



Samuel Yang, MD, FACEP

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CLINICAL OFFICES

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Bio

CLINICAL FOCUS

- Emergency Medicine
- Infectious Diseases
- Systems Biology
- Biomedical Engineering
- Predictive Analytics

ACADEMIC APPOINTMENTS

- Associate Professor - Med Center Line, Emergency Medicine
- Member, Bio-X
- Member, Maternal & Child Health Research Institute (MCHRI)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Grant Reviewer, NIAID, DoD-CDMRP, MRC-UK, Wellcome Trust (2011 - present)

PROFESSIONAL EDUCATION

- Board Certification: Emergency Medicine, American Board of Emergency Medicine (2007)
- Fellowship: Johns Hopkins University School of Medicine (2004) MD
- Residency: Johns Hopkins University School of Medicine (2002) MD
- Medical Education: University of California, Los Angeles (1999) CA
- Undergraduate, Massachusetts Institute of Technology , B.S. (1994)

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Dr. Yang's research is focused on bridging the translational gap at the interface of molecular biology, genome science, engineering, and acute care medicine. The investigative interest of the Yang lab falls within the general theme of developing integrative systems-level approaches for precision diagnostics, as well as data driven knowledge discoveries, to improve the health outcome and our understanding of complex critical illnesses. Using sepsis as the disease model with complex host-pathogen dynamics, the goals of the Yang lab are divided into 2 areas:

- 1) Developing high-content, near-patient, diagnostic system for rapid broad pathogen detection and characterization.
- 2) Integrating multi-omics molecular and phenotypic data layers with novel computational approaches into AI-assisted diagnostics and predictive analytics for sepsis.

CLINICAL TRIALS

- SEP-SEQ Trial - Determining the Etiology of Sepsis Using an Infectious Disease Diagnostic Sequencing Assay, Not Recruiting

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Steven Cogill, Nikhil Ram Mohan, Kristel Tjandra

Postdoctoral Research Mentor

Marjan Hashemi

Publications

PUBLICATIONS

- **Emerging Analytical Techniques for Rapid Pathogen Identification and Susceptibility Testing.** *Annual review of analytical chemistry (Palo Alto, Calif.)*
Shin, D. J., Andini, N., Hsieh, K., Yang, S., Wang, T.
2019
- **Analytical and clinical validation of a microbial cell-free DNA sequencing test for infectious disease.** *Nature microbiology*
Blauwkamp, T. A., Thair, S., Rosen, M. J., Blair, L., Lindner, M. S., Vilfan, I. D., Kawli, T., Christians, F. C., Venkatasubrahmanyam, S., Wall, G. D., Cheung, A., Rogers, Z. N., Meshulam-Simon, et al
2019
- **A "Culture" Shift: Broad Bacterial Detection, Identification, and Antimicrobial Susceptibility Testing Directly from Whole Blood.** *Clinical chemistry*
Andini, N., Hu, A., Zhou, L., Cogill, S., Wang, T., Wittwer, C. T., Yang, S.
2018
- **Microbial Typing by Machine Learned DNA Melt Signatures** *SCIENTIFIC REPORTS*
Andini, N., Wang, B., Athamanolap, P., Hardick, J., Masek, B. J., Thair, S., Hu, A., Avornu, G., Peterson, S., Cogill, S., Rothman, R. E., Carroll, K. C., Gaydos, et al
2017; 7
- **Universal digital high-resolution melt: a novel approach to broad-based profiling of heterogeneous biological samples** *NUCLEIC ACIDS RESEARCH*
Fraleigh, S. I., Hardick, J., Masek, B. J., Athamanolap, P., Rothman, R. E., Gaydos, C. A., Carroll, K. C., Wakefield, T., Wang, T., Yang, S.
2013; 41 (18)
- **Advances in microfluidic PCR for point-of-care infectious disease diagnostics** *BIOTECHNOLOGY ADVANCES*
Park, S., Zhang, Y., Lin, S., Wang, T., Yang, S.

2011; 29 (6): 830-839

- **Continuous dielectrophoretic bacterial separation and concentration from physiological media of high conductivity** *LAB ON A CHIP*
Park, S., Zhang, Y., Wang, T., Yang, S.
2011; 11 (17): 2893-2900
- **Molecular methods for pathogen detection in blood** *LANCET*
Lin, S., Yang, S.
2010; 375 (9710): 178-179
- **PCR-based diagnostics for infectious diseases: uses, limitations, and future applications in acute-care settings** *LANCET INFECTIOUS DISEASES*
Yang, S., Rothman, R. E.
2004; 4 (6): 337-348
- **RNA markers for ultra-rapid molecular antimicrobial susceptibility testing in fluoroquinolone-treated *Klebsiella pneumoniae*** *Journal of Antimicrobial Chemotherapy*
Yang, X., Hashemi, M. M., Andini, N., Li, M. M., Kuang, S., Carroll, K. C., Wang, T., Yang, S.
2020
- **Factors Associated With Influenza in an Emergency Department Setting.** *The Journal of emergency medicine*
Pedersen, C. J., Quinn, J. V., Rogan, D. T., Yang, S.
2019
- **A 'culture' shift: Application of molecular techniques for diagnosing polymicrobial infections.** *Biotechnology advances*
Zhang, Y., Hu, A., Andini, N., Yang, S.
2019
- **Nanoarray Digital Polymerase Chain Reaction with High-Resolution Melt for Enabling Broad Bacteria Identification and Pheno-Molecular Antimicrobial Susceptibility Test.** *Analytical chemistry*
Athamanolap, P., Hsieh, K., O'Keefe, C. M., Zhang, Y., Yang, S., Wang, T. H.
2019; 91 (20): 12784–92
- **Peripheral TREM1 responses to brain and intestinal immunogens amplify stroke severity** *Nature Immunology*
Liu, Q., Johnson, E., et al
2019
- **Using a novel rapid viral test to improve triage of emergency department patients with acute respiratory illness during flu season.** *Journal of clinical virology : the official publication of the Pan American Society for Clinical Virology*
Pedersen, C. J., Rogan, D. T., Yang, S., Quinn, J. V.
2018; 108: 72–76
- **A review on cluster estimation methods and their application to neural spike data** *JOURNAL OF NEURAL ENGINEERING*
Zhang, J., Thanh Nguyen, Cogill, S., Bhatti, A., Luo, L., Yang, S., Nahavandi, S.
2018; 15 (3): 031003
- **Impact of Rapid Molecular Respiratory Virus Testing on Real-Time Decision Making in a Pediatric Emergency Department** *JOURNAL OF MOLECULAR DIAGNOSTICS*
Rogan, D. T., Kochar, M. S., Yang, S., Quinn, J. V.
2017; 19 (3): 460-467
- **Umbilical Cord Blood NOS1 as a Potential Biomarker of Neonatal Encephalopathy.** *Frontiers in pediatrics*
Lei, J., Paules, C., Nigrini, E., Rosenzweig, J. M., Bahabry, R., Farzin, A., Yang, S., Northington, F. J., Oros, D., McKenney, S., Johnston, M. V., Graham, E. M., Burd, et al
2017; 5: 112
- **Integrated Bacterial Identification and Antimicrobial Susceptibility Testing Using PCR and High-Resolution Melt.** *Analytical chemistry*
Athamanolap, P., Hsieh, K., Chen, L., Yang, S., Wang, T. H.
2017
- **RNA-Seq Count Data Modelling by Grey Relational Analysis and Nonparametric Gaussian Process** *PLOS ONE*
Thanh Nguyen, T., Bhatti, A., Yang, S., Nahavandi, S.

2016; 11 (10)

- **Nested Machine Learning Facilitates Increased Sequence Content for Large-Scale Automated High Resolution Melt Genotyping** *SCIENTIFIC REPORTS*
Fraley, S. I., Athamanolap, P., Masek, B. J., Hardick, J., Carroll, K. C., Hsieh, Y., Rothman, R. E., Gaydos, C. A., Wang, T., Yang, S.
2015
- **A rabbit model of non-typhoidal Salmonella bacteremia** *COMPARATIVE IMMUNOLOGY MICROBIOLOGY AND INFECTIOUS DISEASES*
Panda, A., Tatarov, I., Masek, B. J., Hardick, J., Crusan, A., Wakefield, T., Carroll, K., Yang, S., Hsieh, Y., Lipsky, M. M., McLeod, C. G., Levine, M. M., Rothman, et al
2014; 37 (4): 211-220
- **Sensitive Detection and Serovar Differentiation of Typhoidal and Nontyphoidal Salmonella enterica Species Using 16S rRNA Gene PCR Coupled with High-Resolution Melt Analysis** *JOURNAL OF MOLECULAR DIAGNOSTICS*
Masek, B. J., Hardick, J., Won, H., Yang, S., Hsieh, Y., Rothman, R. E., Gaydos, C. A.
2014; 16 (2): 261-266
- **Trainable high resolution melt curve machine learning classifier for large-scale reliable genotyping of sequence variants.** *PLoS one*
Athamanolap, P., Parekh, V., Fraley, S. I., Agarwal, V., Shin, D. J., Jacobs, M. A., Wang, T. H., Yang, S.
2014; 9 (9): e109094
- **Reverse Transcription-PCR-Electrospray Ionization Mass Spectrometry for Rapid Detection of Biothreat and Common Respiratory Pathogens** *JOURNAL OF CLINICAL MICROBIOLOGY*
Jeng, K., Hardick, J., Rothman, R., Yang, S., Won, H., Peterson, S., Hsieh, Y., Masek, B. J., Carroll, K. C., Gaydos, C. A.
2013; 51 (10): 3300-3307
- **State of virtual reality based disaster preparedness and response training.** *PLoS currents*
Hsu, E. B., Li, Y., Bayram, J. D., Levinson, D., Yang, S., Monahan, C.
2013; 5
- **Harnessing Genomic Approaches for Infectious Disease Diagnosis in Emergency Medicine: Getting Closer to Prime Time** *ANNALS OF EMERGENCY MEDICINE*
Rothman, R. E., Yang, S., Hardick, J., Gaydos, C. A.
2012; 60 (5): 621-623
- **Comparative Analysis of Two Broad-Range PCR Assays for Pathogen Detection in Positive-Blood-Culture Bottles: PCR-High-Resolution Melting Analysis versus PCR-Mass Spectrometry** *JOURNAL OF CLINICAL MICROBIOLOGY*
Jeng, K., Gaydos, C. A., Blyn, L. B., Yang, S., Won, H., Matthews, H., Toleno, D., Hsieh, Y., Carroll, K. C., Hardick, J., Masek, B., Kecojevic, A., Sampath, et al
2012; 50 (10): 3287-3292
- **A broad range assay for rapid detection and etiologic characterization of bacterial meningitis: performance testing in samples from sub-Saharan Africa** *DIAGNOSTIC MICROBIOLOGY AND INFECTIOUS DISEASE*
Won, H., Yang, S., Gaydos, C., Hardick, J., Ramachandran, P., Hsieh, Y., Kecojevic, A., Njanpop-Lafourcade, B., Mueller, J. E., Tameklo, T. A., Badziklou, K., Gessner, B. D., Rothman, et al
2012; 74 (1): 22-27
- **Identification of Bacterial Pathogens in Ascitic Fluids from Patients with Suspected Spontaneous Bacterial Peritonitis by Use of Broad-Range PCR (16S rRNA) Coupled with High-Resolution Melt Analysis** *JOURNAL OF CLINICAL MICROBIOLOGY*
Hardick, J., Won, H., Jeng, K., Hsieh, Y., Gaydos, C. A., Rothman, R. E., Yang, S.
2012; 50 (7): 2428-2432
- **Application of a 16S rRNA PCR-High-Resolution Melt Analysis Assay for Rapid Detection of Salmonella Bacteremia** *JOURNAL OF CLINICAL MICROBIOLOGY*
Jeng, K., Yang, S., Won, H., Gaydos, C. A., Hsieh, Y., Kecojevic, A., Carroll, K. C., Hardick, J., Rothman, R. E.
2012; 50 (3): 1122-1124
- **A surface topography assisted droplet manipulation platform for biomarker detection and pathogen identification** *LAB ON A CHIP*
Zhang, Y., Park, S., Liu, K., Tsuan, J., Yang, S., Wang, T.
2011; 11 (3): 398-406
- **An all-in-one microfluidic device for parallel DNA extraction and gene analysis** *BIOMEDICAL MICRODEVICES*
Zhang, Y., Park, S., Yang, S., Wang, T.

2010; 12 (6): 1043-1049

- **Rapid Identification of Bacterial Pathogens in Positive Blood Culture Bottles by Use of a Broad-Based PCR Assay Coupled with High-Resolution Melt Analysis** *JOURNAL OF CLINICAL MICROBIOLOGY*
Won, H., Rothman, R., Ramachandran, P., Hsieh, Y., Kecojevic, A., Carroll, K. C., Aird, D., Gaydos, C., Yang, S.
2010; 48 (9): 3410-3413
- **Use of Quantitative Broad-based Polymerase Chain Reaction for Detection and Identification of Common Bacterial Pathogens in Cerebrospinal Fluid** *ACADEMIC EMERGENCY MEDICINE*
Rothman, R., Ramachandran, P., Yang, S., Hardick, A., Won, H., Kecojevic, A., Quianzon, C., Hsieh, Y., Gaydos, C.
2010; 17 (7): 741-747
- **Rapid Identification of Biothreat and Other Clinically Relevant Bacterial Species by Use of Universal PCR Coupled with High-Resolution Melting Analysis** *JOURNAL OF CLINICAL MICROBIOLOGY*
Yang, S., Ramachandran, P., Rothman, R., Hsieh, Y., Hardick, A., Won, H., Kecojevic, A., Jackman, J., Gaydos, C.
2009; 47 (7): 2252-2255
- **HIV Seropositivity Predicts Longer Duration of Stay and Rehospitalization Among Nonbacteremic Febrile Injection Drug Users With Skin and Soft Tissue Infections** *Annual Meeting of the Society-for-Academic-Emergency-Medicine*
Hsieh, Y., Rothman, R. E., Bartlett, J. G., Yang, S., Kelen, G. D.
LIPPINCOTT WILLIAMS & WILKINS.2008: 398-405
- **Rapid polymerase chain reaction-based screening assay for bacterial biothreat agents** *Annual Meeting of the Society-for-Academic-Emergency-Medicine*
Yang, S., Rothman, R. E., Hardick, J., Kuroki, M., Hardick, A., Doshi, V., Ramachandran, P., Gaydos, C. A.
BLACKWELL PUBLISHING.2008: 388-92
- **Rapid PCR-based diagnosis of septic arthritis by early gram-type classification and pathogen identification** *JOURNAL OF CLINICAL MICROBIOLOGY*
Yang, S., Ramachandran, P., Hardick, A., Hsieh, Y., Quianzon, C., Kuroki, M., Hardick, J., Kecojevic, A., Abeygunawardena, A., Zenilman, J., Melendez, J., Doshi, V., Gaydos, et al
2008; 46 (4): 1386-1390
- **Global Surveillance of Emerging Influenza Virus Genotypes by Mass Spectrometry** *PLOS ONE*
Sampath, R., Russell, K. L., Massire, C., Eshoo, M. W., Harpin, V., Blyn, L. B., Melton, R., Ivy, C., Pennella, T., Li, F., Levene, H., Hall, T. A., Libby, et al
2007; 2 (5)
- **Communicable respiratory threats in the ED: Tuberculosis, influenza, SARS, and other aerosolized infections** *EMERGENCY MEDICINE CLINICS OF NORTH AMERICA*
Rothman, R. E., Hsieh, Y., Yang, S.
2006; 24 (4): 989-?
- **Multiplexed hybridization detection with multicolor colocalization of quantum dot nanoprobes** *NANO LETTERS*
Ho, Y. P., Kung, M. C., Yang, S., Wang, T. H.
2005; 5 (9): 1693-1697
- **Quantitative PCR assay using sputum samples for rapid diagnosis of pneumococcal pneumonia in adult emergency department patients** *JOURNAL OF CLINICAL MICROBIOLOGY*
Yang, S., Lin, S., Khalil, A., Gaydos, C., Nuemberger, E., Juan, G., Hardick, J., Bartlett, J. G., Auwaerter, P. G., Rothman, R. E.
2005; 43 (7): 3221-3226
- **Real-time PCR for Chlamydia pneumoniae utilizing the Roche lightcycler and a 16S rRNA gene target** *JOURNAL OF MOLECULAR DIAGNOSTICS*
Hardick, J., Maldeis, N., Theodore, M., Wood, B. J., Yang, S., Lin, S., Quinn, T., Gaydos, C.
2004; 6 (2): 132-136
- **Use of the Roche LightCycler instrument in a real-time PCR for Trichomonas vaginalis in urine samples from females and males** *JOURNAL OF CLINICAL MICROBIOLOGY*
Hardick, J., Yang, S., Lin, S., Duncan, D., Gaydos, C.
2003; 41 (12): 5619-5622
- **Quantitative multiprobe PCR assay for simultaneous detection and identification to species level of bacterial pathogens** *JOURNAL OF CLINICAL MICROBIOLOGY*
Yang, S., Lin, S., Kelen, G. D., Quinn, T. C., Dick, J. D., Gaydos, C. A., Rothman, R. E.

2002; 40 (9): 3449-3454

- **LACZ EXPRESSION IN GERMLINE TRANSGENIC ZEBRAFISH CAN BE DETECTED IN LIVING EMBRYOS** *DEVELOPMENTAL BIOLOGY*
Lin, S., Yang, S., Hopkins, N.
1994; 161 (1): 77-83