DC CFAR District of Columbia Center for AIDS Research

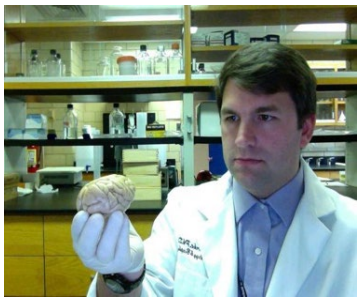
DC CFAR Basic Sciences Core Virtual Research Day
Friday, August 20th, 2021 from 2:00 pm – 5:00 pm

Keynote Speaker Biography

Dr. David Volsky, Ph.D.

Dr. David Volsky started his research career by studying Epstein-Barr Virus (EBV) and its role in cell immortalization and Burkitt's lymphoma. With the emergence of AIDS, he moved to retrovirology working on HIV biology and pathogenesis ever since. His early studies explored interactions between HIV and its cellular receptors, mechanism of action of the HIV Vif protein in HIV replication, and evaluation of HIV expression and genomic diversity in cells and tissues from HIV-infected patients. Subsequently, he focused on HIV neuropathogenesis, exploring HIV interactions with astrocytes and later macrophages and microglia, and how these interactions may lead to neuronal dysfunction and eventually dementia. His laboratory studied disruption of astrocyte glutamate transport by HIV, identified and cloned glutamate transporter EAAT1 promoter, and conducted cellular gene expression profiling in HIV-infected brain cells *in vitro* and in human brain tissues. More recently, with Dr. Potash, he constructed chimeric, mouse-tropic HIV, EcoHIV and found that it can establish chronic infection in immunocompetent mice that develop chronic illnesses typically seen in HIV+ patients on ART, including HIV-associated neurocognitive impairment (HIV-NCI). Following this finding, his laboratory has focused on elucidation of viral and host determinants of NCI and how the disease processes are affected by comorbidities and reversed by experimental therapeutics. He began working on AIDS in 1984, soon after discovery of HIV, drawing on the concepts developed in his previous studies on EBV receptors and different biology of this virus in B cells and T cells. His laboratory developed one of the first antibody and RNA hybridization assays for detection of HIV (then called HTLV-III/LAV) in human populations including US hemophiliacs and Spanish drug addicts. He developed cell lines resistant to the cytopathic effects of HIV for convenient HIV propagation and study of virus biology; isolated one of the first molecularly diverse "swarms" of phylogenetically related HIV clones from a patient; demonstrated functional variability among diverse HIV clones; documented genetic diversity of HIV in patients in the *vif* gene and HIV LTR regions and demonstrated the requirement of the HIV Vif protein to HIV replication in primary human macrophages. In an early foray into HIV treatment, he collaborated with Hoffmann-LaRoche scientists in validating a small molecule Tat inhibitor (Ro5-3335) they developed. These studies started with investigation of HIV interaction with human astrocytes, the most frequent cell in the brain that can carry HIV but lacks the viral CD4 receptor. In 1987 he reported that transformed astrocytes, which also lack CD4, can support HIV replication when transduced with HIV DNA or infected with pseudotyped HIV. This strategy was later exploited in his investigation of HIV infection of murine cells and mice. Subsequently, he investigated the viral pathogenic effects in primary human astrocytes that may play role in HIV brain disease. He conducted gene expression profiling of infected astrocytes and discovered that HIV and gp120 cause downmodulation of the major astrocytic glutamate transporter EAAE2, a defect that can lead to neuronal death by glutamate excitotoxicity. He identified a novel gene product elevated by HIV exposure that reduces EAAT2 promoter activity. He cloned the promoter of another major glutamate transporter EAAT1. Some of these findings were corroborated by his genome-wide study of gene modulation in the brains of HIV-infected people on or off ART, among others, showing reversal of EAAT2 down-modulation with ART and indicating one mechanism of reduced neurotoxicity *in vivo* in patients on ART.

Presenter Biographies



Dr. Mark Burke, Ph.D.

Dr. Mark Burke graduated from the State University of New York at Plattsburgh with an undergraduate degree in psychology. He then went on to complete his doctoral degree in biology at McGill University with a post-doctoral fellowship at University of Montreal. He is currently an Associate Professor at Howard University, the Associate Director of the Developmental Core of the DC Center for AIDS Research (CFAR), and Editor-in-Chief of the Neurodevelopmental Section of the journal Brain Sciences. His research focuses on neurodevelopment and the effects of developmental intrusions in non-human primates, such as hemispherectomies, fetal alcohol exposure, post-natal Zika infection and pediatric HIV infection. Dr. Burke collaborates with faculty from McGill University, University of Montreal, University of North Carolina, Children's National Medical Center, Georgetown University, Emory University and University of California at Davis.

Dr. Rebecca Lynch, Ph.D.

Dr. Lynch is an immunologist/virologist whose work focuses on the interactions between virus and antibody and is especially interested in the consequences of HIV-1 genetic diversity on antibody functionality. She trained at the Vaccine Research Center at the NIH as post-doctoral fellow in Dr. John Mascola's lab where her research focused on antibody and virus lineage development in individuals who develop broadly neutralizing antibody responses against HIV-1 as well as how to assess bNAbs in clinical trials. Her independent laboratory investigates how HIV-1 escapes from broadly neutralizing antibodies, and how to use this information to inform cure strategies. The lab is currently analyzing the neutralization sensitivity of re-activated reservoir virus from individuals on anti-retroviral therapy with an aim to inform personalized HIV-1 treatment. She has successfully transitioned her K22 research into an R01 as well as a CFAR pilot grant into an R21. She has 40 peer-reviewed publications, 7 of which focus on bNAb clinical trials.

Dr. Marjorie Gondré- Lewis, Ph.D.

Dr. Gondré-Lewis, Ph.D. leads the Developmental Neuropsychopharmacology Laboratory at The Howard University College of Medicine. She investigates the impact of maltreatment during early life, mechanisms of reward, as well as the actions of drugs of abuse in the central nervous system. The basic science arm of the laboratory uses animal models to test behavior, pharmacology, genetics, and biochemistry associated with neuropsychiatric disorders. Her Clinical Translational work addresses health disparities, genetic variations, and barriers to achieving brain health in the African American community, with focus toward achieving health equity. She was awarded a grant by the DC CFAR as a Transitioning Investigator to investigate the combined impact of Drugs of Abuse and HIV status on reward centers. She has authored >60 research articles, Reviews, and Book Chapters and has

obtained millions in federal funding to support her research, primarily from Institutes (NIAAA, NIMHD, NINDS, NIAID) of the National Institutes of Health, and also from private funding.

Dr. Natalia Soriano-Sarabia, Ph.D.

I am an Assistant Research Professor at MITM, GW. My research focus on understanding peripheral and tissue reservoirs of persistent HIV infection and developing novel strategies towards a cure. My background is in HIV pathogenesis and human immunology with specific training in innate immunity and HIV latency. My doctoral studies encompassed research in the pathogenesis of HIV and hepatitis C virus coinfection in Spain. In postdoctoral studies in Germany, I focused on understanding the role of the presence of common polymorphisms in Toll-like receptors (TLRs) in HIV disease progression and the study of γδ T cells. I then earned an award for career development from the National institutes of Health from Spain to perform my γδ T cell and HIV latency investigations at the University of North Carolina at Chapel Hill. In November 2019, I moved to the George Washington University.

DC CFAR Basic Sciences Core Services

Core Services

- **Virus Detection and Analysis Molecular Virology Core Laboratory (GWU)**
- **NGS CFAR Core Laboratory (GWU)**
- Research Pathology Core Laboratory (GWU)
- Flow Cytometry and Cellular Immunology Core Laboratory (GWU)
- Characterization of HIV latent reservoirs (GWU)
- Microscopy and Imaging Core Laboratory (GWU)
- **Multiparametric Flow Cytometry Core Laboratory (GWU)**
- Analysis of viral load (VA)
- **RCMI Proteomics Core Laboratory (HU)**
- Artificial Intelligence and Drug Discovery (HU)
- Biacore molecular interactions services (GU)
- Imaging Mass Cytometry (GU)
- Center for functional and molecular imaging (GU)

Available Instrumentation

- FACS Calibur DxP8 and FACScan analyzers (GWU)
- **BD LSR FortessaTM X-20 with 4 lasers and HTS capability (GWU)**
- NextGen MiSeq and NextSeq instruments, **10X Genomics single cell separation and iSeq** (GWU)
- **SP-X Imaging and Analysis System** (GWU)
- Confocal microscopes (Zeiss LSM 510, Zeiss LSM 710), Transmission Electron Microscope (JEOL JEM-1200EX) (GWU)
- Abbott Real-Time HIV-1 assays (VA)
- **Orbitrap Exploris 480 mass spectrometer with Thermo Ultimate 3000 nano-LC and Proteome Discoverer 2.5 software** (HU)
- Dell high-capacity workstations for molecular graphics and data analysis (HU)
- Multidimensional Flow Cytometry (BD Symphony 30 parameters) (GU)
- Biacore T-200 and Biacore 4000 instruments (GU)
- 3T MRI Scanner, EEG laboratory, Near Infrared Spectroscopy system (GU)

*Information on Microgrants, Pilot Awards, and Transitioning Investigator Awards can be found on the DC CFAR website.