

ASU Expertise in

Infectious Disease

March 2020

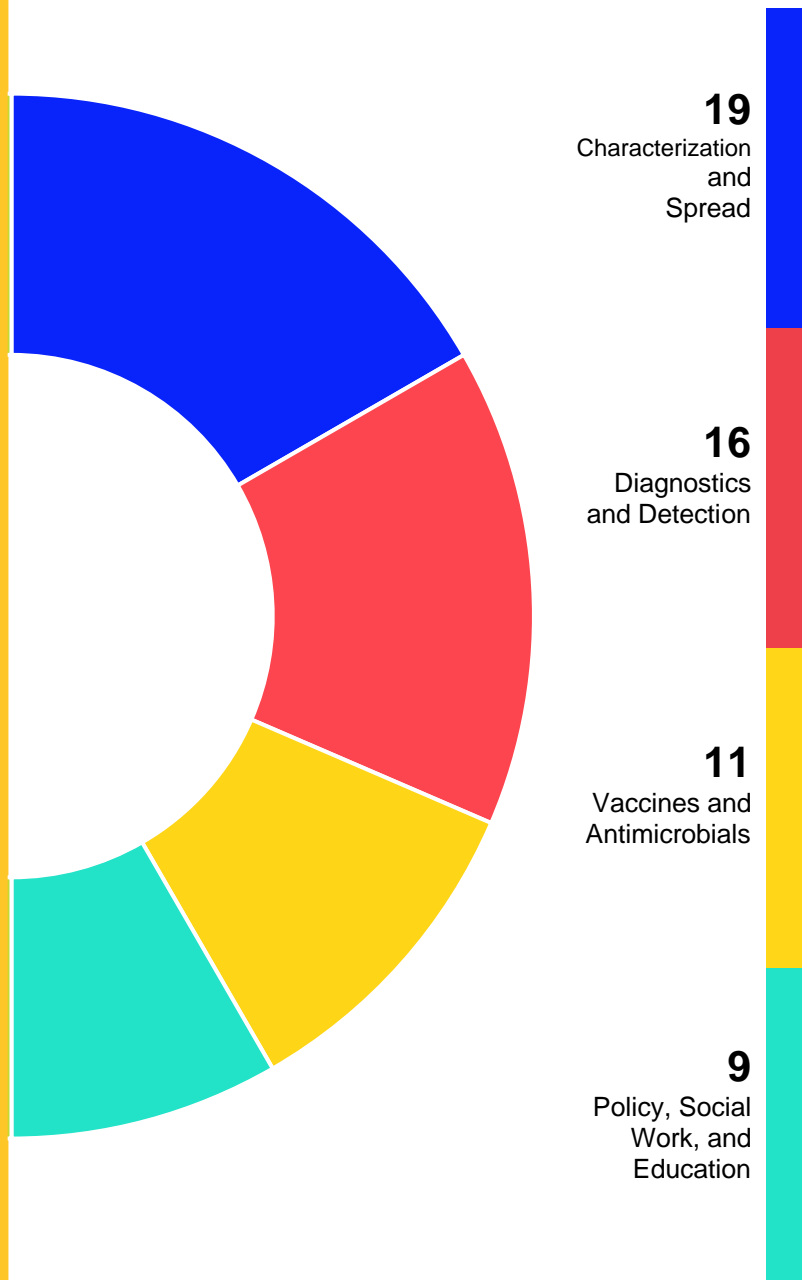
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55 Faculty

5 Centers

2 Laboratories

202 Publications



Background

Infectious diseases are illnesses caused by microorganisms such as bacteria, viruses, fungi, or parasites. Typically, these organisms are harmless or even helpful, but under certain circumstances, they may cause sickness. Infections can be transmitted from person to person, or through another vector, such as insects. Another source of infection can come from ingesting food or water that has been contaminated by harmful organisms.

Scientists continue to develop new and powerful methods for detecting, preventing, and treating infection. Vaccines are a potent tool for fighting infectious disease. They carry an agent that resembles the disease-causing organism, which improves immunity by causing the host to produce antibodies. These antibodies protect the host from later exposure to the actual pathogen.

ASU researchers approach the threat of infectious diseases from many angles, including epidemiology, vaccinology, molecular biology, biosecurity, sociology, and policy issues.

Centers, Initiatives, and Programs

- [Center for Applied Structural Discovery \(CASD\)](#): This center within the Biodesign Institute is developing new technologies and methodologies to reveal the structure and function of biomolecules to drive advances in medicine and energy conversion. CASD is developing technologies for taking snapshots of protein movements together with a series of drugs to understand how they interact. This knowledge will enable them to convert these snapshots into “molecular movies,” which will show how the proteins move and drugs bind and how a virus invades human cells.
- [Center for Evolution and Medicine](#): The Center for Evolution & Medicine is a university-wide Presidential Initiative whose mission is to improve human health by establishing evolutionary biology as an essential basic science for medicine worldwide.
- [Center for Immunotherapy, Vaccines, and Virotherapy \(B-CIVV\)](#): The B-CIVV seeks to invent, develop and translate novel therapeutic strategies against cancer and infectious diseases. B-CIVV is crafting next-generation treatment strategies in the areas of vaccines, engineered viruses and bacteria, and immune-based therapeutics.
- [Center for Innovations in Medicine](#): A center in the Biodesign Institute, CIM pursues innovative, unconventional approaches to improve medical diagnostics and the treatment and prevention of disease.
- [Center for Health Promotion and Disease Prevention](#): This center collaborates with community partners to enhance the health and well being of vulnerable populations across the lifespan. The center is structured around three main cores that include research, training, and community engagement. The center conducts and disseminates extramurally-funded research, supports the training of the next generation of health promotion and disease prevention scholars, and engages local community members, agencies, and stakeholders to support the translation of research findings into real-world applications to prevent spread of infectious diseases.
- [The Lim Lab](#): The Lim lab studies interactions and evolution of the human virome in development and immunity with an emphasis on how viromes shape the trajectory of infant development, metagenomic changes induced by immunosuppression affect transplant outcomes, and the role of the microbiome in diseases of unknown etiology. The Lim Lab is especially

interested in early life events that shape healthy infant development, transmission of the virome and bacterial microbiome from mother to infant, and the impact of HIV disease on mother-infant dynamics.

- [Risk Innovation Lab](#): A transdisciplinary “think lab” where creativity, collaboration, education, engagement and scholarship, come together to transform how humans see, think, and act on risk within society concerning health, well-being, environment in a risk landscape.

Experts

The experts in this area are categorized into four concentrations: (1) Disease Characterization and Spread, (2) Diagnostics and Detection, (3) Vaccines and Antimicrobials, and (4) Policy, Social Work, and Education.

Name	Title/Affiliation	Expertise/Research Focus
Characterization and Spread - 18		
Allen, James JAllen@asu.edu	Professor, School of Molecular Sciences	Membrane proteins by x-ray crystallography, bacterial reaction centers, structural characterization of a protein potentially lethal to larval form of <i>Aedes aegypti</i>
Castillo-Chavez, Carlos ccchavez@asu.edu	Regents Professor, School of Human Evolution and Social Change	Influenza, mathematical biology, theoretical biology, models; role of dynamic social landscapes in disease dispersal, host behavior, disease evolution, dynamics of addiction
Collins, James jcollins@asu.edu	Virginia M. Ullman Professor, School of Life Sciences	Host-pathogen interactions in species decline and extinction; ecology and conservation; amphibian diseases
Fromme, Petra Petra.Fromme@asu.edu	Professor, School of Molecular Sciences	Role of membrane proteins in infection cycle; structure and characterization of virulence determinants. Biochemistry and biophysics of membrane proteins
Ghirlanda, Giovanna Giovanna.Ghirlanda@asu.edu	Professor, School of Molecular Sciences	Proteomics, protein engineering to create artificial model proteins; membrane protein design, glycan-binding protein
Kuang, Yang kuang@asu.edu	Professor, School of Mathematics and Statistical Sciences	Mathematical biology and medicine, epidemiological models, mathematical oncology
Hogue, Ian ihogue@asu.edu	Assistant Professor, School of Life Sciences	Molecular and cell biology of viruses in the nervous system; structural biology; cell culture methodology of herpesviruses
Lim, Efrem Efrem.Lim@asu.edu	Assistant Professor, School of Life Sciences	Evolution of the human virome, virome trajectory, and impacts on HIV.

Name	Title/Affiliation	Expertise/Research Focus
Characterization and Spread - 18		
McFadden, Grant grantmcf@asu.edu	Professor, School of Life Sciences	Discovery of novel viral proteins that inhibit inflammatory pathways, Analyzes the role of intracellular signaling in poxvirus tropism, Developing poxviruses for oncolytic therapeutics to treat cancer, Examining how virus delivery to disseminated sites of cancer can be facilitated by utilizing multiple cell types
Milner, Fabio Fabio.Milner@asu.edu	Professor and Director, School of Mathematics and Statistical Sciences	Mathematical biology, epidemiological models
Misra, Rajeev rajeev.misra@asu.edu	Professor, School of Life Sciences	Bacterial proteomics; efflux pumps; E. coli; bacterial genetics, protein synthesis in cytoplasm
Nickerson, Cheryl Cheryl.Nickerson@asu.edu	Professor, School of Life Sciences	Microbial pathogenesis, gene expression, multidrug resistance, host-pathogen interactions, bacteria
Paaijmans, Krijn Krijn.Paaijmans@asu.edu	Assistant Professor, School of Life Sciences	Biology and ecology of viruses, parasites and insects effects and intensity of infectious of malaria and Zika
Perrings, Charles Charles.Perrings@asu.edu	Professor, School of Life Sciences	Invasive species, effects of disease on economy, biodiversity, and agricultural sectors, modeling
Scotch, Matthew Matthew.Scotch@asu.edu	Associate Professor, College of Health Solutions	Bioinformatics for public health, zoonotic disease surveillance, zoonotic RNA viruses
Shi, Yixin Yixin.Shi@asu.edu	Associate Professor, School of Life Sciences	Bacterial resistance; bacterial signaling and membrane transport proteins; gene expression and regulation, periodontal diseases
Smith, Hal halsmith@asu.edu	Professor, School of Mathematics and Statistical Sciences	Mathematical biology, epidemiological models, nonlinear dynamical systems
Thieme, Horst h.thieme@asu.edu	Professor, School of Mathematics and Statistical Sciences	Epidemiology, mathematical biology, disease outbreaks
Varsani, Arvind Arvind.Varsani@asu.edu	Associate Professor, School of Life Sciences	Virology; evolution of viruses; virological sequencing and dynamics; synthetic biology and bioinformatics for virus characterization; virological response to changes in local ecosystem; interaction and spread within ecosystem; pathogen emergence

Name	Title/Affiliation	Expertise/Research Focus
Diagnostics and Detection - 16		
Abbaszadegan, Morteza Morteza.Abbaszadegan@asu.edu	Professor, School of Sustainable Engineering and the Built Environment	Water quality, microbial detection methodologies, pathogens detection, inactivation and removal mechanisms
Alum, Absar Absar.Alum@asu.edu	Assistant Research Professor, School of Sustainable Engineering and the Built Environment	Microbial pathogen detection in environmental samples, drinking water biofilms, disinfection of water
Anderson, Karen Karen.Anderson.1@asu.edu	Professor, School of Life Sciences, Biodesign	Detection of antibodies resulting from infection; biomarkers; identify antigens for vaccines; immunoprofiling, tumor biologist
Bean, Heather Heather.D.Bean@asu.edu	Assistant Professor, School of Life Sciences	Detections using mass spectrometry; biomarkers of chronic lung infections, biological markers, prebiotics
Borges, Chad Chad.Borges@asu.edu	Associate Professor, School of Molecular Sciences	Biochemistry; Molecular markers of biospecimen integrity, protein posttranslational modifications to indicate disease
Chung, Yunro Yunro.Chung@asu.edu	Assistant Professor, College of Health Solutions	Statistics and machine learning to identify biomarkers for detection of disease, enhanced screening processes, early detection of disease
Forzani, Erica Erica.Forzani@asu.edu	Associate Professor, School for Engineering of Matter, Transport & Energy	Biosensors, biomarker detection, environmental volatile organic compounds, microfluidics
Garcia, Antonio TONY.GARCIA@asu.edu	Professor, School of Biological and Health Systems Engineering	Personalized molecular diagnostics devices, microfluidics, design and characterization of surfaces and colloids for diagnostic devices and biomolecule separation
Green, Alexander alexgreen@asu.edu	Assistant Professor, School of Molecular Science	Designed low-cost, paper-based diagnostic for Zika virus, synthetic biology
LaBaer, Joshua Joshua.Labaer@asu.edu	Executive Director, Biodesign; Professor, School of Molecular Sciences	Biomarkers for detection of disease, elucidation of infection activity, development of new proteomic profiling and mapping methods, personalized diagnostics

Name	Title/Affiliation	Expertise/Research Focus
Diagnostics and Detection - 16		
Lake, Douglas Douglas.Lake@asu.edu	Associate Professor, School of Life Sciences	Valley fever; detection of fungal proteins; cellular immune responses
Liu, Li liliu@asu.edu	Assistant Professor, College of Health Solutions	Integrating genomic, phylogenetic, population genetic, statistical and machine-learning techniques; clinical and molecular signatures of human diseases; computational methods to discover biomarkers for early diagnosis and accurate prediction of therapeutic responses for individual patients
Poste, George George.Poste@asu.edu	Professor, School of Life Sciences	Biomedicine and biotechnology, role of complex systems in cancer and infectious disease, biomarkers and molecular diagnostics
Sandrin, Todd Todd.Sandrin@asu.edu	Vice Provost, Dean, and Professor, New College of Interdisciplinary Arts & Sciences	Mass spectrometry and microbiology; MALDI-based approaches for bacterial characterization; antibiotic resistance; genotype profiling of bacterial populations
Tao, Nongjian Nongjian.Tao@asu.edu	Professor, School of Electrical, Computer, and Energy Engineering	Biosensors; interfaces between biological molecules and solid materials; molecular electronics; DNA characteristics; wireless devices for mobile health
Woodbury, Neal NWoodbury@asu.edu	Chief Science Officer, ASU Knowledge Enterprise; Director and Professor, School of Molecular Sciences	Molecular devices and nanoscale hybrid electronics for environmental monitoring and threat detection; immunosignaturing; proteomics

Name	Title/Affiliation	Expertise/Research Focus
Vaccines and Antimicrobials - 11		
Blattman, Joseph Joseph.Blattman@asu.edu	Associate Professor, School of Life Sciences	T-cell immune response; vaccine development; immunology, mouse models; recombinant viruses, cancer
Caplan, Michael Michael.Caplan@asu.edu	Associate Professor, School of Biological and Health System Engineering	Drug delivery platforms; MRI; biomaterials, local drug delivery, endothelial dysfunction in diabetes, cooperative DNA diagnostics
Chang, Yung YUNG.CHANG@asu.edu	Professor, School of Life Sciences	DNA nanostructure vaccine platforms; zebrafish modeling; nanoparticles; mice; DNA-binding proteins

Name	Title/Affiliation	Expertise/Research Focus
Vaccines and Antimicrobials - 11		
Chen, Qiang Qiang.Chen.4@asu.edu	Professor, School of Life Sciences	Gene delivery; plant-based vaccines; West Nile Virus; immune responses; recombinant proteins; plant-derived monoclonal antibodies; Ebola
Haydel, Shelley Shelley.Haydel@asu.edu	Associate Professor, School of Life Sciences	Mycobacterium tuberculosis and ulcerans; antibacterial clay properties and applications; MRSA; mice models; antibiotic resistance
Hogue, Brenda Brenda.Hogue@asu.edu	Professor, School of Life Sciences	Coronavirus; HIV; proteomics of viruses; mouse models and challenge assays; RNA viruses
Jacobs, Bertram bjacobs@asu.edu	Professor and Director, School of Life Sciences	Pox viruses; vaccines using Vaccinia Virus; HIV; monkeypox; tobacco plants for vaccines; t-cell immune responses; undergraduate HIV education; science and society
Johnston, Stephen Stephen.Johnston@asu.edu	Professor, School of Life Sciences	Immunosignaturing; antibody profiling systems for early detection of diseases; proteomics;
Leket-Mor, Tsafrir tsafrir.mor@asu.edu	Professor, School of Life Sciences	Tobacco plant based vaccines; HIV; recombinant proteins;
Mason, Hugh Hugh.Mason@asu.edu	Associate Professor, School of Life Sciences	Plant-derived vaccines; Norovirus; mucosal vaccines; Ebola; immune responses from pathogens; Yersinia pestis
Williams, Lynda Lynda.Williams@asu.edu	Research Professor, School of Earth and Space Exploration	Medicinal usages of clay; antibiotic resistance

Name	Title/Affiliation	Expertise/Research Focus
Policy, Social Work, and Education - 9		
Chen, Angela Angela.CCChen@asu.edu	Associate Professor, College of Nursing and Health Innovation	HIV and STI prevention and education; college age students; Asian culture; the influences of culture on behavior; hurricane Katrina aftermath public policy and response

Name	Title/Affiliation	Expertise/Research Focus
Policy, Social Work, and Education - 9		
Coon, David David.W.Coon@asu.edu	Associate Dean and Professor, College of Nursing and Health Innovation	Caregiving for patients with chronic disease such as HIV; gay men sexual health; Chinese American health; elders in all communities; Mexican American caregivers and elders
Doebbeling, Bradley Doebbeling@asu.edu	Professor, School of the Science of Health Care Delivery	Patient-centered care, clinical decision-support, infection tracking, intensive care units, data visualization
Hodge, James James.Hodge.1@asu.edu	Lincoln Professor of Health Law and Ethics, Sandra Day O'Connor College of Law	Public health impacts of Zika; emergency legal preparedness; public health legislation; public health; Ebola outbreak; health care settings
Jehn, Megan Megan.Jehn@asu.edu	Associate Professor, School of Human Evolution and Social Change	Infectious disease epidemiology; emergency preparedness; community mitigation strategies for pandemic influenza; decision-making in public health; simulation modeling for pandemic decision making
Marsiglia, Flavio marsiglia@asu.edu	Regents' Professor, School of Social Work	Drug abuse and HIV/AIDS education and prevention in Latino/a communities; middle school educational programs and assessment
Maynard, Andrew Andrew.Maynard@asu.edu	Professor, School for the Future of Innovation in Society	Developed informational video on Zika
Nesse, Randy nesse@asu.edu	Professor, School of Life Sciences	Evolution of diseases; science and society; biology education
Park, Hyejin HyejinPark@asu.edu	Assistant Professor, Mary Lou Fulton Teachers College	Her research and teaching focus on supporting young children with disabilities in the context of family.

Experts Listed by Pathogen

Pathogen	Expert(s)
Adenovirus	Joseph Blattman
Amphibian fungal diseases	James Collins
Bacillus (anthrax)	Lynda Williams
Bacteroides	Morteza Abbaszadegan
Candida albicans (fungus)	Cheryl Nickerson
Coccidioides Fungus (Valley Fever)	Stephen Johnson, Doug Lake, Neal Woodbury

Colletotrichum (fungus)	Todd Sandrin
Coronavirus (SARS, MERS)	Brenda Hogue
Dengue	Carlos Castillo-Chavez, Hugh Mason, Jorge Reyes del Valle
E. coli (pathogenic)	Morteza Abbaszadegan, Absar Alum, Shelley Haydel, Hugh Mason, Rajeev Misra, Cheryl Nickerson, Todd Sandrin, Yixin Shi, Lynda Williams
Ebola	Karen Anderson, Carlos Castillo-Chavez, Qiang Chen, James Hodge, Hugh Mason, George Poste, Matthew Scotch
Enterobacteriaceae (klebsiella, shigella)	Cheryl Nickerson
Enterococcus (vancomycin resistant)	Carlos Castillo-Chavez, Todd Sandrin
Francisella tularensis	James Allen, Petra Fromme
Gastroenteritis	Qiang Chen
Geminivirus (plant virus)	Hugh Mason, Tsafir Mor
Heliobacter	Petra Fromme
Hepatitis viruses	Yang Kuang, Hugh Mason, Jorge Reyes del Valle
Herpes virus	Joseph Blattman, Ian Hogue
HIV/AIDS	David Coon, Petra Fromme, Giovanna Ghirlanda, James Hodge, Brenda Hogue, Bertram Jacobs, Yang Kuang, Josh LaBaer, Efrem Lim, Doug Lake, Tsafir Mor, Flavio Marsiglia, Hal Smith
Human papillomavirus (HPV)	Karen Anderson, Angela Chen
Influenza viruses	Carlos Castillo-Chavez, James Hodge, Megan Jehn, Yang Kuang, Matthew Scotch, Horst Thieme, Carlos Castillo-Chavez
Legionella	Morteza Abbaszadegan
Measles virus	Jorge Reyes del Valle
Mycobacterium tuberculosis	Shelley Haydel, Fabio Milner
Mycobacterium ulcerans	Shelley Haydel
Norovirus	Morteza Abbaszadegan, Qiang Chen, Hugh Mason, Cheryl Nickerson
Norwalk	Qiang Chen, Hugh Mason
Parapoxvirus ovis (Orf virus)	Stephen Johnston
Plasmodium (malaria)	Hugh Mason, Carlos Castillo-Chavez, Krijn Paaijmans
Porphyromonas gingivalis	Yixin Shi
Pox viruses (monkeypox, smallpox, ectromelia)	Bertram Jacobs, Joseph Blattman
Pseudomonas species	Heather Bean, Cheryl Nickerson, Todd Sandrin
Reoviruses	Joseph Blattman
Rotavirus	Carlos Castillo-Chavez, Hugh Mason, Tsafir Mor
Salmonella sp.	Cheryl Nickerson, Yixin Shi

Salmonella typhi (typhoid)	Josh LaBaer
Sindbis virus (SINV)	Brenda Hogue
Staph-MRSA	Heather Bean, Carlos Castillo-Chavez, Bradley Doebbeling, Shelley Haydel
Staphylococcus	Stephen Johnston, Cheryl Nickerson
STIs	Carlos Castillo-Chavez, Angela Chen, David Coon, Fabio Milner, Randy Nesse
Vaccinia virus	Yung Chang, Bertram Jacobs
Vibrio cholerae (Cholera)	Hugh Mason
West Nile virus	Qiang Chen, Matthew Scotch
Yersinia pestis	Hugh Mason
Zika virus	Carlos Castillo-Chavez, Qiang Chen, Jim Collins, Alexander Green, Andrew Maynard, Krijn Paaijmans

Publications

Historic publications data was tracked using SciVal, a publications benchmarking tool. The chart below summarizes ASU's infectious disease publications from 2014-2020.

Each bubble represents a topic. Topics included are the top-100 by scholarly output. The size of the bubble indicates the output (publications) of the entity in the topic.

The position of the bubble is based upon the All Science Journal Classification (ASJC) categories of the journals in which the publication was published. The topics closer to the center of the wheel are more likely to be multidisciplinary, compared to the topics towards the edge of the wheel.

