University of California San Francisco
CURRICULUM VITAE

Name: **Steven Andrew Miller, M.D. Ph.D.**

Position: Health Science Professor of Clinical Laboratory Medicine
Medical Director, UCSF Clinical Microbiology Laboratory
Department of Laboratory Medicine
University of California, San Francisco

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EDUCATION

1991-95	Pomona College, Claremont, CA	B.A.	Summa cum laude Molecular Biology
1995-2003	Albert Einstein College of Medicine	M.D.	Medical Scientist Training Program
1995-2003	Albert Einstein College of Medicine	Ph.D.	Microbiology & Immunology Advisor - Dr. Kami Kim
2003-04	University of California, San Francisco		Resident Clinical Pathology
2004-06	University of California, San Francisco		Chief Resident Clinical Pathology

LICENSES, CERTIFICATION

2004	Diplomate, National Board of Medical Examiners
2005	Medical Licensure, Medical Board of California (Certificate A90410)
2006	Board Certified in Clinical Pathology, American Board of Pathology
2007	Fellow, College of American Pathologists

PRINCIPAL POSITIONS HELD

2006-2012	University of California, San Francisco	HS Assist Prof Laboratory Medicine
2012-2018	University of California, San Francisco	HS Assoc Prof Laboratory Medicine
2018-now	University of California, San Francisco	HS Professor Laboratory Medicine

OTHER POSITIONS HELD CONCURRENTLY

1993	Case Western Reserve University	Undergraduate Research Participant
1994	Cold Spring Harbor Laboratory	Undergraduate Research Participant
1995-2003	Albert Einstein College of Medicine	Medical Scientist Training Program
2005-06	University of California, San Francisco	Residency Research
2006-2009	UCSF Laboratory Medicine	Medical Director, UCSF Clinical Laboratories at Mount Zion
2009-now	UCSF Laboratory Medicine	Medical Director, UCSF Clinical Microbiology Laboratory

2009-now	UCSF Laboratory Medicine	Associate Director, UCSF – Abbott Viral Diagnostics and Discovery Center

AWARDS AND HONORS

1991	Barry M. Goldwater Scholar in Mathematics, Science and Engineering
1991-92	National Science Scholars Program
1991-95	Chevron National Merit Scholarship
1995	The Michael H. Rosen Memorial Pre-Medical Award
1995	The Walter Bertsch Prize for Molecular Biology
1995	The John Stauffer Prize for Academic Merit in the Sciences
1995	Sigma Xi
1995	Phi Beta Kappa
2001	Milton B. Rosenbluth Traveling Fellowship
2003	Dean's Recognition Award
2006	Paul E. Strandjord Young Investigator Award
2006-07	College of American Pathologists Foundation Scholar Research Award
2010	Kaiser Award Nominee for Excellence in Teaching

KEYWORDS/AREAS OF INTEREST

Clinical pathology, molecular microbiology, translational test development, nucleic acid diagnostics, laboratory regulations

PROFESSIONAL ACTIVITIES

CLINICAL

Medical Director, UCSF Clinical Microbiology Laboratory: I am responsible for the operations of the UCSF microbiology laboratory. I serve as a clinical consultant for inpatient and outpatient laboratory testing. I work closely with Infectious Disease and Infection Control to advise appropriate microbiology test ordering and interpretation. I supervise test implementation and validation, and maintain laboratory quality.

Health Science Associate Professor of Clinical Laboratory Medicine, UCSF: I direct the development and validation of new diagnostic tests in molecular microbiology. I evaluate testing platforms for quantitative virology testing, develop protocols for specimen capture and interpret clinical utility of assay methods. I teach graduate students, medical students, residents, fellows and laboratory technologists.

SUMMARY OF CLINICAL ACTIVITIES

I work with infectious disease and infection control services to determine appropriate testing methods for UCSF patients. I implemented new susceptibility test methods based on CLSI guidelines. I direct culture workups for organism identification and clinical interpretation. I consult on clinical infectious disease cases and make testing recommendations for unusual cases. I review and sign out molecular test results for patient infectious disease testing. I research new test methods and prepare proposals for improved diagnostics based on clinical utility and cost analysis.

CLINCAL LABORATORY TESTS DEVELOPED AT UCSF

2006 Provider-Performed Microscopy for Urinalysis (Mount Zion)

2006 Hepatitis C Virus Genotyping (China Basin Microbiology)
2007 Coagulation - Automated PT, PTT, Fibrinogen (Mount Zion)
2007 Blood Bank - Automated ABO, Rh type, Antibody Screen (Mount Zion)
2007 Nucleic Acid Extraction for Research Samples (China Basin Microbiology)
2007 Epstein-Barr Virus DNA, Quantitative PCR (China Basin Microbiology)
2008 Intra-operative Parathyroid Hormone (Mount Zion)
2009 Cytomegalovirus Virus DNA, Quantitative PCR (China Basin Microbiology)
2009 Methicillin-resistant *Staphylococcus aureus* screening (China Basin Microbiology)
2010 *Clostridium difficile* toxin B PCR (China Basin Microbiology)
2010 Influenza A PCR (China Basin Microbiology)
2011 BK Virus DNA, Quantitative PCR (China Basin Microbiology)
2012 *Clostridium difficile* NAP1 strain PCR (China Basin Microbiology)
2012 Rapid Influenza A / B / RSV PCR (China Basin Microbiology)
2013 Respiratory Viral Panel PCR (China Basin Microbiology)
2013 Shiga toxin assay (China Basin Microbiology)
2013 Bacterial vaginosis / Yeast screen (China Basin Microbiology)
2013 Chlamydia trachomatis / Neisseria gonorrhoeae NAT (China Basin Microbiology)
2014 Rapid Influenza A / B PCR (China Basin Microbiology)
2014 Rapid HSV PCR, CSF (China Basin Microbiology)
2015 Adenovirus DNA, Quantitative PCR (China Basin Microbiology)
2016 MALDI-TOF Mass Spectrometry for Bacterial Identification (China Basin Microbiology)
2016 Trichomonas vaginalis RNA (China Basin Microbiology)
2016 Metagenomic Next-Generation Sequencing for Pathogen Detection (China Basin Microbiology)
2017 Respiratory Pathogen Panel PCR (China Basin Microbiology)
2017 Carbapenemase Gene PCR (China Basin Microbiology)
2017 BACTEC Blood Culture System (China Basin Microbiology)
2017 Rapid HSV DNA, skin lesion/blood (China Basin Microbiology)

PROFESSIONAL ORGANIZATIONS

MEMBERSHIPS

1999-now American Society for Microbiology
2003-now American Society for Clinical Pathology
2003-now College of American Pathologists
2005-now Academy of Clinical Laboratory Physicians and Scientists
2006-now American Association of Blood Banks
2006-now Association for Molecular Pathology
2009-now California Society of Pathologists
2018-now American Medical Association

SERVICE TO PROFESSIONAL ORGANIZATIONS

2001-02 Vice President, Student Physicians for Social Responsibility, AECOM Chapter
2009-2010 Member Research Panel, College of American Pathologists
2011-2013 Document Development Committee, Microarrays for Diagnosis and Monitoring of Infectious Diseases, Clinical and Laboratory Standards Institute
2012 Speaker, California Technology Assessment Forum
2013-2016 Governing Body Member, San Francisco Big Data Executive Summit
2014-2018 Chairholder, Document Development Committee, Verification and Validation of Multiplex Nucleic Acid Assays, Clinical and Laboratory Standards Institute
2016-2019 Expert Panel on Molecular Methods, Clinical and Laboratory Standards Institute

SERVICE TO PROFESSIONAL PUBLICATIONS

Ad hoc reviewer for the following publications:

2004-now Trends in Parasitology
2009-now Biologicals
2010-now Frontiers in Pathology
2010-now Journal of Virological Methods
2011-now Journal of Medical Virology
2011-now Journal of Clinical Microbiology
2012-now Nature Reviews Genetics
2012-now Journal of Medical Microbiology
2013-now Diagnostic Microbiology and Infectious Disease
2013-now PLoS One
2014-now Journal of Applied Microbiology
2015-now Future Microbiology
2016-now Clinical Microbiology and Infection
2018-now Journal of Microbiological Methods

INVITED PRESENTATIONS

INTERNATIONAL

Venezuelan National Conference on Microbiology, Trujillo, Venezuela, 2002 (invited speaker)
Keystone Symposium on Molecular Helminthology, Copper Mountain CO, 2005 (poster)
Interscience Conf. on Antimicrobial Agents and Chemotherapy, San Francisco CA, 2009 (speaker)
Peking Union Microbiology and Clinic Forum, Beijing China, 2013 (invited speaker)
Oxford Global Microbiology & Infectious Disease Congress, London England, 2014 (invited keynote speaker, session chair)
German Society of Hygiene and Microbiology Annual Meeting, Muenster Germany, 2015 (invited keynote speaker)
Personalized Medicine World Conference, Mountain View CA, 2016 (invited speaker)
Personalized Medicine World Conference, Mountain View CA, 2017 (invited speaker, session chair)
BioData World Congress, San Francisco CA, 2017 (invited speaker)
International Conference on Clinical Metagenomics, Geneva Switzerland, 2017 (invited speaker)

NATIONAL

Molecular Parasitology Meeting, Woods Hole MA, 1999 (poster)
Molecular Parasitology Meeting, Woods Hole, MA, 2000 (poster)
American Society for Cell Biology Meeting, San Francisco CA, 2000 (poster)
Molecular Parasitology Meeting, Woods Hole MA, 2001 (speaker)
Academy of Clinical Laboratory Physicians and Scientists, Chicago IL, 2006 (speaker)
American Association of Endocrine Surgeons Annual Meeting, 2008 (poster)
Academy of Clinical Laboratory Physicians and Scientists, Philadelphia PA, 2008 (poster)
American Society of Microbiology Annual Meeting, San Diego CA, 2010 (poster)
Association for Molecular Pathology Annual Meeting, San Jose CA, 2010 (poster)
Clinical Virology Symposium, Daytona Beach FL, 2011 (poster)
Academy of Clinical Laboratory Physicians and Scientists, St. Louis MO, 2011 (poster)
Society of General Internal Medicine, Orlando FL, 2012 (poster)
American Society of Microbiology Annual Meeting, San Francisco CA, 2012 (poster)
Association for Molecular Pathology Annual Meeting, Long Beach CA, 2012 (poster)
Molecular Medicine Tri-Conference, San Francisco CA, 2013 (invited speaker)

Clinical Virology Symposium, Daytona Beach FL, 2014 (poster)
American Society of Microbiology Annual Meeting, Boston MA, 2014 (poster)
Molecular Medicine Tri-Conference, San Francisco CA, 2016 (invited speaker, session chair)
American Association of Neuropathologists Annual Meeting, Orange County CA, 2017 (invited speaker)
Molecular Medicine Tri-Conference, San Francisco CA, 2018 (invited speaker)
American Society of Microbiology Annual Meeting, Atlanta GA, 2018 (invited speaker)
ID week, San Francisco CA 2018 (invited speaker, 2 posters)
Molecular Medicine Tri-Conference, San Francisco CA, 2019 (invited speaker)

REGIONAL AND OTHER PRESENTATIONS
Student Physicians for Social Responsibility Conference, Seattle WA, 1999 (invited speaker)
Medical Scientist Training Program Retreat, Mohonk NY, 2001 (invited speaker)
Laboratory Medicine Grand Rounds, UCSF, 2006 (invited speaker)
Siemens Molecular Symposium, San Francisco CA, 2008 (invited speaker)
Life Technologies Symposium, Foster City CA, 2010 (invited speaker)
California Association for Medical Laboratory Technology, Berkeley CA, 2011 (invited speaker)
Symposium on Rapid Antibacterial Susceptibility Testing, Emeryville CA, 2011 (invited speaker)
Northern California American Society for Microbiology Annual Meeting, Pleasanton CA, 2012 (invited speaker)
Southern California American Society for Microbiolgy Annual Meeting, San Diego CA, 2012 (invited speaker)
Association for Professionals in Infection Control and Epidemiology, Sierra Chapter Conference, Elk Grove CA, 2012 (invited speaker)
UC Technology Commercialization Forum, Millbrae CA, 2014 (invited speaker)
Ebola Impact on California Hospitals, Department of Public Health Statewide Teleconference, 2014 (invited speaker)
Clinical Pathology Grand Rounds, Montefiore Medical Center, Bronx NY, 2015 (invited speaker)
Bio-Rad Science Exchange, Hercules CA, 2015 (invited keynote speaker)
San Francisco Chief Data Officer Executive Summit, San Francisco CA, 2016 (invited speaker)
Northern California American Society for Microbiology Annual Meeting, Santa Clara CA, 2016 (invited speaker)
University of Virginia Infectious Diseases/Biodefense Seminar Program, Charlottesville VA, 2017 (invited speaker)
UCSF Pathology Grand Rounds, San Francisco CA, 2017 (invited speaker)
Microbiome Forum, Johns Hopkins University, Baltimore MD, 2017 (invited speaker)
33rd Annual Current Issues in Anatomic Pathology Course, San Francisco CA, 2017 (invited speaker)
Bay Area Symposium on Molecular Investigations of Infectious Diseases, Chan Zuckerberg BioHub, San Francisco CA, 2018 (conference organizer, speaker)
UCSF Health Quality Improvement Symposium, San Francisco CA, 2018 (poster)

CME COURSES ATTENDED

2006	Association for Molecular Pathology Annual Meeting
2006	CAP Laboratory Inspection Team Leader Training
2009	Interscience Conf. on Antimicrobial Agents and Chemotherapy Annual Meeting
2010	American Society of Microbiology Annual Meeting
2010	Association for Molecular Pathology Annual Meeting
2011	Clinical Virology Symposium
2011	Association for Molecular Pathology Annual Meeting
2012	Interscience Conf. on Antimicrobial Agents and Chemotherapy Annual Meeting

2012 Association for Molecular Pathology Annual Meeting
2013 Interscience Conf. on Antimicrobial Agents and Chemotherapy Annual Meeting
2014 Clinical Virology Symposium
2014 American Society of Microbiology Annual Meeting
2016 Association for Molecular Pathology Annual Meeting
2018 American Society of Microbiology Annual Meeting

GOVERNMENT AND OTHER PROFESSIONAL SERVICE

2006 California Department of Health Services, CPS Test Committee Panel
Clinical Laboratory Scientist Certification Examination
2006 CAP Laboratory Inspector, Cook County Bureau of Health Services, Chicago IL
2008 CAP Laboratory Inspector, Quest Diagnostics Inc., San Juan Capistrano CA
2017 California Society of Pathologists Advisor for CA State Bill 43
2018-now Clinical Laboratory Improvement Advisory Committee, NGS Workgroup

UNIVERSITY AND PUBLIC SERVICE

UNIVERSITY SERVICE

SYSTEMWIDE, UCSF CAMPUS WIDE

2009-2012 UC Davis-LLNL Point-of-Care Technologies Center - External Advisory Board
2011-2012 UCD-LLBNL POC Technologies Center - Chair, External Advisory Board
2015-now UC Microbiology Laboratory Workgroup – Member
2016-now UC Clostridium difficile Infection Workgroup - Member
2016-now California Antimicrobial Resistance Laboratory Workgroup - Member

UCSF CAMPUS-WIDE

2006-09 Clinical Laboratory Utilization Subcommittee
2006-09 Laboratory Point of Care Testing Committee
2006-09 Mount Zion Operations Committee
2006-09 Mount Zion Oversight Committee
2006-09 Laboratory Compliance Committee
2008-now Infectious Diseases Management Program
2009-now Antibiotic Advisory Subcommittee of the Pharmacy and Therapeutics Committee
2009-now Infection Control Committee
2016-now High-Containment Laboratory Oversight Committee
2017-now Advisory Panel for Molecular Medicine Consult Service

SCHOOL OF MEDICINE

2004-06 Residents Council, UCSF
2004-06 Resident Representative, Graduate Medical Education Committee
2014-now Dean's Communications Advisory Board

DEPARTMENTAL SERVICE

2004-06 Chief Resident, Laboratory Medicine
2006-09 Clinical Laboratory Directors Committee
2006-now Molecular Genetics Working Group
2006-now Laboratory Medicine Quality Improvement Committee
2007-now Core Faculty for Molecular Pathology Fellowship
2009-now CTSI Resident Research Ambassador
2013-now Clinical Competency Committee of Molecular Genetic Pathology Fellowship

PUBLIC SERVICE

1999-03 Founder and Director, REMEDY Program (Recovered Medical Equipment for the Developing World)

SUMMARY OF SERVICE ACTIVITIES

I am an active participant in clinical laboratory and medical center infection control committees, oversight and planning for laboratory operations, test changes, regulatory compliance and incidents potentially affecting patient care. I participate in external laboratory inspections through the College of American Pathologists. I am the departmental representative for resident research at CTSI and represent UCSF clinical microbiology in California and UC-wide workgroups to improve laboratory operations and reduce nosocomial infections and antimicrobial resistance.

TEACHING AND MENTORING

FORMAL SCHEDULED CLASSES FOR UCSF STUDENTS

Qtr	Academic Yr	Course No. & Title	Teaching Contribution	Units	Class Size
F	2006-2010	Graduate Student Biomarkers 2401.01: Clinical Laboratory Testing	Lecturer; 1 lecture	2	10
F	2009-now	Medical Student PHD: Medical Microbiology	Laboratory instructor; 15 sessions	11	24
F	2010-2014	Medical Student I-3: Medical Microbiology	Lecturer; 2 lectures	11	150
S	2017-now	Nursing Student N294C: Clinical Genomics Course	Lecturer; 1 lecture	1	10
Varies	2018-now	Medical Student CEIx: Enhancing Antibiotic Expertise	Laboratory instructor	1	2
S	2018-now	Medical Student IDS 113: Clinical Microbiology	Lecturer; 2 lectures	1	80
S	2018-now	Graduate Student BMS270: Human Biology & Medicine	Lecturer; 1 lecture	1	15

POSTGRADUATE AND OTHER COURSES

2006-now Clinical Pathology Resident Core Curriculum - Microbiology (2 lectures)
2006-now Laboratory Medicine Molecular Resident Rotation (Microbiology section)
2007-now Clinical Pathology Resident Boards Review - Microbiology (1 lecture)
2007-now Advanced Molecular Microbiology Resident Elective Rotation (Organizer)
2008-09 Laboratory Management Resident Elective Rotation (Organizer)
2010-now Laboratory Methods in Pediatric Infectious Disease (2 lectures)
2010-now Infectious Disease Fellow Core Lectures (2 lectures)

INFORMAL TEACHING

2005-06 Microarray Design and Analysis (Graduate Students)

2005-now Quantitative PCR in the Clinical Laboratory (Residents)
2006-09 Mount Zion Laboratory Case Consultations (Residents, Fellows)
2006-09 Clinical Impact of Laboratory Testing (Clinical Laboratory Scientists)
2006-now Laboratory Medicine Resident Call Conference
2006-now Implementation of Quantitative PCR Testing (Clinical Laboratory Scientists)
2006-now Molecular Infectious Disease Testing in Pathology (Residents)
2006-now Laboratory Medicine Resident On-Call Duties (Residents)
2006-now Topics in Molecular Microbiology (Residents, Fellows)
2006-now Regulatory Issues in Clinical Molecular Testing (Residents, Fellows)
2007-now Parasitology in Laboratory Medicine (Clinical Laboratory Scientists)
2008-09 Clinical Laboratory Management and Administration (Residents)
2008-now Laboratory Medicine Resident Boards Review in Microbiology (Residents)
2009-now Infectious Disease Plate Rounds (Medical students, Residents, Fellows)
2009-now Infectious Disease Case Consultations (Residents, Fellows)
2009-now Clinical Impact of Microbiology Testing (Clinical Laboratory Scientists)
2009-now Microbiology Plate Rounds (Clinical Laboratory Scientists, Residents)
2009-now Topics in Clinical Microbiology (Clinical Laboratory Scientists)

Teaching Narrative

I give formal lectures to medical students, residents, clinical fellows and laboratory technologists. I teach laboratory sessions and give lectures for medical student microbiology. I organize and teach clinical infectious disease plate rounds, using videoconference to demonstrate live material from China Basin. I direct the resident elective rotations in virology and advanced molecular microbiology at China Basin. I teach residents and fellows during their microbiology and molecular pathology rotations. Teaching topics include molecular microbiology, parasitology, laboratory regulations, laboratory management, quantitative PCR, nucleic acid testing and translational test development.

PREDOCTORAL STUDENTS SUPERVISED OR MENTORED

Dates	Name	Program	Faculty Role	Current Position
2001-03	Emily Binder	AECOM grad stud.	Research advisor	Staff Scientist, Wyeth Pharmaceuticals
2005-06	Melaine Delacroix	UCSF grad stud.	Research advisor	Project Scientist, UC Berkeley
2012-2017	Sneha Somasekar	Lab technologist	Supervising faculty	Medical student

POSTDOCTORAL FELLOWS AND RESIDENTS DIRECTLY SUPERVISED OR MENTORED

Dates	Name	Fellow	Faculty Role	Current Position
2007-08	Jacob Moalem MD	Endocrine Surgery Fellow	Research advisor, awarded Northern CA Endocrine Society Resident Prize for Research 2008	Faculty, University of Rochester NY
2007-08	Michael Bonham MD PhD	Pathology Resident	Research advisor, awarded UCSF Lab Medicine Dept. Research Award 2008	Pathologist, Genomic Health
2009-11	Arun Wiita MD PhD	Pathology Resident	Research advisor, awarded UCSF Lab Medicine Dept. Research Award 2010	Faculty, UCSF
2009-12	Nareg	Pulmonary	Research advisor with Dr.	Faculty, UCSF

	Roubinian MD	Fellow	Chiu	
2010	Morvarid Moayeri MD PhD	Pathology Resident	Research advisor	Faculty, UCSF
2010-16	Samia Naccache PhD	Postdoctoral Associate	Research advisor, awarded GEMS-CTSI Postdoctoral award 2010	ABMM fellow, Children's Hospital of Los Angeles
2010-11	Taylor Sittler MD	Pathology Resident	Research advisor with Dr. Chiu	Founder, Color Genomics
2010-11	Christopher Liverman, MD PhD	Pathology Resident	Research advisor, awarded Paul E. Strandjord Young Investigator Award 2011	Pathologist, University of Kansas
2012	Heather Pua, MD	Molecular Genetic Pathology Fellow	Research advisor	Molecular Genetic Pathology Fellow, UCSF
2012	James Platts-Mills, MD	Medicine Resident	Molecular Microbiology Elective Rotation Mentor	Infectious Disease Fellow, University of Virginia
2013	Malak Abedalthagafi, MD	Molecular Genetic Pathology Fellow	Research advisor	Neuropathology Fellow, Brigham and Women's Hospital
2013-14	Nancy Joseph, MD PhD	Molecular Genetic Pathology Fellow	Research advisor	Faculty, UCSF
2013-14	Gillian Genrich, MD	Pathology Resident	Research advisor	Pathology Fellow, CDC
2014	Jonee Taylor, MD	Pathology Resident	Faculty mentor	Pathology Resident, UCSF
2014-2015	Zoltan Nagymanyoki, MD PhD	Molecular Genetic Pathology Fellow	Research advisor	Medical Director, West Pacific Medical Laboratory
2014-15	Anna Plourde, MD	Pathology Resident	Research advisor	Pathology Resident, UCSF
2014-16	Rachel Rutishauser, MD	Infectious Disease Fellow	Research advisor	Infectious Disease Fellow, UCSF
2015-16	Maxime Baud, MD PhD	Neurology Resident	Research advisor	Faculty, University of Geneva, Switzerland
2015-16	Cheryl Mather, MD	Molecular Genetic Pathology Fellow	Research advisor	Faculty, University of Alberta
2015-16	Cyril Jacquot, MD	Pathology Resident	Research advisor	Associate Medical Director, Children's National Health System

2016-now	Jeffrey Whitman, MD	Pathology Resident	Research advisor	Pathology Resident, UCSF
2016-now	Wei Gu, MD PhD	Pathology Resident, Molecular Pathology Fellow	Research advisor	Molecular Genetic Pathology Fellow, UCSF

FACULTY MENTORING

FACULTY MENTORED

Dates	Name	Mentored Position	Mentoring Role	Current Position
2008-12	Charles Chiu MD PhD	Postdoctoral Fellow and Assistant Professor	Career guidance and collaboration on translational clinical test development projects	Associate Professor, Laboratory Medicine and Director, UCSF Viral Diagnostic and Discovery Center
2009-10	Edward Thornborrow MD PhD	Assistant Professor	Transition to clinical laboratory director position	Associate Professor, Laboratory Medicine and Director, Mission Bay Clinical Laboratory

OTHER VISITING FACULTY SUPERVISED

2009 Dr. Tuan Huynh, Department of Microbiology and Immunology
University of Medicine and Pharmacy at Ho Chi Minh City, Vietnam

2009 Dr. Byoung-Seon Yang, Department of Clinical Pathology
Jinju Health College, Jinju, Korea

2010 Dr. Xiaohui Chen Nielsen, Department of Clinical Microbiology
Region Zealand Hospital, Naestved, Denmark

2011 Dr. Fernando Luiz Lopes Cardoso, Hospital Universitario Clementino Fraga Filho
Infectious Disease, Universidade Federal Paulo Rocco, Rio de Janeiro, Brazil

2012 Dr. Yingchun Xu and Dr. Xiaojun Ma, Department of Microbiology
Peking Union Medical College Hospital, Peking, China

2012 Dr. Kiyofumi Ohkusu, Department of Microbiology
Gifu University Graduate School of Medicine, Gifu, Japan

2012 Dr. Michael Kemp, Department of Clinical Microbiology
Odense University Hospital, Odense, Denmark

2012-13 Dr. He Wang, Division of Clinical Microbiology, Department of Clinical Laboratory, Peking Union Medical College Hospital, Beijing, China

2015 Dr. Ali Khlebos, Department of Health, Laboratory Department, Iraq Ministry of Health, Diwaniya, Iraq

2015 Dr. Nicholas Nickerson, Senior Scientific Researcher, Genentech, South San Francisco CA

2016-17 Dr. Marco Lee, Microbiology Fellow, Leeds University, Manchester, United Kingdom

2018 Dr. Rong Da, Department of Clinical Laboratory, First Affiliated Hospital of Xi'an Jiaotong University, Shaanxi, China

MENTORING NARRATIVE
I provide clinical microbiology laboratory experience and research guidance for visiting faculty and postdoctoral fellows. I provide career guidance and research projects for pathology residents, molecular genetic fellows, and infectious disease fellows.

TEACHING AIDS
UCSF Moffitt-Long Laboratory Medicine Resident on-call Survival Guide. A quick reference for common on-call issues. Developed 2007, updated 2008, 2009, 2010
Laboratory Medicine Resident Microbiology Guide: Helpful hints for handling microbiology-related calls at Moffitt/Long and Mount Zion Hospitals. Developed 2008, updated 2009, 2010
UCSF Microbiology Teaching Image Archive
(http://labmedx.ucsfmedicalcenter.org/labmanual/clinlab/micro_images/)

OTHER
UCSF Online Laboratory Manual Updates: Mount Zion Clinical Laboratory, 2006-2009
Memo to Head and Neck Surgeons at Mount Zion: Intraoperative PTH, 2006
UCSF Online Laboratory Manual Updates: Microbiology Laboratory, 2009-now
Memo to UCSF Healthcare Providers: Changes in Cytomegalovirus (CMV) Testing, 2009
Memo to UCSF Healthcare Providers: H1N1 Flu Update, 2009
Memo to UCSF Healthcare Providers: Change in sputum AFB smear ordering process, 2009
Memo to UCSF Healthcare Providers: CSF Fungal Cultures, 2010
Memo to UCSF Healthcare Providers: Test change for *Clostridium difficile* infection (CDI), 2010
Memo to UCSF Healthcare Providers: Influenza A / H1N1 PCR Testing, 2010
Memo to UCSF Healthcare Providers: Blood Culture Collection Volumes, 2011
Memo to UCSF Healthcare Providers: Rapid Influenza A / B / RSV PCR, 2012
Memo to UCSF Healthcare Providers: Anaerobic Blood Culture Bottle Shortage, 2013
Memo to UCSF Healthcare Providers: Shiga-toxin producing *Escherichia coli*, 2013
Memo to UCSF Healthcare Providers: Vaginal smear for Bacterial vaginosis / Yeast, 2013
Memo to UCSF Healthcare Providers: Change in bacterial culture test ordering, 2013
Memo to UCSF Healthcare Providers: Influenza Testing Update, 2014
Microbiology Specimen Collection Guide for UCSF Operating Rooms, 2014
Memo to UCSF Healthcare Providers: Change in test for Herpes Simplex Virus from CSF, 2014
Memo to UCSF Healthcare Providers: Notification of positive blood cultures for inpatients, 2015
Memo to UCSF Healthcare Providers: Laboratory Testing for Zika Virus, 2016
Memo to UCSF Healthcare Providers: New APEX names for AFB cultures, 2016
Memo to UCSF Healthcare Providers: Discontinuation of viral culture test, replaced by PCR and antigen testing, 2016
Memo to UCSF Healthcare Providers: Microbiology abnormal results flagging, 2016
Memo to UCSF Healthcare Providers: Contact Precautions for Carbapenem-Resistant Enterobacteriaceae, 2017
Memo to UCSF Healthcare Providers: BACTEC Blood Cultures, 2017
Memo to UCSF Healthcare Providers: *Clostridium difficile* Reporting Changes, 2017
Memo to UCSF Healthcare Providers: Availability of clinical metagenomic sequencing at UCSF, 2017
Memo to UCSF Healthcare Providers: Change in test ordering for Herpes simplex virus (HSV), 2017
Microbiology Specimen Collection Guide for UCSF Operating Rooms, 2017

TEACHING AWARDS AND NOMINATIONS
2010 Kaiser Award Nominee for Excellence in Teaching

SUMMARY OF TEACHING HOURS

Last Academic Year Total hours of teaching (including preparation): 400
Didactic teaching hours: 50
Informal teaching hours: 150
Mentoring hours: 50
Laboratory teaching hours: 150

This Academic Year Total hours of teaching (including preparation): 400
Didactic teaching hours: 50
Informal teaching hours: 150
Mentoring hours: 50
Laboratory teaching hours: 150

Next Academic Year Total hours of teaching (including preparation): 400
Didactic teaching hours: 50
Informal teaching hours: 150
Mentoring hours: 50
Laboratory teaching hours: 150

RESEARCH AND CREATIVE ACTIVITES

RESEARCH AWARDS AND GRANTS

CURRENT

Phase II-b Randomized Double-Blind Placebo-Controlled Trial of *Lactobacillus crispatus* CTV-05 (LACTIN-V) to Prevent the Recurrence of Bacterial Vaginosis 7/1/2015-6/30/2019
DMID HHSN272201 3000141 (Co-Investigator)
A Study of the Sexually Transmitted Infection Clinical Trials Group (STI CTG)
NIH/NIAID $85,000 direct total

Clinical Implementation of Metagenomic Next-Generation Sequencing for Precision Diagnosis of Acute Infectious Diseases (Co-Investigator) 08/01/2015-09/01/2018
California Initiative to Advance Precision Medicine $1,200,000 direct total

Precision Diagnosis of Acute Infectious Disease in Hospitalized Patients (Co-Investigator)
Schwab Foundation 07/01/2016-06/01/2019
$1,304,638 total

Host-pathogen Interactions in Lung Transplant Recipients with Cystic Fibrosis (Co-Investigator)
Cystic Fibrosis Foundation 01/01/2017-12/31/2018
$300,000 total

Pan-genomic approaches for comprehensive screening of novel or emerging infectious agents in blood 03/01/2017-03/01/2021
NIH/NHLBI R01HL 105704 (Co-Investigator) $734,000 total

Clinical Diagnostics for Lyme Disease (Co-Investigator) 05/01/2017-04/29/2020
Steven and Alexandra Cohen Foundation $1,300,000 total

PAST

Establishing a Microarray Test for Pan-Viral Identification as a Core Laboratory Resource
Translational Technology Award (PI) 4/1/2007-6/30/2008
UCSF CTSI Strategic Opportunities Support Center $75,000 direct/yr1
$75,000 direct total

Development of a Genomic Classifier Test for Endometriosis
Translational Technology Award (Consultant) 4/1/2007-6/30/2008
UCSF CTSI Strategic Opportunities Support Center $75,000 direct/yr1
$75,000 direct total

Resequencing Microarray for Rapid Detection and Antimicrobial Resistance Profiling
U01-AI-06-036 (Co-Investigator) 7/1/2007-6/30/2012
NIH / NIAID $500,000 direct/yr1
$2,500,000 direct total

A Pan-Viral Clinical Diagnostic for Respiratory and Diarrheal Illness
Rogers Bridging the Gap Award (Co-Investigator) 1/1/2010-03/01/2013
Rogers Family Foundation / QB3 $100,000 direct/yr1
$225,000 direct total

Evaluation of Real-Time PCR for Monitoring BK Virus Infection
Focus Diagnostics, Inc. (PI) 7/1/2010-6/30/2011
$37,100 direct/yr1
$37,100 direct total

Quality Control Validation for Development of the Virochip Microarray Test Clinical DiagnosticT1
Translational Catalyst Program for the Development of Diagnostics and Therapeutics
UCSF CTSI (PI) 7/1/2010-6/30/2011
Phase I-III Award Consultation Award

A Rapid Pan-Viral Microarray Diagnostic for Category A-C Pathogens
R56 AI89532-01 (Co-Investigator) 7/1/2010-6/30/2013
NIH / NIAID $250,000 direct/yr1
$750,035 direct total

Comprehensive Diagnostics for Viral Encephalitis / Meningitis
UC Discovery Grant (Co-Investigator) 7/1/2010-1/1/2014
$144,000 direct/yr1
$452,000 total

A Rapid Deep Sequencing Instrument for Translational Research in Microbiology
CTSI SOS Shared Instrument Award (Co-Investigator) 06/01/2011-06/30/2012
UCSF CTSI SOS Program $30,000 direct/yr1
$30,000 total

Evaluation of a Novel Automated PCR Method for Infectious Disease Diagnostics
Herpes Simplex Virus Panel 7/1/2011-6/30/2012
Respiratory Virus Panel $41,144 direct/yr1
GenturaDx, Inc. (PI) $55,600 direct total

Development of a Live Topical Microbicide for Women

R33 AI071978 (Co-Investigator) 2/1/2013-8/31/2013
NIH / NIAID $88,738 direct/yr1
$111,810 total

Rapid Pathogen and Antibiotic Resistance Diagnosis
Berkeley Lab Innovation Grant (Co-Investigator) 1/1/2014-12/31/2014
Lawrence Berkeley Laboratories $89,218 direct yr1
$89,218 total

Clinical Validation of a Multiplexed Diagnostic Assay for Lyme Disease and Other Tickborne Illnesses During Acute Infection
UCSF CTSI (PI) 4/1/2014-6/6/2014
Phase I Award Consultation Award

Deep Sequencing Clinical Analysis Tool for Infectious Disease
UC Proof of Concept Program (PI) 8/1/2013-3/31/2015
$93,035 direct/yr1
$116,294 total

Broad Detection of Infectious Agents in Blood by Microarrays and Deep Sequencing
R01 HL105701-01 (Co-Investigator) 7/1/2011-6/30/2016
NIH / NHLBI $433,615 direct/yr1
$2,375,363 direct total

Clinical Validation of an Unbiased Next-Generation Sequencing Diagnostic Assay for Pneumonia in a CLIA-Certified Laboratory U54HL119893 (Co-Investigator)
University of California CAI Technology Development Award 1/1/2015-04/30/2017
University of California Center for Accelerated Innovation $200,000 direct total

Optimization and Clinical Performance Characteristics of Altona Diagnostics HHV6 Analyte-Specific Reagent (PI) 1/1/2016-06/30/2017
Altona Diagnostics, Inc. $25,817 total

Profiling Exosomal Small RNAs for Viral Infection Diagnosis and Prognosis in Immunocompromised Patients (Co-PI) 02/01/2016-07/30/2017
UCSF Program for Breakthrough Biomedical Research $110,000 total
New Frontier Research Award

Use of ARIES platform for 16S ribosomal RNA gene PCR for bacterial detection (PI)
Luminex, Inc. 10/01/2016-09/30/2017
$20,000 direct total

UCSF Meningitis and Encephalitis Center (Co-Investigator) 07/01/2015-06/30/2018
Sandler Neurosciences Center $3,904,633 total

Precision Diagnosis of Acute Infectious Diseases (Co-Investigator) 05/01/2017-04/29/2018
Marcus Program Transformative Integrated Research Award $400,000 total

PEER REVIEWED PUBLICATIONS

1. Podwall D, Yador E, **Miller S**, Pena J, Franzot SP, Lipetz J, Casadevall A and Steinberg JJ. Interstrain variation in the deoxynucleotide composition of *Cryptococcus neoformans*: nucleotide composition of *Cryptococcus neoformans*. Medical Mycology 1998;36(1):1-5.

2. **Miller SA**, Binder EM, Blackman MJ, Carruthers VB, Kim K. A conserved subtilisin-like protein TgSUB1 in microneme organelles of *Toxoplasma gondii*. Journal of Biological Chemistry 2001;276(48):45341-8.

3. **Miller SA**, Rosario CL, Rojas E, Scorza JV. Intestinal parasitic infection and associated symptoms in children attending day care centres in Trujillo, Venezuela. Tropical Medicine and International Health 2003;8(4):342-7.

4. **Miller SA**, Thathy V, Ajioka JW, Blackman MJ, Kim K. TgSUB2 is a *Toxoplasma gondii* rhoptry organelle processing proteinase. Molecular Microbiology 2003;49(4):883-94.

5. Jolly ER, Chin CS, **Miller S**, Baghat MM, Lim KC, Derisi J, McKerrow JH. Gene expression patterns during adaptation of a parasite helminth to different environmental niches. Genome Biology 2007;8(4):R65.

6. Nadarajah R, Khan GY, **Miller SA**, Brooks, GF. Evaluation of a new generation line probe assay that detects both 5' untranslated and core regions to genotype and subtype hepatitis C virus. American Journal of Clinical Pathology 2007;128(2):300-4.

7. Molaem J, Ruan DT, Farkas RL, Shen WT, Gosnell JE, **Miller S**, Duh QY, Clark OH and Kebebew E. Hemolysis falsely decreases intraoperative parathyroid hormone levels. American Journal of Surgery 2009;197(2):222-6.

8. Bonham M and **Miller S**. Clinical comparison of 99th percentile and 10% CV cutoff values for four commercially available troponin I assays. LabMedicine 2009;40(8):470-3.

9. Elicker BM, Schwartz BS, Liu C, Chen EC, **Miller SA**, Chiu CY and Webb WR. Thoracic CT Findings of Novel Influenza A (H1N1) Infection in Immunocompromised Patients. Emergency Radiology 2010;17(4):299-307.

10. **Miller S**, Seet H, Khan Y, Wright C and Nadarajah R. Comparison of QIAGEN Automated Nucleic Acid Extraction Methods for CMV Quantitative PCR Testing. American Journal of Clinical Pathology 2010;133:558-63.

11. Nadarajah R, Post LR, Liu C, **Miller SA**, Sahm DF and Brooks GF. Detection of Vancomycin-Intermediate *Staphylococcus aureus* with the Updated Trek-Sensititre System and the Microscan System: Comparison with Results from the Conventional Etest and CLSI Standardized Methods. American Journal of Clinical Pathology 2010;133:844-8.

12. Moalem J, Ruan DT, Farkas RL, Shen WT, **Miller S**, Duh QY, Clark OH and Kebebew E. Prospective evaluation of the rate and impact of hemolysis on intraoperative parathyroid hormone (IOPTH) assay results. Annals of Surgical Oncology 2010;17:2963-9.

13. **Miller SA**, van Zante A and Schwartz BS. Cytologic evaluation can predict microbial culture results for infectious causes of pulmonary nodules in patients undergoing fine needle aspiration biopsy. Diagnostic Microbiology and Infectious Disease 2010;68:330-3.

14. Liu C, Schwartz B, Vallabhaneni S, Nixon M, Chin-Hong P, **Miller S**, Chiu C, Damon L and Drew W. Clinical Outcomes of Pandemic Influenza A (2009 H1N1) Infection in Patients with Hematologic Malignancy. Emerging Infectious Diseases 2010;16:1910-7.

15. Greninger AL, Chen EC, Sittler T, Schneierman A, Roubinian N, Yu G, Kim E, Pillai D, Guyard C, Mazzulli T, Isa P, Arias CF, Hackett J, Schochetman G, **Miller S**, Tang P and Chiu CY. A Metagenomic Analysis of Pandemic Influenza A (2009 H1N1) Infection in Patients from North America. PLoS One 2010;5:e13381.

16. Moayeri M, Wright C, Castro L, Pandori M and **Miller S**. Comparison of the GeneXpert FluA PCR to direct fluorescent antibody and respiratory viral panel PCR assays for detection of 2009 novel H1N1 influenza. Journal of Clinical Microbiology 2010;48:4684-5.

17. Chen EC, **MillerSA**, DeRisi JL and ChiuCY. Using a Pan-Viral Microarray Assay (Virochip) to Screen Clinical Samples for Viral Pathogens. Journal of Visualized Experiments 2011: http://www.jove.com/details.stp?id=2536 doi: 10.3791/2536.

18. Wiita A, Roubinian N, Khan Y, Chin-Hong P, Singer J, Golden J and **Miller S**. Cytomegalovirus Disease and Infection in Lung Transplant Recipients in the Setting of Planned Indefinite Valganciclovir Prophylaxis. Transplant Infectious Disease 2012;14:248-58.

19. **Miller S**, Liverman CS, Post L, Khan Y and Wright C. Analytical and clinical performance characteristics of the Simplexa BK virus quantitative PCR assay for the diagnosis of polyomavirus-associated nephropathy in renal transplant recipients using plasma and urine specimens. Journal of Clinical Virology 2012;55:310-6.

20. Yu G, Greninger AL, Isa P, Phan TG, Martinez MA, Sanchez ML, Contreras JF, Santos-Preciado JI, Parsonnett J, **Miller S**, DeRisi JL, Delwart E, Arias CF and Chiu CY. Discovery of a Novel Polyomavirus in Acute Diarrheal Samples from Children. PLoS One 2012;7:e49449.

21. **Miller S**, Wiita A, Wright C, Reyes H and Liu C. Evaluation of Glutamate Dehydrogease Immunoassay Screening with Toxin Confirmation for the Diagnosis of *Clostridium difficile* Infection. LabMedicine 2013;44:e65-e71.

22. Naccache SN, Federman S, Veeraraghavan N, Zaharia M, Lee D, Samayoa E, Bouquet J, Greninger AL, Luk K-C, Enge B, Wadford DA, Messenger SL, Genrich GL, Pellegrino K, Grard G, Leroy E, Schneider BS, Fair JN, Martinez MA, Isa P, Crump JA, DeRisi JL, Sittler T, Hackett J, **Miller S** and Chiu CY. A cloud-compatible bioinformatics pipeline for ultrarapid pathogen identification from next-generation sequencing of clinical samples. Genome Research 2014;24:1180-1192.

23. Wilson MR, Naccache SN, Samayoa E, Biagtan M, Bashir H, Yu G, Salamat SM, Somasekar S, Federman S, **Miller S**, Sokolic R, Garabedian E, Candotti F, Buckley RH, Reed KD, Meyer TL, Seroogy CM, Galloway R, Henderson SL, Gern JE, DeRisi JL and Chiu CY. Actionable diagnosis of neuroleptospirosis by next-generation sequencing. The New England Journal of Medicine 2014;370:2408-2417.

24. Abedalthagafi M, Rosenberg O, Schwartz B and **Miller S**. First report of tenosynovitis in an immunocompetent person caused by *Mycobacterium heraklionense*. Journal of Medical Microbiology Case Reports 2014;1:doi:10.1099/jmmcr.0.002071.

25. **Miller S**, Samayoa E, Post L, Wright C, McKinley G, Wood M and Ching J. Development and clinical evaluation of a novel fully automated qualitative PCR assay for the diagnosis of anogenital herpes simplex virus infection. Diagnostic Microbiology and Infectious Disease 2014;80:102-106.

26. Naccache SN, Peggs KS, Mattes FM, Phadke R, Garson JA, Grant P, Samayoa E, Federman S, **Miller S**, Lunn MP, Gant V, Chiu CY. Diagnosis of neuroinvasive astrovirus infection in an immunocompromised adult with encephalitis by unbiased next-generation sequencing. Clinical Infectious Disease 2015;60:919-923.

27. Srinivasan R, Karaoz U, Volegova M, MacKichan J, Kato-Maeda M, **Miller S**, Nadarajan R, Brodie EL, Lynch SV. Use of 16S rRNA gene for identification of a broad range of clinically relevant bacterial pathogens. PLoS One 2015;10:e0117617.

28. Horton JC, **Miller S**. Magnetic resonance imaging in epidemic adenoviral keratoconjunctivitis. JAMA Opthalmology 2015;E1-E2.

29. Seo S, Renaud C, Kuypers JM, Chiu CY, Huang M-L, Samayoa E, Xie H, Yu G, Fisher CE, Gooley TA, **Miller S**, Hackman RC, Myerson D, Sedlak RH, Kim Y-J, Fukuda T, Fredricks DN, Madtes DK, Jerome KR, Boeckh M. Idiopathic pneunomia syndrome after hematopoietic cell transplantation: Evidence of occult infectious etiologies. Blood 2015;125:3789-97.

30. Greninger AL, Langelier C, Cunningham G, Keh C, Melgar M, Chiu CY, **Miller S**. Two rapidly growing mycobacterial species isolated from a brain abscess: First whole genome sequence of *Mycobacterium immunogenum* and *Mycobacterium llatzerense*. Journal of Clinical Microbiology 2015;53:2374-2377.

31. Greninger AL, Cunningham G, Hsu ED, Yu JM, Chiu CY, **Miller S**. Draft genome sequence of *Mycobacterium obuense* strain UC1, isolated from patient sputum. Genome Announcements 2015:3;e00612-15.

32. Greninger AL, Cunningham G, Yu JM, Hsu ED, Chiu CY, **Miller S**. Draft genome sequence of *Mycobacterium arupense* strain GUC1. Genome Announcements 2015;3:e00630-15.

33. Greninger AL, Cunningham G, Yu JM, Hsu ED, Chiu CY, **Miller S**. Draft genome sequence of *Mycobacterium elphantis* strain Lipa. Genome Announcements 2015;3:e00691-15.

34. Greninger AL, Cunningham G, Chiu CY, **Miller S**. Draft genome sequence of *Mycobacterium heraklionense* strain Davo. Genome Announcements 2015;3:e00807-15.

35. Babik JM, Katrak S, **Miller S**, Shah M, Chin-Hong P. Epstein-Barr virus encephalitis in a renal transplant recipient manifesting as hemorrhagic, ring-enhancing mass lesions. Transplant Infectious Disease 2015;17:744-50.

36. Greninger AL, Cunningham G, Chiu CY, **Miller S**. Draft genome sequence of *Mycobacterium heckeshornense* strain RLE. Genome Announcements 2015;3:e00930-15.

37. Su PP, **Miller S**, Rutishauser RL, Babik J. Broad-range PCR for early diagnosis of nosocomial *Enterococcus gallinarum* meningitis. Infectious Disease 2016;48:640-642.

38. Dudli S, Liebenberg E, Magnitsky S, **Miller S**, Demir-Deviren S, Lotz JC. *Propionibacterium acnes* infected intervertebral discs cause vertebral bone marrow lesions consistent with Modic changes. Journal of Orthopaedic Research 2016;34:1447-1455.

39. Greninger AL, Streithorst J, Chiu CY, **Miller S**. First draft genome sequences of Neisseria sp. Strain 83E34 and Neisseria sp. Strain 74A18, previously identified as CDC eugonic fermenter 4b species. Genome Announcements 2016;4:e01277-16.

40. Greninger AL, Streithorst J, Golden JA, Chiu CY, **Miller S**. Complete genome sequence of sequential *Pandoraea apista* isolates from the same cystic fibrosis patient supports a model of chronic colonization with *in vivo* strain evolution over time. Diagnostic Microbiology and Infectious Disease 2017;87:1-6.

41. Mongkolrattanothai K, Naccache SN, Bender JM, Samayoa E, Pham E, Yu G, Bard JD, **Miller S**, Aldrovandi G, Chiu CY. Neurobrucellosis: Unexpected answer from metagenomic next-generation sequencing. Journal of the Pediatric Infectious Diseases Society 2017;6:393-398.

42. Schlaberg R, Chiu CY, **Miller S**, Procop GW, Weinstock G. Validation of metagenomic next-generation sequencing tests for universal pathogen detection. Archives of Pathology and Laboratory Medicine 2017;141:776-786.

43. Greninger AL, Streithorst J, Chiu CY, **Miller S**. First complete genome sequence of Corynebacterium riegelii. Genome Announcements 2017;5:e00084-17.

44. Murkey JA, Chew KW, Carlson M, Shannon CL, Sirohi D, Sample H, Wilson MR, Vespa P, Humphries RM, **Miller S**, Klausner JD, Chiu CY. Hepatitis E virus-associated meningoencephalitis in a lung transplant recipient diagnosed by clinical metagenomic sequencing. Open Forum Infectious Disease 2017;4:ofx121.

45. Shaw JD, **Miller S**, Plourde A, Shaw DL, Wustrack R, Hansen EN. Methylene blue-guided debridement as an intraoperative adjunct for the surgical treatment of periprosthetic joint infection. The Journal of Arthroplasty 2017;32:3718-3723.

46. Chiu CY, Coffey LL, Murkey J, Symmes K, Sample HA, Wilson MR, Naccache SN, Arevalo S, Somasekar S, Federman S, Stryke D, Vespa P, Schiller G, Messenger S, Humphries R, **Miller S**, Klausner JD. Diagnosis of fatal human case of St. Louis encephalitis virus infection by metagenomic sequencing, California, 2016. Emerging Infectious Diseases 2017;23:1694-1698.

47. Langelier C, Zinter MS, Kalantar K, Yanik GA, Christenson S, Odonovan B, White C, Wilson M, Sapru A, Dvorak CC, **Miller S**, Chiu CY, DeRisi JL. Metagenomic sequencing detects respiratory pathogens in hematopoietic cellular transplant patients. American Journal of Respiratory and Critical Care Medicine 2018;197:524-528.

48. Magnitsky S, Dudli S, Tang X, Kaur J, Diaz J, **Miller S**, Lotz JC. Quantification of propionic acid in the bovine spinal disk after infection of the tissue with *P. acnes* bacteria. Spine 2018;43:E634-E638.

49. Baud MO, Vitt JR, Robbins NM, Wabl R, Wilson MR, Chow FC, Gelfand JM, Josephson A, **Miller S**. Pleocytosis is not fully responsible for low cerebrospinal fluid glucose in meningitis. Neuroimmunology and Neuroinflammation 2018;5:e425.

50. Dudli S, **Miller S**, Demir-Deviren S, Lotz JC. Inflammatory response of disc cells against *Propionibacterium acnes* depends on the presence of lumbar Modic changes. European Spine Journal 2018;27:1013-1020.

51. Sirohi D, Vaske C, Sanborn Z, Smith SC, Don MD, Lindsey KG, Federman S, Vnkalakunti M, Koo J, Bose S, Peralta-Venturina M, Ziffle JV, Grenert JP, **Miller S**, Chiu C, Amin MB, Simko JP, Stohr BA, Luthringer DJ. Polyoma virus-associated carcinomas of the urologic tract: a clinicopathologic and molecular study. Modern Pathology 2018;31:1429-1441.

52. Baliga S, Murphy C, Sharon L, Shenoy S, Biranthabail D, Waltman H, **Miller S**, Ramasamy R, Shah J. Rapid method for detecting and differentiating Mycobacterium tuberculosis complex and non-tuberculous mycobacteria in sputum by fluorescence in situ hybridization with DNA probes. International Journal of Infectious Diseases 2018;75:1-7.

53. Zinter MS, Dvorak CC, Mayday MY, Iwanaga K, Ly NP, McGarry ME, Church GD, Faricy LE, Rowan CM, Hume JR, Steiner ME, Crawford ED, Langelier C, Kalantar K, Chow ED, **Miller S**, Shimano K, Melton A, Yanik G, Sapru A, DeRisi JL. Pulmonary metagenomic sequencing suggests missed infections in immunocompromised children. Clinical Infectious Diseases 2018; in press.

54. Langelier C, Kalantar KL, Moazed F, Wilson MR, Crawford ED, Deiss T, Belzer A, Bolourchi S, Caldera S, Fung M, Jauregui A, Malcolm K, Lyden A, Khan L, Vessel K, Quan J, Zinter M, Chiu CY, Chow ED, Wilson J, **Miller S**, Matthay MA, Pollard KS, Christenson S, Calfee CS, DeRisi JL. Integrating host response and unbiased microbe detection for lower respiratory tract infection diagnosis in critically ill adults. PNAS 2018;115:E12353-E12362.

55. Quach HT, Robbins CJ, Balko JM, Chiu CY, **Miller S**, Wilson MR, Nelson GP, Johnson DB. Severe epididymo-orchitis and encephalitis complicating anti-PD-1 therapy. The Oncologist 2019; in press.

56. Mulliken JS, Langelier C, Budak JZ, **Miller S**, Dynerman D, Hao S, Li LM, Crawford E, Lyden A, Woodworth MH, DeRisi JL, Desmond E, Browne C, Luu A, Grandis DJ, Grossman W, Deuse T, Melcher GP. Bergeyella cardium: Clinical characteristics and draft genome of an emerging pathogen in native and prosthetic valve endocarditis. Open Forum Infectious Diseases 2019; in press.

57. **Miller S**, Naccache SN, Samayoa E, Massacar K, Arevalo S, Federman S, Stryke D, Pham E, Fung B, Bolosky WJ, Ingebrigtsen D, Lorizio W, Paff SM, Leake JA, Pesano R, DeBiasi RL, Dominguez SR, Chiu CY. Laboratory validation of a clinical metagenomic sequencing assay for pathogen detection in cerebrospinal fluid. Genome Research 2019; in press.

58. Wilson MR, Sample HA, Zorn KC, Arevalo S, Yu G, Neuhaus J, Federman S, Stryke D, Briggs B, Langelier C, Berger A, Douglas V, Josephson SA, Chow FC, Fulton BD, DeRisi JL, Gelfand JM, Naccache SN, Bender J, Bard JD, Murkey J, Carlson M, Vespa PM, Vijayan T, Allyn PR, Campeau S, Humphries RM, Klausner JD, Ganzon CD, Memar F, Ocampo NA, Zimmermann LL, Cohen SH, Polage CR, DeBiasi RL, Haller B, Dallas R, Maron G, Hayden R, Messacar K, Dominguez SR, **Miller S**, Chiu CY. Clinical metagenomic sequencing for diagnosis of meningitis and encephalitis. New England Journal of Medicine 2019; in press.

NON-PEER REVIEWED PUBLICATIONS AND OTHER CREATIVE ACTIVITIES

1. **Miller S**. The REMEDY Program: Recovery and donation of unused surgical supplies to developing countries. Einstein Quarterly Journal of Biology and Medicine 2002;19(3):121-4.

2. **Miller SA**. Subtilisin-like proteases TgSUB1 and TgSUB2 in *Toxoplasma gondii*: Involvement in specialized secretory organelles used for host cell invasion. Doctoral dissertation, Albert Einstein College of Medicine, Bronx, NY, 2003.

3. Swain R, **Miller S**, Lu CM. Cervicofacial actinomycosis. American Society of Clinical Pathologists CheckSample, Microbiology, 2005.

4. **Miller S**. Case study in implementing an expanded outpatient transfusion service: A patient safety approach. Advance for Medical Laboratory Professionals Online, 2009.

REVIEW ARTICLES

1. Chiu C and **Miller S**. Microarrays and deep sequencing in clinical microbiology. Microbe 2011;6:13-20.

2. **Miller S**, Karaoz U, Brodie E, Dunbar S. Solid and suspension microarrays for microbial diagnostics. Methods in Microbiology 2015;42:395-431.

3. **Miller S**. Monitoring for viral infections in transplant patients. Clinical Microbiology Newsletter 2016;38:129-134.

4. Simner PJ, **Miller S**, Carroll KC. Understanding the promises and hurdles of metagenomic next-generation sequencing as a diagnostic tool for infectious diseases. Clinical Infectious Diseases 2018;66:778-788.

5. Gu W, **Miller S**, Chiu CY. Clinical metagenomic next-generation sequencing for pathogen detection. Annual Review of Pathology: Mechanisms of Disease 2019 14:317-336.

BOOKS AND CHAPTERS

1. Self-Assessment in Clinical Laboratory Science (Wu, ed). Chapter IV-A: Molecular Diagnostics and Molecular Virology. AACC Press, Washington, DC USA, 2008.

2. Microarrays for Diagnosis and Monitoring of Infectious Diseases; Approved Guideline. Clinical and Laboratory Standards Institute (CLSI). CLSI document MM22-A (ISBN 1-56238-951-3 [Print]; ISBN 1-56238-952-1 [Electronic]). Clinical and Laboratory Standards Institute, Wayne, PA USA, 2014.

3. Molecular Microbiology: Diagnostic Principles and Practice, 3rd edition (Persing, ed). Chapter 6: Next-Generation Sequencing. ASM Press, Washington DC USA, 2016.

4. Jawetz, Melnich & Adelberg's Medical Microbiology, 27th edition (Carroll, ed). Section IV: Virology and Section VII: Diagnostic Medical Microbiology and Clinical Correlation. McGraw-Hill Medical New York, NY USA, 2016.

5. Clinical Microbiology Procedure Handbook, 4th edition (Leber, ed). Section 3: Aerobic Bacteriology: Sub-section 3.6 Diagnosis of Catheter-Related Bloodstream Infection. ASM Press, Washington DC USA, 2016.

6. Advanced Techniques in Diagnostic Microbiology, 3rd edition (Tang and Stratton, eds.) Chapter 49: Metagenomic Next-Generation Sequencing for Microbial Pathogen Detection and Identification. Springer Press, New York, NY USA, 2018.

7. CLSI. Validation and Verification of Multiplex Nucleic Acid Assays. 2nd ed. CLSI guideline MM17. Wayne, PA: Clinical and Laboratory Standards Institute; 2018.

PATENTS ISSUED OR PENDING (ALLOWED)

2010 Array for Detecting Antibiotic Resistance, USPTO 61/375,816
2012 Novel Polyomavirus Associated with Diarrhea in Children, USPTO 13/973,544
2012 Clinical Analysis Software for Deep Sequencing Data for Infectious Disease, USPTO pending
2012 Development of Pathogen Enrichment Hybridization Panels for Deep Sequencing Analyses from Validated Microarray Probes, USPTO pending
2014 A Hybrid Method for Target Sequence Depletion from Next-Generation Sequencing Libraries, USPTO pending
2014 SURPI, an Ultra-Rapid Cloud-Compatible Bioinformatics Pipeline for Pathogen Detection and Discovery from Clinical Next-Generation Sequencing Data
2014 VSN – Visualization Suite for Next-Generation Sequencing
2016 Microbial Standard Reference Materials for Pathogen Detection
2017 Historic Contaminant Database for Metagenomic Next-Generation Sequencing Applications
2018 Quantification of Background and Normalization of Target Concentration in next-Generation Sequencing Libraries using Spiked Internal Controls, USPTO pending

OTHER CREATIVE ACTIVITIES

1. UCSF Moffitt-Long Laboratory Medicine Resident on-call Survival Guide. A quick reference for common on-call issues. Developed 2007, updated 2008, 2009, 2010.

2. Laboratory Medicine Resident Microbiology Guide: Helpful hints for handling microbiology-related calls at Moffitt/Long and Mount Zion Hospitals. Developed 2008, updated 2009, 2010.

ABSTRACTS

1. **Miller S**, Jolly E and McKerrow J. Host immunomodulation of Schistosoma mansoni worm development. American Journal of Clinical Pathology 2006;126:463.

2. Bonham MJ and **Miller S**. Choosing the right troponin assay for your lab: Impact on clinical decision making of commercially available troponin I assays. American Journal of Clinical Pathology 2008;130:470.

3. **Miller S**, Barker C, Hao Y, Erle D, Barczak A, Fischer K, DeRisi J and Chiu C. Establishing a microarray test for pan-viral identification (Virochip) as a core laboratory resource at UCSF. American Journal of Clinical Pathology 2008;130:475.

4. Wiita A, Khan Y, Roubinian N and **Miller S**. Indefinite valgancyclovir prophylaxis in lung transplant recipients monitored by clinical outcomes and quantitative cytomegalovirus load in bronchoalveolar lavage fluid. American Journal of Clinical Pathology 2010;134:495.

5. **Miller S**, Chen E, Naccache S, Pinsky BA and Chiu C. Virochip analysis: Utility of a pan-viral microarray for identification of viral causes of acute clinical illness and outbreak investigations. Journal of Molecular Diagnostics 2010;12:883.

6. Liverman CS, Post L, Khan Y, McHugh I, Wright C and **Miller S**. Validation of a quantitative PCR assay for detection of BK virus in transplant patients. American Journal of Clinical Pathology 2011;136:458-9.

7. Samayoa E, Naccache S, Rein-Weston A, Luk K, Hackett J, **Miller S** and Chiu C. Sensitivity of high-throughput sequencing for viral detection in blood. Journal of Molecular Diagnostics 2012;14:671.

8. Naccache SN, Greninger A, Samayoa E, **Miller S**, Chiu CY. Clinical utility of unbiased metagenomic next-generation sequencing in diagnosis of acute infectious diseases: A prospective case series. Open Forum Infectious Diseases 2015;2:103.

9. Gu W, Lee M, Arevalo S, Federman S, Whitman J, Khan L, Chiu C, **Miller S**, DeRisi J. Pathogen detection by metagenomic next generation sequencing of purulent body fluids. Journal of Molecular Diagnostics 2017;19:973.

RESEARCH PROGRAM

I am interested in the use of molecular methods for diagnosis and monitoring of clinical infectious disease, particularly in immunocompromised and transplant patients. Conventional clinical testing often is unable to identify pathogens of interest in patient samples, and my research aims to develop methods to better identify infectious agents, which could improve patient care and public health.

Current projects include clinical evaluation and implementation of quantitative PCR measurements of viral illness in transplant and immunocompromised patients and multiplex identification of these agents in disease or symptom-specific panels. Collaborative projects are in progress evaluating metagenomic next-generation sequencing (mNGS) assays for microbial identification of viral, bacterial, fungal and parasitic pathogens for CNS, blood and respiratory samples. We are developing targeted assays to detect the most common agents of bloodstream, respiratory and diarrheal disease, as well as potential agents of bioterrorism and emerging infectious disease. We are validating and analyzing the clinical utility of mNGS for detection of pathogens causing severe illness for public health investigations, clinical trials support, and clinical diagnostic testing.

I evaluate the clinical utility of new test methods for diagnosis of infectious disease. I compare existing clinical assays to more sensitive tests, such as PCR detection, and summarize the resulting changes in patient management and improvements in patient care. I investigate the impact of changes in antibiotic resistance testing on patient management, such as recent CLSI recommendations in the approach to beta-lactamase- and carbapenemase-producing bacteria. These findings have immediate impact in antibiotic prescribing for patients at UCSF, and serve to inform other laboratories and physicians about the best approach to diagnosing and treating infections.

I am also collaborating on a large-scale effort to predict bacterial resistance through genetic analysis. My role in this project involves selection of genetic elements for analysis, collection of

bacterial strains, analysis for phenotypic resistance, and prospective collection of clinical samples for direct testing using microarray techniques. We are attempting to use large-scale genomic analysis to yield a predicted resistance profile faster than conventional growth methods that can improve use of effective antibiotics and decrease the potential for development of resistance over time.

RECENT SIGNIFICANT PUBLICATIONS

Miller S, Liverman CS, Post L, Khan Y and Wright C. Analytical and clinical performance characteristics of the Simplexa BK virus quantitative PCR assay for the diagnosis of polyomavirus-associated nephropathy in renal transplant recipients using plasma and urine specimens. Journal of Clinical Virology 2012;55:310-6.

This article describes the assay conditions and performance characteristics of a laboratory-developed test for quantitating BK virus in renal transplant recipients and its utility in predicting the development of polyoma virus-associated nephropathy.
Designed study, interpreted data, wrote manuscript

Wiita A, Roubinian N, Khan Y, Chin-Hong P, Singer J, Golden J and **Miller S**. Cytomegalovirus Disease and Infection in Lung Transplant Recipients in the Setting of Planned Indefinite Valganciclovir Prophylaxis. Transplant Infectious Disease 2012;14:248-58.

This article evaluates the diagnostic utility of CMV PCR on bronchoalveolar fluid in lung transplant recipients in the setting of valganciclovir prophylaxis.
Designed study, interpreted data, revised manuscript

Wilson MR, Naccache SN, Samayoa E, Biagtan M, Bashir H, Yu G, Salamat SM, Somasekar S, Federman S, **Miller S**, Sokolic R, Garabedian E, Candotti F, Buckley RH, Reed KD, Meyer TL, Seroogy CM, Galloway R, Henderson SL, Gern JE, DeRisi JL and Chiu CY. Actionable diagnosis of neuroleptospirosis by next-generation sequencing. The New England Journal of Medicine 2014;370:2408-2417.

This article describes a clinical case of neuroleptosporosis that was diagnosed in our laboratory using next-generation sequencing for a patient with SCID. All other diagnosic tests failed to identify the infection, which was eventually confirmed by the CDC.
Directed assay development, interpreted data, edited manuscript

Miller S, Samayoa E, Post L, Wright C, McKinley G, Wood M and Ching J. Development and clinical evaluation of a novel fully automated qualitative PCR assay for the diagnosis of anogenital herpes simplex virus infection. Diagnostic Microbiology and Infectious Disease 2014;80:102-106.

This article describes the clinical evaluation of a novel fully automated method for HSV PCR. This was a collaborative project with a startup company, subsequent to this study the company was purchased by Luminex with plans to provide this as a novel sample-to-answer assay method.
Designed study, interpreted data, wrote manuscript

Greninger AL, Streithorst J, Golden JA, Chiu CY, **Miller S**. Complete genome sequence of sequential *Pandoraea apista* isolates from the same cystic fibrosis patient supports a model of

chronic colonization with *in vivo* strain evolution over time. Diagnostic Microbiology and Infectious Disease 2017;87:1-6.

This article describes the strain evolution of P. apista based on whole-genome sequencing, establishing the in vivo mutation rate and changes over the clinical course.
Designed study, interpreted data, wrote manuscript