVA Center for Telehealth to develop in-hospital telemedicine for patients admitted to the UVA Special Pathogens Unit with suspected Ebola virus disease. The Institute of Global Infectious Diseases would enable Dr. Sifri, his research group, and the Office of Hospital Epidemiology to continue to pursue important questions regarding the emergence and spread of MDROs around the globe. In addition, Dr. Sifri anticipates this infrastructure could be leveraged for research and education efforts directed towards emerging infectious disease as they arise.
around the globe, especially those that have the risk of becoming epidemiologically important in Virginia, such as Ebola, MERS-CoV, or most recently Zika virus.

93. Jim Smith is the Henry L. Kinnier Professor of Environmental Engineering in the Department of Civil and Environmental Engineering. Dr. Smith’s research focuses on developing appropriate technologies to improve water quality for the global poor. Globally, over 3 billion people do not receive water at the level of service we experience here the USA. As a result, over 2 million children die annually from ingestion of waterborne pathogens and the associated gastrointestinal infections, dehydration, and malnutrition. Countless more children suffer from growth stunting and cognitive impairment. In the absence of centralized water treatment and distribution systems, the World Health Organization has suggested that the best opportunity is to develop technologies that treat water right before consumption (e.g. at the household or point-of-use level). However, this is a difficult design problem as the inventions must be technologically effective, socially acceptable, extremely inexpensive, and simple to use. However, success in developing these appropriate technologies will result in countless lives saved by reducing infections by waterborne pathogens throughout the developing world.

94. Nathan Swami is an Associate Professor and Graduate Program Director in the Department of Electrical and Computer Engineering. Dr. Swami’s work on microfluidic diagnostic and co-culture systems for the control of infections is well matched to the proposed Institute of Global Infectious Disease. Current microbiological analysis approaches to detect infectious pathogens and identify therapies are focused on time-consuming and costly methods based on animal models or adhesion assays that reduce the number of experimental permutations that can be studied. His research group is focused on label-free microfluidic approaches for highly parallelized microbial manipulation, electroporation and analysis of microbes, with single-cell sensitivity. Specifically, Dr. Swami’s group utilizes the characteristic intracellular electrophysiology arising from the phenotypic differences between cells to identify subpopulations using single-cell impedance cytometry for enabling spatially localized microfluidic enrichment and biomarker analysis.

95. Sana Syed is an Assistant Professor of Pediatrics in the Division of Pediatric Gastroenterology. Dr. Syed has recently joined the University of Virginia faculty after completing fellowships in Pediatric GI (Emory) and Advanced Nutrition (Boston Children’s/ Harvard Medical School). The long-term goals of Dr. Syed’s research work are to understand intestinal function in the setting of poor oral vaccine immunogenicity and recurrent enteric infections in undernourished children living in low- and middle-income countries. Prior and current global projects include: 1) Investigation of biomarkers of gut function in infants at risk of growth faltering in Tanzania and Pakistan, her fellowship project mentored by Drs. Chris Duggan (Boston) and Asad Ali (Pakistan); and 2) SEEM, a collaboration with PIs Drs. Sean Moore (UVa) and Asad Ali (Pakistan) at the Aga Khan University in Karachi to define the etiologies and histopathology of environmental enteropathy among a birth cohort in a rural village in Pakistan.
96. Tania A. Thomas is an Assistant Professor in the Division of Infectious Diseases and International Health. Prior to joining UVA, she previously trained at Oregon Health and Sciences University and Yale University. Her research program involves the epidemiology and diagnosis of tuberculosis in endemic settings such as Tanzania, Bangladesh, Pakistan and the Philippines. Her current work focuses on host-immune responses to TB and leveraging them as diagnostic biomarkers for children and adults. She also conducts community-based contact investigation studies to increase the early detection of pediatric TB cases. Domestically, she serves as the state consultant for pediatric TB cases through the Virginia Department of Health.

97. Cirle A. Warren is an Associate Professor of Medicine at the Division of Infectious Diseases and International Health of the School of Medicine. As a physician scientist, her research focuses on the pathogenesis of and development of novel interventions for enteric infections. She has recently identified potential new treatments for Clostridium difficile infection, which is often worsened, not cured, when antibiotics are administered. Dr. Warren is investigating the mechanisms underlying the worse disease presentation in the elderly compared with younger individuals. She is involved in mentoring UVA undergraduates, medical students, residents, and fellows, providing laboratory, clinical or international research experience, as needed. She has also trained international research fellows from Brazil, the Philippines, Ghana, South Africa and Peru. She has collaborations with scientists, clinicians and developmental workers from private, academic or non-governmental institutions in Brazil, Costa Rica and the Philippines. She is currently involved in the development and promotion of Southeast Asian Studies at the University.

98. Judith White is a Professor in the Department of Cell Biology. Dr. White’s laboratory has studied enveloped virus entry into cells for over 30 years. They have helped unravel this process—a key target for anti-viral intervention—in the cases of influenza virus and a model retrovirus. Since 2006, Dr. White’s group has been working on the entry process of Ebola virus (EBOV) and more recently, Lassa fever Virus (LASV). Both are listed as category A priority pathogens by the NIH, and both are listed by the WHO as “top emerging diseases likely to cause major epidemics” based on a meeting of experts held in Dec. of 2015. EBOV is notorious for causing the devastating outbreak of Ebola virus disease (EVD) that occurred in West Africa in 2014-2015. Although only rough, the estimated number of LASV infections per year (also in West Africa) is 100,000 to 300,000 with 5,000 deaths/year (CDC website). It is further estimated that between 10% and 16% of patients admitted to hospitals in certain areas of Sierra Leone and Liberia are infected with LASV. At this time there are no approved vaccines or therapeutics for either viral disease. Dr. White’s laboratory is conducting both basic and translational research on EBOV and LASV, by probing mechanistic aspects of virus entry as well as participating in drug discovery efforts aimed at finding “practical” drugs to use as prophylactics and/or therapeutics for patients (and their contacts) stricken with either EVD or Lassa Virus Disease (LVD). “Practical” drugs are relatively low cost to develop, manufacture, deliver, and administer in resource-limited areas as in West Africa. Given the overlapping geographic distribution of EVD and LVD, their similar presenting symptoms, as well as similarities in the entry processes and replication strategies of EBOV and LASV, an
over-arching goal is to identify a drug (combination) efficacious against both EBOV and LASV.

99. Andrew C. Wicks is the Ruffin Professor of Business Administration at Darden. He is director of the Olsson Center for Applied Ethics, director of the doctoral program and academic advisor for the Business Roundtable Institute for Corporate Ethics. Wicks also serves as an adjunct professor in the Religious Studies department and the Frank Batten School of Leadership and Public Policy at UVA. He will contribute expertise to the Institute in research areas including health care ethics, stakeholder responsibility, stakeholder theory, trust, total quality management, and ethics and entrepreneurship. He works with MBA students, executives and corporations in the United States and abroad. Wicks is actively working with Ethics-LX, an entrepreneurial venture, to create a series of web-based simulations that incorporate ethics into the functional areas of business. He has authored four books and over 30 journal articles, and he has received awards for both his research and teaching.

100. Michael Wiener is a Professor in the Department of Molecular Physiology and Biological Physics, School of Medicine. His research has focused upon structure/function studies of two membrane protein systems highly germane to infectious disease, primarily using x-ray crystallography. One is an active transport system responsible for uptake of large and/or scarce nutrients, particularly iron-containing molecules, across the outer membrane of Gram-negative bacteria. The other is the human membrane-bound protease ZMPSTE24, which was very recently determined to have an additional non-enzymatic role as a broad-spectrum viral restriction factor, effective against multiple enveloped endocytosed viruses. The Wiener lab determined the novel structure of ZMPSTE24 and is characterizing its fascinating kinetics. His lab is conducting viral fusion studies with purified ZMPSTE24 to understand its molecular basis of antiviral function. Both the bacterial transport system and ZMPSTE24 are potential targets for therapeutics to treat prominent bacterial and viral infections.

101. Michael D. Williams joined the faculty of the University of Virginia in 2012, where he is an Associate Professor of Surgery and Director, Emergency General Surgery in the Department of Surgery and Director of the UVA Center for Health Policy, a joint program of the Batten School, the School of Medicine and the Department of Public Health Sciences. The Center for Health Policy provides comprehensive, apolitical analysis of current and proposed health policy for citizens and policymakers. He is also Lead Physician for Transitions Care for Well Virginia, UVA’s Accountable Care Organization. He has served as the Director of the UVA Summer Medical and Dental Education Program, which was established by a major grant from the Robert Wood Johnson Foundation. The program aims to help under-represented minority students become more competitive candidates for medical school. Dr. Williams has held numerous leadership positions in both clinical and academic medicine, and has many peer-reviewed publications to his credit. He passionately believes in the importance of patient-centered innovation in the application and management of health systems. His over 20 years of experience in health care delivery and systems design has led him to the conclusion that Health Equity starts with efficient, cost-
effective health system design and management. Dr. Williams has a strong interest and background in Population Health, and sees this as the greatest opportunity to achieve health equity, both in the United States and globally. He serves on the Board of Directors for Healthshare Global, LLC, a non-profit committed to improving communities through improving health globally.

102. **Martin Wu** is an Associate Professor in the Department of Biology in the College of Arts & Sciences. He has a broad background and training in microbial genomics, metagenomics and large-scale sequence data analysis. Using high throughput 16s rRNA sequencing and applying microbial evolution and ecology theory, Wu’s laboratory has been investigating how microbes as a community respond to host and environmental changes. Of particular relevance to the Institute in Global Infectious Disease is his expertise in the field of human microbiome.

103. **Mark Yeager** is the Andrew P. Somlyo Distinguished Professor and Chair of Molecular Physiology and Biological Physics. His research focuses on assembly mechanisms of pathogenic viruses. By the use of electron cryomicroscopy (cryoEM), X-ray crystallography and molecular modeling, Mark Yeager and his colleagues have discovered key design principles for the assembly of major viral pathogens such as HIV-1, hepatitis B, hepatitis C, SARS and rotavirus. The application of “hybrid structural methods” is especially powerful for the examination of megadalton assemblies that are pleomorphic, as exemplified by his studies on HIV capsid assembly. Electron crystallography of engineered two-dimensional crystals of the HIV-1 capsid protein CA yielded the first subnanometer resolution map that showed the molecular design of the hexagonal lattice of the conical capsid. In addition, the cryoEM-based model enabled the engineering of disulfide bonds that stabilized the hexameric and pentameric CA building blocks of the capsid, so that high-resolution structures could be determined by X-ray crystallography. These results enabled the building of the first atomic model of the conical capsid that revealed the molecular basis for the continuously variable hexagonal lattice in the pleomorphic, conical capsid. Follow-on studies identified an interface in the lattice as a potential drug target and showed that the restriction factor TRIM5α assembled as a hexagonal lattice, which was templated by the CA lattice. Dr. Yeager has also investigated structures associated with pathogenesis of *Neisseria, Pseudomonas*, and cholera bacteria.

104. **Steven Zeichner** is the McLemore Birdsong Professor of Pediatrics, Head of the Division of Pediatric Infectious Diseases, and Director of the Pendleton Pediatric Infectious Disease Laboratory, School of Medicine. He holds a joint appointment in the Department of Microbiology, Immunology, and Cancer Biology. A board certified pediatric infectious disease physician, Dr. Zeichner has conducted globally important clinical and basic research related to infectious diseases. In his clinical research, Dr. Zeichner participated in and was the principal investigator for phase 1 studies of new antiretroviral agents in children. He was the lead editor for the Textbook of Pediatric HIV Care and the Handbook of Pediatric HIV Care. In his basic research Dr. Zeichner conducted important research on the molecular genetics of HIV and herpesviruses, including Kaposi’s Sarcoma-associated Herpesvirus
His current research projects involve developing innovative technologies to distinguish highly immunogenic from less immunogenic antigens, which would be useful for vaccine development, including prophylactic vaccines for infectious diseases and therapeutic cancer vaccines. Dr. Zeichner has projects that aim to develop new, low cost recombinant bacterial vaccines for HIV prophylaxis and therapeutic cancer vaccines that would be especially appropriate for low income country settings. He has active collaborations with investigators at the University of the Free State, Bloemfontein, South Africa, and the South Africa Medical Research Council to develop a therapeutic vaccine for Burkitt lymphoma (BL), which is linked to Epstein-Barr Virus and malaria infections in Sub-Saharan Africa. Dr. Zeichner is also working with investigators at the Mbarara University of Science and Technology (MUST) and the epidemiology unit of Médicins Sans Frontières, Epicentre, based at MUST to define and improve BL diagnosis and therapeutics.

105. **Jianhui Zhou** is an Associate Professor in the Department of Statistics in the College of Arts & Sciences. His research focuses on statistical modeling of data from health studies. Specifically, Dr. Zhou developed statistical methods for longitudinal and functional data, and applied them to modeling growth curves collected from a cohort of children in a developing country who were at risk of malnutrition and infectious diseases. The developed methods help to identify children with growth faltering at early stage and select the associated risk factors, and facilitate timely medical interventions to improve the health of children at the risk of infectious diseases.

106. **Jochen Zimmer** is an Associate Professor in the Department of Molecular Physiology and Biological Physics. His research interests focus on how cells communicate with their environment, in particular how biological polymers, such as polypeptides and polysaccharides, are transported across biological membranes. Biopolymers are essential for life and many bacterial pathogens secrete proteinaceous virulence factors and complex carbohydrates crucial for pathogenicity. Examples include capsule and biofilm formation in *Neisseria meningitides* and *Pseudomonas aeruginosa*, respectively, and pore-forming toxin secretion in hemorrhagic *E. coli* as well as *Bacillus anthracis*. Determining the molecular mechanisms underlying biopolymer secretion requires a multipronged approach, which the Zimmer lab accomplishes by combing biochemical and molecular and structural biology techniques. As a general approach, they seek to reconstitute polymer translocation processes in vitro from purified components and to determine the 3-dimensional structures of the required transporters at different states during the transport cycle. The Zimmer lab is currently extending this research toward bacterial ABC-transporter mediated toxin and capsular polysaccharide secretion.