# **STEFAN G. SARAFIANOS**

Department of Pediatrics Laboratory of Biochemical Pharmacology Emory University School of Medicine 1760 Haygood Dr, HSRB E470, Atlanta, GA 30322 tel: (404) 727-9579 (office) or (573) 268-2687 (mobile) email: <u>ssarafi@emory.edu</u>

#### EDUCATION

Georgetown University, Washington, DC	Ph.D. 1993	Biochemistry
University of Patras, Patras, Greece	B.S. 1985	Chemistry
ACADEMIC TRAINING AND POSITIONS		
2018-present, Professor		
Department of Pediatrics, Emory University S	chool of Medicine	Atlanta, GA
2018-present, <i>Nahmias-Schinazi Distinguished F</i> Emory University School of Medicine	Professor of Pediatrics,	Atlanta, GA
2017-present, Associate Director		
Laboratory of Biochemical Pharmacology		
Department of Pediatrics, Emory University S	School of Medicine	Atlanta, GA
2017-present, Adjunct Professor		
Department of Molecular Microbiology & Imm	nunology	
University of Missouri		Columbia, MO
2017-present, Investigator		
Center for Drug Discovery, Pediatric Researc	ch Alliance	Atlanta, GA
2017-present, Affiliated Investigator		
Center for Childhood Infections & Vaccines, F	Pediatric Research Alliance	Atlanta, GA
2017-present, Co-Director		
HIVE U54 Center, Scripps Research Institute	•	La Jolla, CA
2017-2018, Acting Professor		
Department of Pediatrics, Emory University S	School of Medicine	Atlanta, GA
2016-present, Executive Committee		
HIVE P50/U54 Center, Scripps Research Ins	titute	La Jolla, CA
2015-2017, Professor		
Department of Molecular Microbiology & Imm	hunology	
Department of Biochemistry, University of Mis	ssouri	Columbia, MO
2013-2017, Chancellor's Excellence Endowed Cl	hair in Molecular Virology	Columbia, MO
2011-2017, Member of Graduate Program, Unive	ersity of Illinois, College of Medicine	Rockford, IL
2011-2015, Associate Professor		
Department of Molecular Microbiology & Imm	nunology	
Department of Biochemistry, University of Mis	ssouri	Columbia, MO
2006-2017, Investigator, at the Christopher S. Bo	ond Life Sciences Center	Columbia, MO
2006-2011, Assistant Professor		
Department of Molecular Microbiology & Imm	unology	

University of Missouri, School of Medicine	Columbia, MO
2002-2006, Research Associate Professor	
Center for Advanced Biotechnology & Medicine, Rutgers University	Piscataway, NJ
Structure-based drug design of antiviral inhibitors	
1999-2002, Research Assistant Professor	
Center for Advanced Biotechnology & Medicine, Rutgers University	Piscataway, NJ
1995 1999 Post doctoral follow at the laboratory of Dr. Edward Arnold	
1995-1999, Post-docioral fellow at the laboratory of Dr. Edward Affold	
Center for Advanced Biotechnology & Medicine, Rutgers University	Piscataway, NJ
Structural basis of drug-resistance in HIV-1 reverse transcriptase.	
1993–1995, Post-doctoral fellow at the laboratory of Dr. Mukund Modak	
University Medicine & Dentistry of New Jersey	Newark, NJ
Mechanism of drug resistance and polymerase / RNase H catalysis by HIV-1 RT	

# DISTINCTIONS/AWARDS

2020	Nominated for scientific advisory board of <i>NIH IDeA Center Of Biomedical Research Excellence</i> (COBRE) at University of Delaware			
2019-prese	2019-present Kumamoto University International Scientific Advisory Board Member			
2019	Co-organizer of the 25 <sup>th</sup> West Coast Retrovirus meeting Palm Springs CA USA			
2018	Endowed Chair: Nahmias-Schinazi Distinguished Professorship Emory University School of Medicine			
2017	Elected to Fellowship in the American Academy of Microbiology			
2017	Co-organizer of the international <i>Retroviruses</i> meeting. Cold Spring Harbor Laboratory, NY, USA			
2017	Mizzou Alumni Association 50 <sup>th</sup> Faculty-Alumni Award			
2017	Honorary Member of the Medical Alumni Organization of the University of Missouri			
2016-prese	ent Member of the HIVE Center Executive Committee			
2013	Chancellor's Excellence Chair in Molecular Virology University of Missouri School of Medicine			
2010	Awarded by the Chancellor one of three Excellence Chairs (each endowed by \$1.5 million) (The other			
	two were awarded to a National Academy of Sciences member and to a Department Chair)			
2013	Chancellor's Award for Outstanding Research and Creative Activity in the Biological Sciences.			
	Distinction award for mid-level faculty in biological sciences.			
2013	Finalist for the Graduate Faculty Mentor Award-Nominated by the Department of Molecular			
2010	Microbiology & Immunology, University of Missouri, School of Medicine			
2011	Top cited Journal Molecular Biology article from 2009-2011 (Sarafianos et al. Vol 385, issue 3)			
2009	Dorsett L Spurgeon MD Award. Distinguished Medical Research Award. This award is for the most			
	outstanding young faculty at the MU Medical School.			
2009	Cover figure of Journal of Molecular Biology (Sarafianos et al. Vol 385, issue 3)			
2005	Travel award. H/V meeting. Kumamoto, Japan			
2005	Cover figure of Journal of Medicinal Chemistry in 2005			
2004	Travel award, Ribonucleases H meeting, Strasbourg, France			
2004	Cover figure of "Retroviruses" conference proceedings; Cold Spring Harbor, NY			
2003	Fellowship award, 10 <sup>th</sup> Conference on Retroviruses and Opportunistic Infections, Boston MA			
2003	Manuscript on SARS-CoV was in the top 10 "hot" Nucleic Acids Research manuscripts in 2003			
2002	Fellowship award, RNases 2002, Bath, England			
2002	Fellowship award, 3d HIV DRP Symposium on Antiviral Drug Resistance, Chantilly, VA			
2002	Fellowship award, Ribonucleases H meeting, Tsuruoka, Japan			
2001	Scholarship award, International meeting on Hepatitis drug resistance, DART 2001, Maui, Hawaii			
2001	Scholarship award, 5 <sup>th</sup> Intern Workshop on HIV Drug Resist. & Treatment Strategies, Scottsdale AZ			
2000	Fellowship award, First HIV DRP Symposium on Antiviral Drug Resistance, Chantilly, VA			
2000	Travel award, Ribonucleases H meeting, Seattle, WA			

- 1999 Travel award, Gordon Conference, "Purines and Pyrimidines", Newport, RI
- 1998 Fellowship award, Proteins that Bind RNA meeting, Avalon, NJ
- 1997 Travel award, Gordon Conference, "Purines and Pyrimidines", Newport, RI
- 1996 Travel award, *Gordon Conference*, "Biopolymers", Newport, RI
- 1996 *Burroughs-Wellcome*; Young Scientist Scholarship Award at International Workshop on HIV Drug Resistance, St. Petersburg, FL
- 1995 Fellowship award, *Retroviruses* conference; Cold Spring Harbor, NY
- 1993 Zorbach Memorial Prize (Awarded to less than 10% of Georgetown Chemistry Ph.D.s)
- 1992 "Best Thesis of Year", distinction for outstanding thesis defense, Georgetown University

### **PROFESSIONAL MEMBERSHIPS**

American Association for the Advancement of Science American Chemical Society American Society for Biochemistry and Molecular Biology American Society for Microbiology American Society for Virology American Crystallographic Association

#### EDITORIAL RESPONSIBILITIES

Reviewer: Antimicrobial Agents Chemotherapy, Antiviral Research, Biochemistry, EMBO J., Journal of Molecular Biology, J. Virology, Nature, Nature Structure Molecular Biology, PLoS Pathogens, PLoS One, Proc. Natl. Acad. Sci. USA, Protein Engineering, Science, Structure, Virology, Virus Res., Viruses.

Editorial Boards:

1.	Viruses-Guest Editor	2020-present
2.	Global Health & Medicine-Associate Editor	2019-present
3.	Journal of Biological Chemistry-Editorial Board Member	2014-present
4.	Antimicrobial Agents and Chemotherapy-Editorial Board Member	2012-present

#### **GRANT REVIEWING**

- 2021-03 NIH Reviewer HIV Comorbidities and Clinical Studies (HCCS) Study Section
- 2021-02 Reviewer NIDA Research Center of Excellence (SEP) ZDA1 IXR-Q (01) S
- 2020-12 VA INFA Subcommittee Review Panel ZRD1 INFA-K (01) 2
- 2020-11 Chair for Special Emphasis Panel/Scientific Review ZRG1 HCCS-J (07) S
- 2020-11 NIH Reviewer Emergency Awards/Rapid Investigation SARS-CoV-2 and Covid-19 ZAI1 TCB-X (J3) 2
- 2020-11 Chair NIH ZRG1 HCCS-J Study Section
- 2020-11 Vice-Chair and NIH Reviewer HIV Comorbidities and Clinical Studies (HCCS) Study Section
- 2020-11 Ad Hoc reviewer, Emory CFAR-03 Grant
- 2020-09 NIH Reviewer SARS-CoV-2 Study Section Special Emphasis Panel ZAI1 RG-W (J1)
- 2020-7 VA Review Panel ZRD1 SPLO -K (01) 2 for SARS-CoV-2/COVID-19
- 2020-7 Canada Foundation for Innovation Exceptional Opportunities Fund COVID-19 (CFI40948)
- 2020-7 NIH Reviewer SARS-CoV-2 Study Section ZAI1-RG-W-S2. Emergency Awards: Rapid Investigation of SARS-CoV-2 and COVID-19
- 2020-6 NIH Reviewer SARS-CoV-2 Study Section ZAI1-RG-W-S1. Emergency Awards: Rapid Investigation of SARS-CoV-2 and COVID-19
- 2020-3 NIH Reviewer HIV comorbidities and Clinical Studies (HCCS) Study Section
- 2020-2 NIH Reviewer for PHS 2020 SBIR Program
- 2019-11 Reviewer for 2 F31 BCDB graduate program grant applications
- 2019-11 Peer Reviewer for The Francis Crick Institute/Dr. Peter Cherepanov
- 2019-11 NIH Reviewer HIV Comorbidities and Clinical Studies (HCCS) Study Section

- 2019-7 NIH Reviewer HIV Comorbidities and Clinical Studies (HCCS) Study Section Washington D.C.
- 2019-6 Emory CFAR grant review
- 2019-3 NIH Reviewer IDMX02 Panel Discussion
- 2019-3 NIH Reviewer ZRG1 IDM SEP Topics in Virology Study Section
- 2019-2 NIH Reviewer HIV comorbidities and Clinical Studies (HCCS) Study Section
- 2018-12 NIH Infectious Diseases and Microbiology ZRG1-IDM-Y (02) SRG Study Section
- 2018-11 Charter member-HIV Comorbidities and Clinical Studies (HCCS) Study Section
- 2018-11 Emory CFAR grant review
- 2018-7 Charter member of NIH AIDS AMCB Study section
- 2018-7 Ad Hoc reviewer, ZRG1 IDM SEP Topics in Virology
- 2018-6 Emory CFAR grant reviewer
- 2018-4 NIH SBIR Phase 2 Study section ZAI1-RCU-A-C1, Topic 035: Method for the Detection of Minority Populations of Drug Resistant HIV
- 2018-3 Charter member-NIH AIDS AMCB Study section2017-10 NCI, Center for Cancer Research, Site Visit of Bioorganic Chemistry Section, Frederick MD
- 2017-7 Charter member of NIH AIDS AMCB Study section
- 2017-7 Ad Hoc reviewer, ZAI1 DR-A (S1) 1 NIAID Resource-Related Research Projects (R24)
- 2017-3 National Science Centre, Poland; review of SONATA grants
- 2017-3 Georgia Institute of Technology and Children's Healthcare of Atlanta; seed grants on "novel therapeutics for neglected diseases".
- 2017-3 Ad Hoc reviewer, Welcome Trust, review of "Investigator Award in Science"
- 2017-3 Ad Hoc reviewer, NIH DP2 New Innovator Award study section
- 2017-2 NCI site visit of the Macromolecular Crystallography Lab and Structural Biophysics Lab
- 2017-1 Review of NIH grants at BJHF Washington University Institute of Clinical and Translational Sciences
- 2017-1 ZRG1 AARR-E (41) P Program Projects: Community Prevention of HIV/AIDS
- 2016-12 Ad Hoc reviewer, ZRG1 AARR-K-58 Special Emphasis Panel
- 2016-11 Veteran Administration Infectious Diseases A study section
- 2016-11 Ad Hoc reviewer, ZRG1 IMST-D-30 I Shared Instrumentation
- 2016-7 Ad Hoc reviewer, ZRG1 AARR-E-55 Targeting Persistent HIV Reservoirs
- 2016-7 Ad Hoc reviewer, ZRG1 AARR-E-56 Basic Research on HIV Persistence
- 2016-7 Ad Hoc reviewer, ZRG1 IDM-X 10 Member Conflict: Topics in Virology
- 2016-6 Ad Hoc reviewer, Pilot grants, HIVE center for NIGMS-funded Center for AIDS Structural Biology
- 2016-4 Ad Hoc reviewer, ZDE1 CF (17) Oral Immune system plasticity in chronic HIV under treatment and oral co-infections
- 2016-4 COBRE-PSF NIH grant reviewing
- 2016-1 Ad Hoc reviewer, ZDE1 CF (10) 1 NIDCR Oral HIV Reservoirs SEP
- 2016-1 Ad Hoc reviewer, ZRG1 AARR-E-56 Basic Research on HIV Persistence
- 2015-11 Review of grants for BJHF Washington University Institute of Clinical and Translational Sciences
- 2015-11 Veteran Administration Infectious Diseases A study section
- 2015-7 Ad Hoc reviewer, ZRG1 AARR-E-55 Targeting Persistent HIV Reservoirs
- 2015-7 Ad Hoc reviewer, ZRG1 AARR-E-56 Basic Research on HIV Persistence
- 2015-7 NIH Intramural Site-Visit reviewer of AIDS and Cancer Virus Program of National Cancer Institute, NCI//NIH (July 14-16, 2015)
- 2015-5 Ad Hoc reviewer, ZRG1 MOSS-C (56) R, New Innovator Award NIH study section
- 2015-5 Veteran Administration Infectious Diseases A study section
- 2015-4 Chair, reviewer, Novel NeuroAIDS Therapeutics: Integrated Preclinical/Clinical Program (P01) NIH study section
- 2015-3 Chair, reviewer, ZRG1-AARR-E81-S, *HIV/AIDS Innovative Research Applications* NIH study section
- 2014-11 Chair, reviewer, ZRG1-AARR-E81-S, *HIV/AIDS Innovative Research Applications* NIH study section
- 2014-11 Veteran Administration Infectious Diseases A study section
- 2014-8 Ad Hoc reviewer, ZRG1-AARR-K03M, Member Conflict: AIDS & Related Research NIH study section
- 2014-7 Chair, reviewer, ZRG1-AARR-E81-S, *HIV/AIDS Innovative Research Applications* NIH study section
- 2014-5 Veteran Administration Infectious Diseases A study section
- 2014-3 Ad Hoc reviewer, ZRG1 AARR-E (81), "HIV/ADS Innovative Research Applications" NIH study section
- 2014-3 Ad Hoc reviewer, AIDS Discovery and Development of Therapeutic Targets (ADDT) NIH study section

- 2013 Reviewer, Wellcome Trust-DBT-India Alliance study section
- 2013 Ad Hoc reviewer, AIDS Molecular and Cellular Biology (AMCB) NIH study section
- 2012 Site-Visit reviewer of Center of Excellence in Japan: *Global Education and Research Center Aiming at the control of AIDS*
- 2012 *Ad Hoc* reviewer of NIH Study Section on HIV Eradication from CNS Reservoirs
- 2011 *Ad Hoc* reviewer of grants on virology research from the European Community
- 2010 Site-Visit reviewer of a Global Center of Excellence (COE) in Japan. Invited on site (Kumamoto, Japan) to evaluate research at a center that focuses on AIDS research and is considered one of the premier COEs in Japan and a leading AIDS research site
- 2009 External reviewer of Japanese government grants at the Global Education and Research Center Aiming at the control of AIDS
- 2009-2013 Charter member of NIH AIDS ADDT Study section
- 2007-8 Ad Hoc reviewer of NIH grants at the Midwest Research Center of Excellence
- 2007 Ad Hoc reviewer of grants, Smithsonian Institutions

### **PROFESSIONAL CONSULTING ACTIVITIES**

- 2019 Consulting for *Gilead Sciences*
- 2014 Consulting/collaboration with Merck & Co
- 2008-2010 Consulting/collaboration with *Tibotec therapeutics*
- 2007 Consulting for *GlaxoSmithKline*
- 2006 Consulting for *Gilead Sciences*

# SUMMARY OF RESEARCH FUNDING SINCE 2008

The following numbers do not include instrumentation and "other" grants (#50-57) or 2 Burroughs Wellcome Graduate Student Fellowships, 4 Howard Hughes Medical Institute undergraduate or other local fellowships.

Number of Grants/Fellowships since 2008: 49		
Total Costs awarded:	\$28,944,744	
Direct Costs awarded:	ed: \$26,096,960	
Since joining Emory (2017):	: \$8,284,894 in total costs	
Also: Sarafianos is co-director of Center grant: \$5,531,143 total costs in 2018		

### **CURRENT RESEARCH SUPPORT**

# 1. **R01 GM118012-A1** (Sarafianos)

NIH/NIAID Total Support: **<u>\$1,423,009</u>** (Direct costs: \$1,141,904) "Reverse Transcriptase Multi-Class Drug Resistance and Rilpivirine Susceptibility in Diverse HIV-1 Subtypes" This project determines how resistance to two classes of HIV inhibitors develops in different HIV subtypes. Role: PI

2. R01 Al148382 (Melikian/Sarafianos/Torbett) NIH/NIAID 09/01/19 to 08/31/23

07/01/16 to 05/31/21 (NCE)

Total Sarafianos Support: (\$1,031,199)

Total Support: **<u>\$5,534,618</u>** (Direct costs: \$4,626,471)

"Molecular Interactions of HIV-1 with the Nuclear Pore Complex" Structural and virological studies to characterize interactions of HIV capsid with the Nuclear Pore Complex. Role: MPI

3. R01 Al121315-A1 (Sarafianos/Wang)

06/14/16 to 05/31/21

NIH/NIAID Total Support: <u>\$3,047,249</u> (Direct costs: \$2,415,784) "Taking aim at HBV eradication using novel NRTIs and capsid effectors" This project aims to identify promising leads for the development of anti-HBV drugs which target three different steps in the virus life cycle. These studies should help design new therapeutic combinations that could lead to better treatments for HBV-infected individuals and eventually to HBV eradication. Role: contact PI

#### 4. **R37 Al076119-13** (Sarafianos)

NIH/NIAID

NIH/NIAID

Total Support: **\$1,766,691** (Direct costs: \$1,343,790) "Ultrapotent inhibitors of Wild-type and Multi-drug Resistant HIV-1 reverse transcriptase" This is a renewal application (years 12 to17) of a project that will continue to determine the mechanism of action and resistance of potent inhibitors of HIV-1 reverse transcriptase. Role: PI

#### 5. R01 Al120860-A1 (Sarafianos/Wang)

Total Support: **\$2,379,497** (Direct costs: \$1,836,885) "Structural studies of HIV Capsid with host factors Capsid-targeting antivirals"

This project will help to clarify the role of HIV capsid protein in various stages of the virus life cycle through interactions with host factors and small molecule effectors. These studies should aid in the understanding of basic HIV biology and may reveal new opportunities for chemotherapeutic intervention. Role: contact PI

#### 6. U54 AI150472-08 (Torbett/Sarafianos)

NIH/NIAID (previously NIGMS/GM103368)

11/01/17 to 08/31/22 Total Sarafianos Support: **<u>\$1,900,272</u>** (Direct: \$1,309,440) Total Support: **\$26,478,479** (Direct: \$15,360,000)

"HIVE Center: HIV Interactions in Viral Evolution"

This is a renewal of the HIVE Center. The goal of this Center grant is to study the impact of resistance mutations on various stages of HIV replication, in particular on protein interactions during virus assembly. Role: Co-Director and PI of Project 3

#### 7. 00077678 (Kirby)

07/01/18 to 06/30/20 (NCE) Pediatric Research Alliance/Center for Childhood Infections and Vaccines Total Support: **\$50,000** Direct "Targeting Novel Inhibition of the Enterovirus 71 RNA-dependent RNA Polymerase"

This pilot grant in collaboration with Co-I Stefan Sarafianos will validate the antiviral mechanism of action of two lead compounds against Enterovirus 71 (EV71) and screen for novel inhibitors of the RNA-dependent RNA polymerase (RdRp) of EV71, a picornavirus which causes Hand, Foot, and Mouth Disease in children. Role: Co-I

#### 8. U54 AI150472-07S1 (Torbett/Sarafianos)

NIH/NIAID (previously NIGMS/GM103368)

"HIVE Center: HIV Interactions in Viral Evolution"

This is an administrative supplement to the existing HIVE grant to request a Leica GSD microscope for the HIVE Center. There is no effort since this is an administrative supplement for equipment on an existing grant. Role: Co-Director and PI of project 3

#### 9. R01 GM118012-S2 (Sarafianos)

#### NIH/NIGMS

\$79,645 (Direct costs) "Reverse Transcriptase Multi-Class Drug Resistance and Rilpivirine Susceptibility in Diverse HIV-1 Subtypes" This is an administrative supplement to the existing R01 grant to request a Leica cryo-CLEM system. There is no effort since this is an administrative supplement for equipment on an existing grant. Role: PI

# 10. R01 Al146017 (Sarafianos/Hachiya/Lyumkis)

NIH/NIAID Total support: **\$2,550,918** (Direct costs: \$2,046,653) "Novel mechanism of integrase (IN) resistance to dolutegravir through epistatic interactions between IN and the nucleocapsid and polypurine tract regions of HIV-1"

08/01/18 to 08/31/22

\$260,833 (Direct costs)

08/01/18 to 05/31/20

03/15/19 to 02/28/24

06/15/15 to 05/31/21 (NCE)

02/12/20 to 01/31/25

This is a multi-PI R01 on a surprising mechanism of resistance to an integrase inhibitor through mutations outside the IN gene. Role: contact PI

#### 11. 00087542 (Tedbury)

Emory DOP JFF Total Support: **\$45,000** "Live Cell Imaging of HIV-1 Antisense RNA Accumulation as a Predictor of Progression to Latency." Role: Co-I

#### 12. CFAR-R03 (Tedbury)

Emory CFAR Total Support: **\$39,754** "Lens epithelium-derived growth factor/p75 in HIV-1 antisense RNA transcription and viral latency." Role: Co-I

# 13. U01 Al131566 (Suthar)

NIH/NIAID

Scored as High Priority

05/01/20 to 02/28/22 Total Support: **\$18,467** 

03/15/19 to 07/31/20 (NCE)

07/01/19 to 06/30/20

"SARS-CoV-2 infection in airway epithelial cells."

This is competitive revision for SARS-Cov-2 research under the parent grant "Determining how macrophages" regulate immunity to Zika virus." Role: Co-I

14. R01 Al146017-02S1 (Graduate student research careers supplement; PI: Sarafianos) 04/10/20 to 02/28/21 Total support: **\$57,898** (Direct costs: \$39,300) NIH/NIAID

"Novel mechanism of integrase (IN) resistance to dolutegravir through epistatic interactions between IN and the nucleocapsid and polypurine tract regions of HIV-1"

This is a research supplement to promote reentry into biomedical and behavior research careers programs: graduate student Darius Mahboubi. The parent grant is a multi-PI R01 on a surprising mechanism of resistance to an integrase inhibitor through mutations outside the IN gene. Role: contact PI

#### 15. Rapid RFP: COVID-19 (Fu/Sarafianos/Liotta)

Emory SOM Imagine, Innovate, and Impact (I3) Award, "Accelerated discovery of SARS-CoV-2 viral entry inhibitors"

This is a project that will utilize ultra-high throughput screening to rapidly identify inhibitors of SARS-CoV-2 entry.

Role: Co-PI

# PREVIOUS RESEARCH SUPPORT

16. Ministry of Health, welfare and Labor of Japan (Sarafianos)

Japanese government Total Support: **\$73,101** (Direct costs: \$73,101) "Development of novel anti-hepatitis virus (HBV) agents potent against wild-type and drug-resistant HBVs" Role: PI

### 17. 6R01 Al076119 (Sarafianos)

NIH/NIAID

05/01/14 to 04/30/20 Total Support: **\$1,911,479** (Direct costs: \$1,401,882)

"Ultrapotent inhibitors of HIV-1 reverse transcriptase"

This is a renewal application of a project that will continue to determine the mechanism of action and resistance of potent inhibitors of HIV-1 reverse transcriptase. Role: PI

### 06/01/20 to 05/31/21 Total support (Fu): **<u>\$50,000</u>**

04/01/19 to 03/31/20

- 18. R21 Al127195 (Lange/Sarafianos/Burke) 06/24/16 to 05/31/19 (NCE) NIH/NIAID Total Support: **\$422,125** (Direct costs: \$275,000; \$25,000 direct for Sarafianos) "RNA Aptamers that Differentiate Among HIV-1 Capsid Assembly States" The major goals of this proposal are to identify RNA aptamers that differentiate among HIV-1 capsid assembly states as a platform for studying HIV assembly, disassembly, and host factor interactions. Role: MPI
- 19. Ministry of Health, welfare and Labor of Japan (Sarafianos) 11/01/17 to 03/31/19 Japanese government Total Support: **\$91,889** (Direct costs: \$91,889) "Development of novel anti-hepatitis virus (HBV) agents potent against wild-type and drug-resistant HBVs" Role: PI
- 20. R01 Al120860-S1 (Graduate student diversity supplement; PI: Sarafianos) 03/16/16 to 05/31/18 NIH/NIAID Total Support: **\$126,640** (Direct costs: \$87,792)

"Structural studies of HIV Capsid with host factors and Capsid-targeting antivirals" Research supplement to promote diversity in Health-Related Research: graduate student Mary Casey. This project will determine how HIV-1 develops resistance to second generation integrase inhibitors and the information gained will aid in improving therapeutic strategies for patients as well as the design of next generation integrase inhibitors. Role: PI

21. R01 AI076119-S1 (Graduate student diversity supplement; PI: Sarafianos) 08/25/15 to 04/30/18 NIH/NIAID Total Support: **\$64,522** (Direct costs: \$47,520)

"Ultrapotent Inhibitors of Wild-type and Multi-drug Resistant HIV" Research supplement to promote diversity in Health-Related Research: graduate student Obiaara Ihenacho. Role: PI

22. R01 Al100890-A1 (Sarafianos/Wang/Parniak)

07/01/12 to 06/30/18 (NCE)

Total Support: **\$3,415,099** (Direct costs: \$2,983,380)

NIH/NIAID

"Novel antivirals targeting the RNase H activity of HIV reverse transcriptase" This project will discover compounds that target an essential biological activity of the HIV virus, that currently approved drugs do not address. These studies should lead to the development of future therapeutics that complement existing drugs and should also strengthen our efforts to block drug-resistant strains of HIV. Role: contact PI

23. R01 Al100890-S1 (Graduate student diversity supplement; PI: Sarafianos) 06/01/14 to 06/30/18 NIH/NIAID Total Support: **\$194,291** (Direct costs: \$126,573) "Novel antivirals targeting the RNase H activity of HIV reverse transcriptase"

Research Supplement to Promote Diversity in Health-Related Research: graduate student: Andrew Huber. Role: PI

# 24. DAA3-17-62988-1 (Kirby)

03/14/17 to 03/13/18

CRDF global/NSF Total Support: **\$15,000** (Direct costs: \$13,637) "Molecular mechanisms by which HIV-1 acquires resistance to second-generation integrase strand transfer inhibitors."

This grant in collaboration with Dr. Atsuko Hachiya at Nagoya Medical Center, Japan, will evaluate the role of novel mutations identified in a patient who failed a raltegravir-based regimen in resistance to HIV-1. This award is part of the Infectious Disease and Immunology Research: U.S.-Japan Cooperative Medical Sciences Program (USJCMSP) Collaborative Award Initiative. Role: Co-I

# 25. Ministry of Health, welfare and Labor of Japan (Sarafianos)

Japanese government "Studies on HBV reverse transcriptase"

01/01/14 to 03/31/17 Total Support: **\$410,000** (Direct costs: \$410,000)

Role: PI

#### 26. P50 GM103368 (Olson)

NIH/NIGMS

"HIV macromolecular interactions and impact on viral evolution of drug resistance" The goal of this Center grant is to study the impact of resistance mutations on various stages of HIV replication, in particular on protein interactions during virus assembly. Role: PI of Project 12

# 27. R01 GM118012-A1S1 (Sarafianos)

NIH/NIAID

Total Support: **<u>\$124,050</u>** (all direct costs) "Reverse Transcriptase Multi-Class Drug Resistance and Rilpivirine Susceptibility in Diverse HIV-1 Subtypes" Instrumentation supplement for microscale thermophoresis instrument. Role: PI

# 28. R01 Al099284-01 (Rice)

NIH/Rockefeller Univ Total Support for the Sarafianos laboratory: **\$1,582,863** (Direct costs: \$1,044,794) "Hepatitis C antivirals: Mechanism of action, combination efficacy and resistance"

This project will examine the mechanism of action of front-line HCV antivirals. The Sarafianos lab will also examine the efficacy of combinations of antivirals to inform future clinical development towards an interferonfree regimen. It will address basic issues in resistance mechanisms, viral fitness and replication space. The above amounts were originally approved for research at our site. Research faculty Dr. Robert Ralston used part of these funds at University of Kansas where he moved to continue relevant research. Role: Co-I

#### 29. **R21 Al112417** (Sarafianos) NIH/NIAID

Total Support: **\$413,950** (Direct costs: \$275,000) "Capsid-Targeting Small Molecules Blocking HIV through Novel Mechanism of Action" We will evaluate the unique mechanism of action of a series of newly identified inhibitors targeting HIV capsid.

### 30. P50 GM103368 (Olson)

NIH/NIGMS

Role: PI

"HIV macromolecular interactions and impact on viral evolution of drug resistance" The goal of this collaborative grant application is to obtain high resolution structures of macromolecular complexes involved in HIV replication, and characterize the biochemical and kinetic processes involved in assembly and maturation of pol proteins and identify small molecule probes that disrupt these processes. Role: PI of Collaborative Development Project

### 31. Trail to a Cure (Sarafianos/Johnson/Burke)

Total Support: **\$19,000** (Direct costs: \$1,000 for 2011, \$5,000/year for 2014-2015, \$8,000 for 2016) Annual donation by the "Trail to a Cure" foundation for AIDS Research. Role: PI

### 32. Mizzou Advantage (Sarafianos)

Total Support: **\$149,945** (Direct costs: **\$149,945**) "Studying HIV-1 Subtype B or C Drug Resistance in Patient Cohorts from Missouri, Cameroon & India" University of Missouri initiative to encourage interdisciplinary scholarship and international collaborations.

# 33. KORUS (Sarafianos)

Korean government Total Support: **\$426,520** (Direct costs: \$385,621) "A Promising BINT (Bio, Information, and Nano Technology)-Based Diagnostics/Theranostics Technology" Korean Government program project in collaboration with a Korean Biotech (Genematrix) to develop instrumentation for the detection of drug resistance mutations emerging during antiviral therapies. Role: PI

#### 09/01/15 to 08/31/17

07/01/16 to 05/31/17

Total Support: **<u>\$297,790</u>** (Direct cost: \$194,000)

05/01/12 to 10/31/17 (NCE)

05/01/13 to 04/30/14

02/01/14 to 01/31/16

Total Support: **\$134,996** (Direct costs: \$87,945)

05/01/14 to 10/31/17 (NCE)

05/01/09 to 04/30/14

2011 - 2017

# 34. R33 Al079801-03 (Parniak/Sarafianos)

NIH/NIAID Total Support for Sarafianos lab: \$179,399 (Direct costs for Sarafianos Lab: \$120,000) "Microbicide properties of RT inhibitor combinations-R33 phase"

This project is a continuation of the R21 listed above. This grant is a continuation from grant R21 AI079801 (provided the milestones are reached). Hence costs are already included in above number. Role: MPI

#### 35. R01 Al076119 (Sarafianos)

NIH/NIAID

"Ultrapotent inhibitors of HIV-1 reverse transcriptase" This project will determine the mechanism of action and resistance of potent inhibitors of HIV-1 reverse transcriptase. The compounds are nucleoside reverse transcriptase inhibitors with a 4'-ethynyl modification. Role: PI

### 36. R21 Al094715-A1 (Sarafianos)

NIH/NIAID Total Support: **\$416,625** (Direct costs: \$275,000) "Structure-Based Expansion of Neutralization Ability of KD-247, An Anti-V3 mAb" Use crystallography and biochemical methods for affinity maturation of anti-HIV antibodies. Role: PI

### 37. R01 Al076119-S2 (Sarafianos)

NIH/NIAID

05/01/09 to 09/30/10 Total Support: **\$256,512** (Direct costs: \$193,002)

Total Support: **\$50,304** (Direct costs: \$33,648)

Total Support: **\$1,852,086** (Direct costs: \$1,382,146)

"Acquisition of stopped-flow instrumentation"

Funding from American Recovery and Reinvestment Act in the form of instrumentation supplement grant for the purchase of pre-steady state kinetics equipment. Role: PI

### 38. R01 Al076119-S1 (Sarafianos)

NIH/NIAID

"Testing of EFdA toxicity" Funding from American Recovery and Reinvestment Act to accelerate research related to the development of EFdA as a therapeutic. Role: PI

# 39. R01 Al074389 (Burke)

02/01/08 to 01/31/13 Total Support for Sarafianos lab: **<u>\$312,900</u>** (Direct costs for Sarafianos Lab \$210,000) NIH/NIAID "Determinates of anti-HIV nucleic acid aptamer potency and resistance"

Dr. Sarafianos's laboratory will perform structural studies of complexes of HIV-1 RT with aptamer molecules discovered and tested in Dr. Burke's laboratory. Role: Co-I

# 40. R21 AI079801 (Parniak)

Total Support for Sarafianos lab: **<u>\$173,054</u>** (Direct costs for Sarafianos Lab: \$119,969) NIH/NIAID "Microbicide properties of RT inhibitor combinations-first phase"

This project will evaluate combinations of potent NRTIs with NNRTIs as protective barriers in HIV cell culture and explore formulations of these combinations in an ex vivo cervical explant tissue model. Role: Co-I

# 41. USDA-ARS-58-1940-8-868 (McIntosh)

USDA Total Support for Sarafianos Lab: **\$535,283** per year (Direct costs for Sarafianos Lab: \$535,283) "Swine Genomics and Biodefense Countermeasures Discovery"

Dr. Sarafianos's component involves use of high throughput (HT) screening of chemical libraries for the discovery of foot-and-mouth disease virus (FMDV) inhibitors.

06/01/11 to 5/31/13

07/01/08 to 06/30/13

09/01/10 to 08/31/13

07/01/08 to 06/30/10

07/01/08 to 06/30/12



07/01/09 to 06/30/10

# 42. Canadian Institutes of Health Research (CIHR) (Marchand)

Total Support: **<u>\$155,000</u>** (Direct costs: \$155,000) "Characterization of EFdA, a Novel Translocation-Deficient Reverse Transcriptase Inhibitor" Post-doctoral fellowship for Dr. Bruno Marchand on mechanisms of inhibition by 4'-E RT inhibitors. Role: Mentor

# 43. TIBOTEC Co. (Sarafianos)

Toxicity of HIV-1 reverse transcriptase inhibitors" Role: PI

#### 44. International Med Center of Japan-AIDS Clinical center (Hachiya) Total Support: **\$42,000** (Direct costs: \$42,000)

"Mechanisms of HIV drug resistance"

This is a post-doctoral fellowship supplement to Dr. Atsuko Hachiya in the Sarafianos lab for studying mechanisms of HIV reverse transcriptase drug resistance Role: Mentor

#### 45. MRCE-NIH pilot grant (Sarafianos)

Total Support: **<u>\$149,500</u>** (Direct costs: \$100,000) "High-Throughput screening for inhibitors of Dengue virus and SARS coronavirus enzymes" Role: PI

#### 46. TIBOTEC co. (Sarafianos)

"Crystallographic and biophysical studies with viral enzymes" Use of X-ray and other techniques to characterize interactions between viral enzymes and inhibitors. Role: PI

#### 47. amfAR The foundation for AIDS Research (Marchand)

Total Support: **\$125,000** (Direct costs: \$113,636) "Inhibitors of wild-type and drug-resistant HIV reverse transcriptase" Post-doc fellowship application for Bruno Marchand on mechanisms of resistance to 4'-E RT inhibitors. Role: Mentor

### 48. GeneMatrix Inc, Korea (Hong/Folk/Sarafianos)

03/01/07 to 02/28/08 Total Support: **\$70,000** (Direct costs for a grad stud in Sarafianos Lab: \$28,000) "Development of a MALDI-TOF-based biochip for prognosis & treatment responses on antivirals" Analysis of antiviral resistance mechanisms in HBV. Role: Co-PI

### 49. USDA-ARS-58-1940-5-519 (McIntosh)

Direct costs for Sarafianos Lab: \$100,000 USDA "Program for prevention of animal infectious diseases: Advanced technologies for foreign animal disease vaccines and control"

Program for prevention of Foot and Mouth Disease Virus in collaboration with USDA at Plum Island. Dr. Sarafianos's lab established assays for high throughput screening of chemical libraries for drug discovery. Role: PI of component 3

# OTHER FUNDED PROPOSALS

### 50. Mizzou Advantage (Hazelbauer/Sarafianos)

Total Support: **\$10,000** (Direct costs only) "Regional Symposium on Molecular Biophysics: Single-Molecule Analysis of Macromolecules"

Total Support: **<u>\$67,886</u>** (Direct costs: \$45,409)

1/01/10 to 05/31/12

03/01/09 to 02/28/12

07/01/09 to 06/30/11

03/01/08 to 02/28/09

02/01/08 to 01/31/10

01/01/07 to 06/30/08

01/06/10 to 12/30/10

01/01/08 to 12/31/10

Total Support: **\$38,401** (Direct costs: \$30,001)

The purpose of the grant was to establish a Biophysics symposium and invite key researchers in the field. Role: Co-PI

51.	Life Sciences fellowship (Marchand)	04/1 Total Support: <b>\$40,000</b> (Direct co	6/07 to 04/15/09 sts and benefits)
	Post-doc fellowship for Dr. Bruno Marchand later declined Role: Mentor	for an AmfAR grant)	
52.	<b>F32 Al009578 (Sarafianos)</b> NIH/NIAID "Structural studies of HIV reverse transcriptase in complex Completed nationally for NIH post-doctoral fellowship. I so with a polypurine tract containing RNA/DNA substrate. Role: PI	05/09 Total support: <b>§110,000</b> /3 with RNA/DNA substrates" olved the crystal structure of HIV-	9/96 to 08/31/99 yrs (Direct costs) 1 RT in complex
53.	Acquisition of Digital Droplet PCR (Pls: Roberts, Saraf	<b>ïanos</b> ) Cost: \$100,000	2014
54.	Acquisition of Alpha Screen Plate Reader (Pls: Hannink Submitted an instrumentation grant at the Life Sciences C instrument for measuring intermolecular interactions and fl	k, <b>Sarafianos</b> ) Cost: \$36,000 Center for the purchase of an Alph luorescence.	2010 a screen reader
55.	Acquisition of Phosphorimager (PIs: Pintel, Sarafianos	) Cost: \$90,000	2010
56.	Acquisition of Poster Printer (Pls: Johnson, Sarafianos	) Cost: \$10,000	2011
57.	Acquisition of Biacore T-100 (PI: Sarafianos) Cost: \$33	0,000	2008

# SUMMARY OF TRAINING STUDENTS SINCE 2006

POSTDOCTORAL FELLOWS-RESEARCH FACULTY; <u>TOTAL: 18</u> GRADUATE STUDENTS; <u>TOTAL: 20</u> GRADUATE STUDENTS-ROTATIONS; <u>TOTAL: 60</u> UNDERGRADUATE-VISITING SCHOLARS-MED/VET-HIGH SCHOOL STUDENTS; <u>TOTAL: 83</u> DEFENSE COMMITTEES; <u>TOTAL: 47</u>

### TEACHING

2020 fall	"Structural Biol-Crystallography and Cryo-EM" BCBD Foundations Course 10 Lectures (2hr each)
2019 fall	"Structural Biol-Crystallography and Cryo-EM" BCBD Foundations Course 10 Lectures (2hr each)
2018 fall	"Structural Biol-Crystallography and Cryo-EM" BCBD Foundations Course 10 Lectures (2hr each)
2017 spring	"Topics in Microbiology-Advanced Virology" 9100 undergraduate course- 4 lectures
2017 spring	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2016 fall	"Infection and Immunity" 9449, MMI graduate course- 4 lectures
2016 fall	"Virology" 4303/7303, MMI graduate course - 2 lectures
2016 fall	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2016 spring	"Topics in Microbiology" 3200 undergraduate course- 4 lectures
2015 fall	"Virology" 4303/7303, MMI graduate course - 5 lectures
2015 spring	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2014 fall	"Infection and Immunity" 9449, MMI graduate course- 4 lectures

2014 fall	"Virology" 4303/7303, MMI graduate course - 4 lectures
2014 fall	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2014 summer	Summer Undergraduate Researchers-Dr. Joel Maruniak course: 1 lecture
2014 spring	"Math in Life Sciences" Undergraduate course, invited by Dr. George Smith, 1 lecture
2014 spring	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2013 fall	"Virology" 4303/7303, MMI graduate course - 4 lectures
2013 fall	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2013 fall	"Infection and Immunity" 9449, MMI graduate course- 4 lectures
2013 fall	"Topics in Microbiology" 9001, MMI graduate course- 1 lecture
2013 spring	"Virology" course for graduate students (Micro8303)-4 lectures
2013 spring	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2013 spring	"Math in Life Sciences"-1 lecture invited by Dr. George Smith, Biological Sciences
2013 spring	"Biochemistry Ethics" graduate course (Dr. Dennis Lubahn)-Contributed to 1 lecture
2013 spring	"Senior Seminars in Biology"-1 lecture invited by students
2012 fall	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2012 fall	"Infection and Immunity" MMI graduate course 9001- 4 lectures
2012 spring	"Medical Microbiology and Immunology" 3200 undergraduate course- 4 lectures
2011 fall	"Infection and Immunity" MMI graduate course 9001- 4 lectures
2011 fall	"Virology" course for graduate students (Micro8303)-4 lectures
2011	"Math in Life Sciences" 1 Invited lecture. Course organizer: Dr. George Smith
2011 fall	"Medical Microbiology and Immunology" 3200; 4 Invited lectures for pre-med undergraduates
2011 spring	"Medical Microbiology and Immunology" 3200; 4 Invited lectures for pre-med undergraduates
2010	"Antiviral therapies" 2 Invited lectures for Undergraduate students, Division of Biological Sciences Course organizer: Dr. George Smith
2009	"Antiviral therapies" Invited lecture for Undergraduate students
	Division of Biological Sciences. Course organizer: Dr. George Smith
2009	"Virology" course for graduate students (Micro8303), 7 Lectures: Virus entry, viral replication, therapeutics, coronaviruses, virus structure, paper discussions
2008	"HIV therapies and Drug Resistance" Invited lecture in a course for Undergraduate students.
	Division of Biological Sciences. Course organizer: Dr. George Smith
2007	Virology course for graduate students (Micro8303), 7 Lectures: Virus entry, viral replication, therapeutics, coronaviruses, virus structure, paper discussions
2004	Molecular Seminar Series in Biophysics and Biophysical Chemistry
	Rutgers University, Course coordinator of senior undergraduate course
2002-2004	Biochemistry course for graduate students (course coordinator-Dr. Monica Roth)
	University of Medicine and Dentistry of NJ -Robert Wood Johnson
	2 Lectures: reverse transcriptases, DNA polymerases, replicases
1987-1991	Head Teaching Assistant and Teaching Assistant
	Georgetown University, Washington, DC
	Teaching laboratory and recitation for 10 sessions: Organic Chemistry, Biochemistry, and General Chemistry, Methods and Instrumental Analysis in Chemistry II

# TRAINING

- 1. Dr. William Cantara, Assistant Professor, Emory University, (2020-today)
- 2. Dr. Yee Tsuey Ong; Assistant Scientist I, Emory University, (2019-today)
- 3. Dr. Ivo Melcak; Assistant Professor, Emory University, (2019-today)
- 4. Dr. Uyen (Mimi) Le; Research Specialist Lead, Emory University (2019-today)
- 5. Dr. Ryan Slack, Post-Doctoral Fellow, Emory University, (2018-today)
- 6. Dr. Shuiyun Lan, Assistant Scientist I, Emory University, (2018-today)
- 7. Dr. Haijuan (Nina) Du, Senior Research Specialist, Emory University (2018-today)
- Dr. Philip Tedbury, Assistant Research Professor, University of Missouri (2016-2017) Assistant Professor at Emory University (2017-today)
- 9. Dr. Tanya Ndongwe (post-doc 2015)
- 10. Dr. Eleftherios Michailidis (post-doctoral fellow, 2012-2013) Currently post-doctoral fellow at Dr. Charles Rice's laboratory at Rockefeller University
- 11. Dr. Adeyemi Adedeji (post-doctoral fellow, summer 2012) Former Assistant Professor, Clinical Pathology at Midwestern University, College of Veterinary Medicine Currently Scientist at Genentech
- 12. Dr. Bruno Marchand (post-doctoral fellow, 2007-2011) Currently Research Scientist II at Gilead Sciences since Jan 2012
- Dr. Karen Kirby (post-doctoral fellow, 2007-2012; research scientist, 2012-2016) Assistant Research Professor University of Missouri (2016-2017) Assistant Professor at Emory University (2017-today)
- 14. Dr. Atsuko Hachiya (post-doctoral fellow, AIDS Government Clinic, Tokyo, Japan, 2009-2011) Currently Assistant Professor, Nagoya Medical Center
- 15. Dr. Kamal Singh (Research Assistant Professor, 2008-2018) Currently Associate Professor, Assistant Director, Molecular Interactions Core, University of Missouri
- Dr. Devendra Kumar Rai (post-doctoral fellow, 2010-2012)
  Former Research Associate at USDA
  Currently Senior Researcher, University of Minnesota
- 17. Dr. Robert Ralston (Research Assistant Professor, 2012-2014) Currently Research Professor at University of Kansas Medical Center
- Dr. Bechan Sharma (Sabbatical training 2011)
  Currently Professor and Ex-Chairman of Biochemistry, University of Allahabad, India

# Graduate students; Total: 20

1.	2019-today	Maria Cilento	PhD Biochem, Cell & Develop Biol, Emory
2.	2018-today	Darius Mahboubi	PhD Molecular Systems Pharmacology, Emory
3.	2018-today	Raven Shah	PhD Biochem, Cell & Develop Biol, Emory
4.	2016-2017	Seongmi Kim	MS Pathobiology area, U. of MO
		Currently Research Technician at Irwin Cha	iken lab, Drexel University, Philadelphia, PA
5.	2015-2020	Assi Vincent Yapo	PhD MMI, U. of MO
6.	2015-2019	Mahmoud Farghali	PhD MMI, U. of MO
		Currently Assistant Lecturer of Microbiology	r, Tanta University, Egypt
7.	2014-2019	Mary Casey	PhD MMI, U. of MO
8.	2013-2017	Andrew Huber	PhD Vet Path, U. of MO
		Currently Post-doc fellow at Taosheng Cher	n lab, St. Jude's Research Hospital, Memphis, TN
9.	2013-2017	Obiaara Ihenacho Ukah	PhD MMI, U. of MO
		Currently Medical Student at the University	of Missouri School of Medicine
10	. 2013-2018	Maritza Puray Chavez	PhD MMI-Fulbright scholar, U. of MO
		Currently Post-doctoral fellow at Sebla Kutlu	uay lab, Washington Univ. of St. Louis, MO

11. 2013-2017	Jackie Flores	MS MMI, U. of MO	
12. 2013-2017	Anna Gres	PhD Chemistry, U. of MO	
	Currently Post-doctoral fellow at Andre Hoe	urrently Post-doctoral fellow at Andre Hoelz lab, CalTech, Pasadena, CA	
13. 2012	Ademola Kassim	MSc University Illinois	
	Currently Research and Development Asso	ciate Scientist Sigma Aldrich	
14. 2012-2017	Dandan Liu	PhD MMI, U. of MO	
	Was Post-doc fellow at Gaya Amarasinghe	lab, Washington University of St. Louis, MO	
	Currently Senior Scientist, Pfizer		
15. 2012-2016	Zhe Li Salie	PhD Biochem, U. of MO	
	Currently Research Associate, Ollman Saph	nire Lab, Scripps Research Institute, La Jolla CA	
16. 2006-2012	Eleftherios Michailidis	PhD MMI, U. of MO	
	Currently Post-doctoral fellow Charles Rice	laboratory, Rockefeller University NYC, NY	
17. 2007-2012	Adeyemi Adedeji	PhD MMI, U. of MO	
	Currently Scientist-Pathologist at Genentech, San Francisco, CA		
18. 2008-2014	Yee Tsuey Ong	PhD MMI, U. of MO	
	Currently Assistant Scientist, Emory University	sity, Atlanta, GA	
19. 2009-2015	Tanya Ndongwe	PhD MMI, U. of MO	
	Currently Scientist 1 at Biomarin Pharmaceutical Inc, San Francisco, CA		
20. 2006-2010	Matt Schuckmann	MSc MMI, U. of MO	
	Currently Biological science technician, at U	JSDA-ARS, Stuttgart, Arkansas	
21. 2012 (Visiting)	Ignacio de la Higuera, Esteban Domingo lat	o (not counted) PhD (from Madrid, Spain)	
	Currently Post-doctoral fellow at The Stedm	an Lab, Portland State University, Portland, OR	
22. 2017 (Visiting) Flore De Witt, Zeger Debyser lab (not counted) PhD (from Leuven, Belgium)		ed) PhD (from Leuven, Belgium)	
	Currently Post-doctoral fellow, Molecular Vi	rology and Gene Therapy, KU Leuven, Belgium	

# Graduate students - rotations; Total: 61

2021	Meher Sethi	Emory Microbiology and Molecular Genetics
2020	Levi Gifford	Emory Biochem, Cell & Develop Biol
	Alexa Snyder	Emory Biochem, Cell & Develop Biol
	Will McFadden	Emory Biochem, Cell & Develop Biol
	Lindsey Ramirez	Emory Molecular Systems Pharmacology
	Justin Luu	Emory Microbiology and Molecular Genetics
	Susan Kim	Emory Biochem, Cell & Develop Biol
2019	Dillion Francis	Emory Molecular Systems Pharmacology
2018	Sarah Strassler	Emory Biochem, Cell & Develop Biol
	Monica Cortez	Emory Biochem, Cell & Develop Biol
	Cate Risener	Emory Molecular Systems Pharmacology
	Maria Cilento	Emory Biochem, Cell & Develop Biol
2016	Melissa Menie	MMI
	Victoria Grill	Biochemistry
	Tiffany Taylor (Post-bac)	Genetics Area Program
2015	Jennifer Wolf	MMI
	Ashley Campbell	Biochemistry
	Seongmi Kim	Biochemistry
	Matthew Burch	MMI
2014	Mahmoud Farghali	MMI
	Kinsey Hilliard	MMI
	Mark Schroeder	Biochemistry

	Kwaku Tawiah	Biochemistry
	Malak Benslimane	Genetics Area Program
	Assi Vincent Yapo	MMI
	Kristy Ortega	Postbac rotation
2013	Mary Casey	MMI
	Megan Hollenbeck	Biochemistry
	Anna Gres	Chemistry
2012	Mindy Miller	MMI
	Maritza Puray Chavez	MMI
	Obiaara Ihenacho	MMI
	Jackie Flores	MMI
	Vinit Shanbhag	Biochemistry
	Priya Bariya	Biochemistry
	Xizheng Bill Xu	MD.PhD,
	Phuong Nguyen	Biochemistry
2011	Zhe Li Salie	Biochemistry
	Mahmoud Khalafalla	Biochemistry
	Bahar Findik	Biochemistry
	Dandan Liu	MMI
	Chunhui Miao	MMI
	Pieter Norden	Genetics
	Kyle Hill	MMI
	Yufei Li	Biochemistry
	Kavita Bomb	MMI
2010	Gerialisa Caesar	post-bac
2009	Tanya Ndongwe	MMI
2008	Olufemi Fasina	MMI
	Sanathkumar Janaka	MMI
	Haruyo Matsuyama	Genetics
	Yee Tsuey Ong	MMI
2007	Adeyemi Adedeji	MMI
	Nicholas A Eisele	MMI
	Chanakya Das	MMI
	Sangita Pal	MMI
	Erkan Osman	MMI
2006	Kristen Clary	MMI
	Matthew Schuckmann	MMI
	Matthew Gubin	MMI
	Eleftherios Michailidis	MMI

Undergraduate students- Medical/Vet students- Visiting Scholars-High School Students after joining the University of Missouri (71); after joining Emory (12); Total: 83 (42 women)

2021 Vishal Shankar Ansh Patel 2020 Talia Sisroe Jason Jiang Nicole Lulkin 2019 Alex Welsh Claudia Wahoski Ciro Carrillo Marcano Jr. Ally Jin Andres Emanuelli 2018 Melina Khorrami high school student, accepted at UCLA Madeline Lazar, Biochemistry Georgia Tech Olivia Blackman Kanwal Momin 2017 EXPRESS fellow Adit Shah, Biochemistry 2016 Skyler Kramer, Biochemistry Cortney Hutson, Biochemistry Gilberto Perez, Biochemistry EXPRESS fellow 2015 Rohit Rao, Biological Sciences Emily Coonrod, Biological Sciences **Discovery fellow** (Human and Statistical Genetics PhD program, Washington University of St. Louis) Blake Nourie, Biological Sciences Seongmi Kim, Biochemistry 2014 Maria Boftsi visiting scholar, Greece Hannah Brenton, Biological Sciences Leonard Rogers, Biochemistry (Molecular Cell Biology PhD program, Washington University of St. Louis) Samuel Min, Biochemistry Alejandra Pinillos, Biological Sciences Robert Newman MU Vet student. Summer 2014 EXPRESS fellow Olajumoke Akala, Biological Sciences 2013 **Dominique Stephens** Butler University, Indiana; Summer 2013 Benjamin G. Langsten MU Vet student: Summer 2013 Sumidha Katti high school student Ipsa Chaudhary high school student Arzoo Singh visiting scholar, India visiting scholar, India Aakansha Singh Thomas Gerard Laughlin, Biochemistry Trail to a Cure fellow Nnamdi Ihenacho, Biological Sciences EXPRESS fellow Amanda Pelletier, Biological Sciences HHMI fellow. LSUROP fellow Nicholas Wiegers, Biological Sciences HHMI fellow Kelsey Boschert, Nutritional Sciences Discovery Fellows Prog HONORS college (University of Kansas Medical School) **EXPRESS** fellow 2012 Briana Bester, Biological Sciences

Connor V. Abbott, Chemical Engineering Paul K. Cho, Biological Sciences Jung Y. Nam, Biological Sciences Jeremy Clincy, Biochemistry McNair fellow Andrew Huber, Biological Sciences Trail to a Cure fellow Dallas Pineda, Biochemistry EXPRESS fellow, LSUROP fellow (Summer researcher at NIH, Southern Illinois University School of Dental Medicine) Grahmm Funk, Biological Sciences 2011 HHMI fellow Hilary A Schmidt, Biological Engineering Leslie Chiang, Biological Sciences HHMI fellow Katherine Laddusaw, Biological Sciences Kristin Ponzar, Biological Sciences Yun Pan, Biological Sciences Ariel Hagedorn HHMI fellow; McNair fellow **Achilles Meskos** visiting scholar, Greece 2010 LSUROP fellow Nicholas E. Calcaterra, Biochemistry (Johns Hopkins University, UC Berkeley School of Law) Ceili A. Cornelison, Computer Science Jackie Carrico, Biochemistry LSUROP, HHMI, Trail to a Cure fellow (U of Colorado School of Medicine) Kayla B. Matzek, Biol Sci, (U of Missouri School of Medicine) Bryant Scholar (Pre-accepted at the University of Missouri School of Medicine) Maxwell D. Leslie, Biological Sciences and Psychology HHMI fellow (Veterinary Medicine program at Virginia-Maryland College of Veterinary Medicine) Christopher Dorst (Washington University of Saint Louis, Graduate School UNC Chapel Hill) Tracy L. Fetterly (Vanderbilt University, Neuroscience Graduate Program Vanderbilt U.) 2009 Jacob C. Jackson, HONORS Biological Sciences LSUROP fellow (School of Medicine at Cornell, Weil, Anesthesiologist Resident, Cornell U, NYC) LSUROP fellow Ryan Durk, Biol Sci, (School of Medicine of Vanderbilt University; Physician resident at Barnes Jewish) Christie Pautler, HONORS Biological Sciences Conley Scholar (Pre-accepted at the School of Medicine of University of Missouri) Phuong Bich Do, HONORS Biological Sciences McNair fellow (Graduate School of Biological Sciences, University of Missouri) Daniel Griffin, Biochemistry Discovery Fellows Program (Saint Louis University, School of Medicine) Alan C. Leslie, Biochem, (*Technician at ABC labs, Columbia MO*) EXPRESS fellow Shannon D. Arnold, HONORS Biological Sciences McNair fellow 2008 Christopher Brownsworth, Year 1, Medicine Saeed J Kahn, HONORS Biological Sciences Amelie Olga Mafotsing Fopoussi, Biological Sciences McNair fellow (Accepted at the graduate school of public health at Ann Arbor Michigan) Musetta Steinbach Carleton College, Minnesota (Accepted at the University of Chicago) Emily M. Ryan, HONORS Biological Sciences LSUROP fellow (A.T. Still University Osteopathic Medical School) Ali M. Sawani, Biochemistry EXPRESS fellow

#### (Accepted at the MD/PhD program at Ann Arbor Michigan)

Daniel Sietsema, Biol Sci, (Technician, University of Colorado, Denver)

2006-07 Michael O. Boyd, Biological Sciences Candace Clayborne-Harris, Biological Sciences. Timothy J. Graven, Biological Sciences Sandor F. Jones, Biological Sciences Ryan M. Kelly, Biochemistry Patrick Mulligan, Biological Sciences Michael Owens, History Heather M Uhles, Biological Engineering Chi-Hin Wong, Mechanical Engineering, Work study

#### Ph.D. defense committees Total: 47

Dariana Torres Vidisha Singh Nicole Bowen Maria Cilento Biian Mahboubi Darius Mahboubi Raven Shah Assi Vincent Yapo (defended 2020) Mahmoud Farghali (defended 2019) Mary Casey (defended 2019) Ashley Matthew (defended 2018) Patrick Nittler Ashley Campbell Phuong Nguyen Andrew Huber (defended 2017) Maritza Puray Chavez (def. 2018) Obiaara Ihenacho Ukah (def. 2017) Jackie Flores (defended MS 2017) Anna Gres (defended 2017) Madhuvanthi Vijayan (defended 2016) Matthew Fuller (defended 2017) Dandan Liu (defended 2016) Lieve Dirix (defended 2016) Bassem Shebl (defended 2016) Zhe Li Salie (defended 2016) Thameesha Gamage (MS def. 2016) Tanyaradzwa Ndongwe (defend. 2015) Jean Bernatchez (defended 2014) Yee Tsuey Ong (defended 2014) Olufemi Fasina (defended 2014) Jennifer La (defended 2013) Ademola Kassim (defended 2013) David Roeseler (defended 2013) Angela Whatley (defended 2013) Richard Adevemi (defended 2013)

(Emory U., Biochem, Cell & Developmental Biology; Melikyan lab) (Emory U., Immunology & Molecular Pathogenesis, Ann Chahroudi Lab) (Emory U., Molecular Systems Pharmacology, Baek Kim lab) (Emory U., Biochem, Cell & Developmental Biology; Sarafianos lab) (Emory U., Molecular Systems Pharmacology, Baek Kim lab) (Emory U., Molecular Systems Pharmacology; Sarafianos lab) (Emory U., Biochem, Cell & Developmental Biology; Sarafianos lab) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Massachusetts Medical School, Celia Schiffer laboratory) (University of Missouri, Biology; Mannie Liscum laboratory) (University of Missouri, Biochemistry; John Tanner laboratory) (University of Missouri, Biochemistry; Donald Burke laboratory) (University of Missouri, Vet Path; Stefan Sarafianos laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, Chemistry; Stefan Sarafianos laboratory) (University of Missouri, MMI; Bumsuk Hahm laboratory) (University of Missouri, MMI; David Pintel laboratory) (University of Missouri, MMI: Stefan Sarafianos laboratory) (KU Leuven/Univ. of Leuven, Belgium, Molec Virol; Zeger Debyser lab) (University of Missouri, Biochemistry; Peter Cornish laboratory) (University of Missouri, Biochemistry; Stefan Sarafianos laboratory) (University of Missouri, Chemistry; John Tanner laboratory) (University of Missouri, MMI; Stefan Sarafianos laboratory) (McGill University, Montreal, Canada, Microbiol; Matthias Götte lab) (University of Missouri, MMI; Stefan Sarafianos laboratory) (University of Missouri, MMI; David Pintel laboratory) (Monash University, Australia; Gilda Tachedjian laboratory) (MSc-program at University of Illinois; Stefan Sarafianos laboratory) (University of Missouri, Biological Sciences; Sam Waters laboratory) (MMI-University of Missouri; Donald Burke laboratory) (MMI-University of Missouri; David Pintel laboratory)

Sanathkumar Janaka (defended 2013)	(University of Missouri, MMI; Marc Johnson laboratory)
Eleftherios Michailidis (defended 2012)	(University of Missouri, MMI; Stefan Sarafianos laboratory)
Adeyemi Adedeji (defended 2012)	(University of Missouri, MMI; Stefan Sarafianos laboratory)
Matthew Schuckmann (MS def. 2011)	(University of Missouri, MMI; Stefan Sarafianos laboratory)
Michael Taylor Mitchell (MS def. 2011)	(University of Missouri, Biochemistry; Mark Hannink laboratory)
Josh Franken (MS defended 2010)	(Biochemistry-University of Missouri; Donald Burke laboratory)
Maryam Ehteshami (defended 2010)	(McGill University, Montreal, Canada; Matthias Götte laboratory)
Egor Tchesnekov (defended 2009)	(McGill University, Montreal, Canada; Matthias Götte laboratory)
Xiongying Tu (defended 2008)	(Rutgers-CABM; Arnold laboratory)
Cindy J. Arrigo (defended 2002)	(UMDNJ-Newark; Modak Laboratory)
J. Jin (defended 2001)	(UMDNJ-Newark; Modak Laboratory)
Steve Tuske (defended 2000)	(UMDNJ-Newark; Modak laboratory)

### **ORGANIZED AND HOSTED SEMINAR VISITS**

- Dr. Gaitikrushna Singh (University of Minnesota) December 2020
- Dr. Susan Weiss (University of Pennsylvania) CFAR Event October 2020
- Dandan Liu Post-doctoral Candidate (Georgia State University) October 2020
- Dr. Penelope Mavromara (Democritus University of Thrace) March 2020
- Dr. William Cantara (The Ohio State University) February 2020
- Dr. Hiroaki Mitsuya (NIH/Kumamoto University) February 2020
- Dr. Andrew Routh (utmb Health) December 2019
- Dr. Bruce Torbett (Scripps Institute, La Jolla CA) November 2019
- Dr. Athanassios Economou (Georgia Institute of Technology) October 2019
- Dr. Steve Qin (Emory University) June 2019
- Dr. Juan Perilla (University of Delaware) May 2019
- Dr. Ivo Melcak (The Rockefeller University) May 2019
- Dr. Maureen Powers (Emory University) February 2019
- Dr. Michael Malim (King's College London) October 2018
- Dr. Susan Wall (Emory University School of Medicine, Dept. of Nephrology) October 2018
- Dr. Victor Corces (Emory University) August 2018
- Dr. Christina Mwachari (Kenya Medical Research Institute) August 2018
- Dr. Zhengqiang Wang (University of Minnesota) February 2018
- Dr. Andres Sönnerborg (Karolinska Institutet) February 2018
- Dr. Ujjwal Neogi (Karolinska Institutet) February 2018
- Dr. Zeger Debyser (Katholieke Universiteit Leuven)
- Dr. Nathan Sherer (University of Wisconsin) (invited through Biochemistry)
- Dr. Gregory Melikian (Emory University) (invited through Biochemistry)
- Dr. Juan Perilla (University of Illinois)
- Dr. Dmitry Lyumkis (Salk Institute) (invited through Biochemistry)
- Dr. Priscilla Yang (Harvard University) (invited through Biochemistry)
- Dr. Peijun Zhang (University of Pittsburgh)
- Dr. Juan Perilla (University of Illinois)
- Dr. Andrew J. Henderson (Boston University) (invited through Biochemistry)
- Dr. Bruce Torbett (Scripps Institute, La Jolla CA)
- Dr. Athe Tsibris (Harvard University)

- Dr. Patrick Griffin (Scripps Institute, FL) (invited through Biochemistry)
- Dr. Daniel Kuritzkes (Harvard University)
- Dr. Robert Gallo (Institute of Human Virology) (Co-hosted by Sarafianos and Johnson)
- Dr. Jack Johnson (Scripps Institute, La Jolla CA)
- Dr. Shuzo Matsushita (Kumamoto University)
- Dr. Joseph Marcotrigiano (Rutgers University) (invited through Biochemistry)
- Dr. Charles Rice (Rockefeller University, through the Chancellor's Distinguished Lectures Program)
- Dr. Raymond Birge (UMDNJ)
- Dr. Craig Cameron (Penn State)
- Dr. Xiaowei Zhuang (Harvard University) (invited through Biochemistry)
- Dr. Tom Ellenberger (Chair of Microbiology, Washington U in St. Louis) (invited through Biochem)
- Dr. Masao Matsuoka (Kyoto University)
- Dr. Hiroaki Mitsuya (NIH/Kumamoto University)
- Dr. Michael Parniak (University of Pittsburgh School of Medicine)
- Dr. Eiichi Kodama (Tohoku University School of Medicine)
- Dr. Susan Weiss (University of Pittsburgh)
- Dr. Stuart LeGrice (Drug Resistance Program NCI/NIH)

# SERVICE AT MOLEC. MICROBIOL & IMMUNOL, SCHOOL OF MEDICINE, UNIVERSITY OF MISSOURI

- 2015 Met with MO senator staffers to help them in their efforts to prepare for policy decisions
- 2015 KBIR radio interview on HCV drugs
- 2014 Was asked to meet with research officers from the Kansas City University of Medicine and Biosciences (KCUMB) (Jan 2014) to organize future research collaborations.
- 2013-16 <u>Medical School Admissions Committee Member</u>. Participated in reviewing applications of potential medical students, interviewing 2 students every week, and attending weekly meetings. Total involvement is 12-15 hours per week from October until May.
- 2013 Was asked to meet with Dr. Rajiv Shah, <u>Federal Administrator of the United States Agency for</u> <u>International Development (USAID)</u> during his visit at MU in November 2013.
- 2013 Was asked to meet with the new members of the University of Missouri <u>Board of Curators</u> as part of their Mizzou Snapshot Tour in June 2013.
- 2013 Visit with <u>the Freshman Legislators of the Missouri State Government</u> in Jan 2013. Provided extensive information on how research at MU benefits the state of Missouri and the world.
- 2012 <u>Graduate Student Admissions Committee Member</u>. Participated in reviewing all applications of potential graduate students, and using skype for several interviews.
- 2013- Executive committee of MMI-Vet-Path Graduate Program-Elected in 2013.
- 2012-13 <u>SOM Advisory Committee on Research Space</u>. Participated in monthly meetings of SOM committee evaluating applications for research space allocation.
- 2013- <u>Infrastructure Task Force</u>. Participated in meetings of SOM committee focusing on planning for future infrastructure needs.
- 2013- <u>Research Strategic Planning Workforce</u>. Participated in meetings of SOM committee focusing on planning for expansion of SOM faculty.
- 2013- <u>Reviewer of Spurgeon Award candidates</u>. I have been reviewing the faculty candidates for the prestigious Spurgeon award for outstanding research by Young faculty at MU.
- 2013 <u>Faculty Search Committee</u>; member. Reviewed ~70 applications for Bacterial Pathogenesis candidates and was involved in organizing visits of six candidates.
- 2012 <u>SOM committee meetings focusing on drug development</u>. Participate in meetings for preparation of grant application for national translational grant.
- 2012 <u>Dean's Advisory Committee on Research</u>. Presented (also Lab member Dr. Ralston), contributed and participated in meetings providing perspective for translational studies on Drug Development.

- 2011 Invited talk and participation as a representative of School of Medicine Research Faculty during a visit of a <u>Kansas University Delegation</u>, exploring collaborative opportunities (October 17<sup>th</sup>, 2011).
- 2011 <u>Faculty Search Committee</u>; member. Hired Teaching Assistant Professor Dr. Jason Furher.
- 2011 Graduate Student Admissions Committee, MMI.
- 2008-09 Committee for rebuilding the departmental Website; member.
- 2008-09 <u>Faculty Search Committee</u>; member. <u>Faculty Search Committee</u>; member. Reviewed 240 applications, helped organize visits of >12 candidates. Drs. M. Baldwin and Shan-Lu Liu were hired.
- 2009-2011 Committee for Departmental Seminar, member.

# CAMPUS-WIDE SERVICE AT THE UNIVERSITY OF MISSOURI

- 1. 2015. Gave a lecture/training class at the IBC committee on CRISPR-based technologies.
- 2. 2015-04. Invited to give a talk at the Chancellor's Fund for Excellence Development Committee.
- Reviewer of Chancellor's Award for Outstanding Research & Creative Activity in the Biological Sciences.
  2012 Research Council (representing Biochemistry)
- 5. 2008-today Vice Chair of Institutional Biosafety Committee, MU Environmental Health and Safety
- 6. 2009-today Chair of Biosafety Subcommittee on organizing biosafety regulations on core facilities
- 7. 2007-today <u>Biosafety level 3 steering committee</u>. This committee reviews applications for use of the Biosafety Level 3 facility at the Bond Life Sciences Center
- 8. Reviewer of Research Board grants (2007-2017)
- 9. 2006-2009 <u>FAC, Faculty Activities Committee</u> Representative member for the department of Molecular Microbiology and Immunology. This committee reviews matters of faculty interest with respect to primarily non-financial aspects of the administration of the University. I have contributed to its efforts to revise campus grievance procedures, to ameliorate concerns over changes in the UM System's faculty workload policy, and to address issues regarding the status of nontenure-track faculty.

# SERVICE AT EMORY UNIVERSITY

- 1. Contributed to BCDB Training Grant Application (PIs: Corbett A, Boise L)
- Planning Committee for Emory CFAR ESI Mentoring Workshop and mock study section participant-Nov 9 2018
- 3. Member of search committee for Biochemistry Chair
- 4. Department Leadership Council, Department of Pediatrics
- 5. Ad hoc committee for planning leadership transition of the Robert P. Apkarian Integrated Electron Microscopy Core
- 6. Ad hoc committee for researching state-wide resources for the acquisition of a 300 kV electron microscope
- 7. Member of search committee to hire cryo-EM specialist for Robert. P. Apkarian Integrated Microscopy Core
- 8. Member of search committee to hire single particle cryo-EM staff scientist for Robert. P. Apkarian Integrated Microscopy Core
- 9. Contributed to S10 grant for acquisition of a STED high resolution microscope (PI: Neil Anthony)
- 10. Contributed to grant for deep sequencing equipment for Yerkes (PI: Steven Bosinger)
- 11. Emory CFAR grant reviewer (2018-6)
- 12. Emory CFAR grant reviewer (2018-11)
- 13. Emory MMG student recruitment interviewer (2019-2)
- 14. Emory BCDB student recruitment interviewer (2019-4)
- 15. Emory MD/PhD Interviewer/Evaluator (2019-11)
- 16. Emory BCDB student recruitment interviewer (2020-2)
- 17. Emory MMG student recruitment interviewer (2020-2)
- 18. Emory Virology candidate interviewer (2020-2)
- 19. Emory WHSC SOM Synergy II Nexus Grant reviewer (2020-4)

- 20. Appointed as a member of the Major User Group within the Facility Advisory Committee for the Robert P. Apkarian Integrated Electron Microscopy Core (2020-6)
- 21. Emory CFAR (03) study section grant reviewer (2020-12)
- 22. Emory BCDB student recruitment interviewer (2021-1)
- 23. Emory MMG student recruitment interviewer (2021-2)
- 24. Emory MSP student recruitment interviewer (2021-2)

#### **INVITED PRESENTATIONS** (since 2005)

2020-6 Emory + Children's COVID-19 Pediatric Research Webinar Atlanta, GA 2020-5 Biological Discovery through Chemical Innovation (BDCI) Atlanta, GA 2020-1 Joint Research Center for Human Retrovirus Infection-Kumamoto University Kumamoto, Japan 2020-1 Joint Research Center for Human Retrovirus Infection-Kagoshima University Kagoshima, Japan 2019-6 Invitation for a talk at Merck West Point, PA 2019-5 Cold Spring Harbor, Retroviruses Cold Spring Harbor, NY 2019-2 Pediatrics Research Grand Rounds Atlanta. GA 2019-2 Boston University Boston, MA 2018-10 24th Annual West Coast Retrovirus Meeting Palm Springs, CA 2018-8 Global Virus Network 5<sup>th</sup> Annual Short Course Baltimore, MD 2018-4 University of Massachusetts Medical School Worcester, MA 2018-3 Emory University-MMG Program Atlanta, GA 2017-10 Lovola University Medical Center Chicago, IL 2017-10 Albert Einstein College of Medicine New York, New York 2017-9 Int. Ctr Clinical Research, National Center for Global Health and Medicine Tokyo, Japan 2017-9 University of Pittsburgh Pittsburgh, PA 2017-6 Structural Biology Related to HIV AIDS-2017 Bethesda, Washington DC 2017-6 National Institutes of Health Bethesda, Washington DC 2017-5 New York University (NYU) New York, New York 2017-1 Scripps Research Institute San Diego, CA 2016-11 Katholieke Universiteit Leuven Leuven, Belgium 2016-10 Emory University Atlanta, GA 2016-9 HIV & Hepatitis Nordic Conference Stockholm, Sweden 2016-9 Karolinska Institutet Stockholm, Sweden 2016-9 18<sup>th</sup> International Meeting of the Institute of Human Virology Baltimore, MD 2016-9 14<sup>th</sup> International RNase H Meeting Kyoto, Japan 2016-9 Clinical Research Center, Nagoya Medical Center Nagoya, Japan 2016-6 NIGMS Structural Biology of HIV / HIVE Meeting Bethesda, MD 2016-6 ASV meeting Blacksburg, VA 2016-5 Cold Spring Harbor, Retroviruses Cold Spring Harbor, NY 2015-12 Scripps Research Institute San Diego, CA 2015-11 Rutgers University Piscataway, NJ 2015-6 NIGMS Structural Biology of HIV /HIVE Meeting Bethesda, MD 2015-5 Cold Spring Harbor, Retroviruses Cold Spring Harbor, NY 2015-4 RNase H meeting, (Rieko Ishima) Pittsburgh, PA 2015-2 Conference on Retroviruses and Opportunistic Infections Seattle, WA 2015-1 Scripps Research Institute San Diego, CA 2014-12 Merck Co. West Point, PA 2014-11 Center for Cancer Research, National Cancer Institute, NIH Bethesda, MD

2014-8 International Union of Crystallography	Montreal, Canada
2014-6 NIGMS Structural Biology of HIV /HIVE Meeting	Bethesda, MD
2014-5 Cold Spring Harbor, Retroviruses	Cold Spring Harbor, NY
2014-4 Rockefeller University	New York, NY
2014-2 University of Pittsburgh	Pittsburgh, PA
2013-12 HIV interaction and Viral Evolution (HIVE) & structural biology meeting	La Jolla, CA
2013-6 NIGMS Structural Biology of HIV /HIVE Meeting	Bethesda, MD
2013-5 Cold Spring Harbor, Retroviruses	Cold Spring Harbor, NY
2013-3 University of Maryland	Beltsville, MD
2013-3 University of Medicine and Dentistry of New Jersey	Newark, NJ
2012-10-16 International Conference on AIDS Research	Kumamoto, Japan
2012-1-17 University of Minnesota, Center for Drug Design	Minneapolis, MN
2011-6-27 University of Pittsburgh-RNHI Program	Pittsburgh, PA
2011-4-18 University of Missouri-Life Sciences Week Invited Guest	Columbia, MO
2011 University of Minnesota, Center for Drug Design	Minneapolis, MN
2011 Ohio State University, Biophysics	Columbus, OH
2010 University of Minnesota, Virology group	Minneapolis, MN
2010 International Conference on AIDS Research	Kumamoto, Japan
2010 Cold Spring Harbor, Retroviruses	Cold Spring Harbor, NY
2009 International Conference on AIDS Research	Kumamoto, Japan
2008 Ribonucleases H (trip canceled for personal reasons)	Tsuruoka, Japan
2008 University of Missouri-Columbia-Chemistry	Columbia, MO
2008 Saint Louis University	St. Louis, MO
2007 8th Annual Symposium on Drug Resistance, NCI	Richmond, VA
2007 Great Plains	Lawrence, KS
2007 Christopher Bond Life Sciences Center, University of Missouri-Columbia	Columbia, MO
2006 Gilead Pharmaceuticals	San Francisco, CA
2006 Cold Spring Harbor, Retroviruses	Cold Spring Harbor, NY
2006 University of Pittsburgh-Infectious Diseases	Pittsburgh, PA
2005 Rutgers University, School of Pharmacy	Piscataway, NJ
2005 National Kumamoto University, School of Medicine	Kumamoto, Japan
2005 Aaron Diamond AIDS Research Center, Rockefeller University	New York City, NY

# CHAIR SESSION, MODERATOR, PLANNING COMMITTEE OF CONFERENCES

- 1. May 2020 <u>Session Chair</u>, at the international *Retroviruses* meeting, at Cold Spring Harbor Laboratory, New York, NY, USA
- October 2019 <u>Co-organizer</u> of the international 25<sup>th</sup> West Coast *Retroviruses* meeting, at Palm Springs, CA, USA.
- 3. March 2019, Session Chair, CROI Virus Cell Interaction Oral Abstract Session, Seattle, WA
- 4. June 2018, <u>Session Chair</u>, NIGMS Structural Biology Related to HIV/AIDS 2018, at NIH, Bethesda, MD, USA.
- 5. June 2017, <u>Session Chair</u>, NIGMS Structural Biology Related to HIV/AIDS 2017, at NIH, Bethesda, MD, USA.
- 6. May 2017 <u>Co-organizer</u> of the international *Retroviruses* meeting, at Cold Spring Harbor Laboratory, New York, NY, USA.
- 7. May 2012 <u>Symposium Chair session and moderator</u> at the international *Retroviruses* meeting, at Cold Spring Harbor Laboratory, New York, NY, USA.
- 8. Mar 2010 <u>Biophysics Symposium Organizing Committee</u>, University of Missouri, Columbia MO.

- 9. May 2008 Symposium Chair session and moderator at the international Retroviruses meeting, at Cold Spring Harbor Laboratory, New York, NY, USA.
- 10. Nov 2008 Symposium Chair session and moderator at the 9<sup>th</sup> Annual Symposium on Antiviral Drug Resistance: Targets and Mechanisms, Richmond VA, USA.

#### PUBLICATIONS

SGS is the author of **178 manuscripts (40 since moving to Emory in November 2017)**, including 16 invited reviews. He is also the author of 48 structures deposited at the PDB. "\$" denotes Sarafianos is corresponding author. More than 200 abstracts have been presented at conferences by S.G. Sarafianos or co-authors (not shown).

- 1. Sarafianos SG, Nair PP, Kumar S. 1990. "AT<sup>32</sup>P-dependent estimation of nanomoles of fatty acids: its use in the assay of phospholipase A2 activity." Anal Biochem 184, 374-379.
- 2. Sarafianos SG, Pandey VN, Kaushik K and Modak MJ. 1995. "Site-directed mutagenesis of arginine 72 of HIV reverse transcriptase. Catalytic role and inhibitor sensitivity." <u>J Biol Chem</u> 270, 19729-19735. **Sarafianos SG**, Pandey VN, Kaushik N and Modak MJ. 1995. "Glutamine 151 participates in the substrate
- dNTP binding function of HIV-1 reverse transcriptase." Biochemistry 34, 7207-7216.
- 4. Sarafianos SG, Pandey VN, Kaushik N and Modak MJ. 1995. "Arginine 78 participates in the DNA binding function of HIV-1 reverse transcriptase." *Protein Engineering* 6, 64.
- 5. Sarafianos SG, Kortz U, Pope MT and Modak MJ. 1996. "Mechanism of polyoxometalate-mediated inactivation of DNA polymerases: an analysis with HIV-1 reverse transcriptase indicates specificity for the DNA-binding cleft." Biochemical Journal 319, 619-626. PMCID: PMC1217812.
- 6. Kaushik N, Rege N, Yadav P, Sarafianos SG and Modak MJ. 1996. "Biochemical analysis of catalytically crucial aspartate mutants of human immunodeficiency virus type 1 reverse transcriptase." Biochemistry 35, 11536-11546.
- 7. Pandey VN, Kaushik N, Rege N, Sarafianos SG, Yadav P and Modak MJ. 1996. "Role of M184 of human immunodeficiency virus type-1 reverse transcriptase in the polymerase function and fidelity of DNA synthesis." Biochemistry 35, 2168-2179.
- 8. Sarafianos SG, Das K, Ding J, Hsiou Y, Hughes SH and Arnold E. 1996. "Mechanism of HIV-1 reverse transcriptase inhibition by nonnucleoside inhibitors." In Recent Advances in Chemistry and Structure-Active Relationship, Ed. Bentley, P.H., and O'Hanlon, P.J. The Royal Society of Chemistry, Cambridge, England. pp. 328-334.
- 9. Ding J, Das K, Hsiou Y, Sarafianos SG, Clark Jr AD, Jacobo-Molina A, Tantillo C, Hughes SH and Arnold E. 1998. "Structure and functional implications of the polymerase active site region in a complex of HIV-1 RT with a double-stranded DNA template-primer and an antibody Fab fragment at 2.8 Å resolution." J Mol Biol 284. 1095-1111.
- 10. Sarafianos SG, Das K, Clark AD Jr, Ding J, Boyer PL, Hughes SH, and Arnold E. 1999. "Structures of 3TC Met184Ile and Met184Val mutants of HIV-1 reverse transcriptase with and without bound nucleic acid reveal template-primer repositioning and steric hindrance mechanism for lamivudine resistance." Antiviral Therapy 3, spl, 17-18.
- 11. Sarafianos SG, Das K, Ding J, Boyer PL, Hughes SH and Arnold E. 1999. "Touching the heart of HIV-1 drugresistance: the fingers close down on the dNTP at the polymerase active site." Chemistry & Biology 5, 257-264 (invited review).
- 12. Gao H, Sarafianos SG, Arnold E and Hughes SH. 1999. "Similarities and differences in the RNase H activities of human immunodeficiency virus type 1 reverse transcriptase and Moloney murine leukemia virus reverse transcriptase." J Mol Biol 294, 1097-1113.
- 13. Sarafianos SG, Das K, Clark Jr AD, Ding J, Boyer PL, Hughes SH and Arnold E. 1999. "Lamivudine (3TC)resistance in HIV-1 reverse transcriptase involves steric hindrance with β-branched amino acids" Proc Natl Acad Sci USA 96, 10027-10032. PMCID: PMC17836.
- 14. Boyer PL, Sarafianos SG, Arnold E and Hughes SH. 2000. "Analysis of mutations at positions 115 and 116 in the dNTP binding site of HIV-1 reverse transcriptase." Proc Natl Acad Sci USA 97, 3056-3061. PMCID: PMC16191.
- 15. Boyer PL, Sarafianos SG, Arnold E, and Hughes SH. 2001. "Selective excision of AZTMP by drug-resistant human immunodeficiency virus reverse transcriptase." J Virol 75, 4832-4842. PMCID: PMC114238.

- Gao HQ, Boyer PL, Sarafianos SG, Arnold E and Hughes SH. 2000. "The role of steric hindrance in 3TC resistance of human immunodeficiency virus type-1 reverse transcriptase." <u>J Mol Biol</u> 300, 403-418.
- 17. Mu L, Sarafianos SG, Nicklaus MC, Russ P, Siddiqui MA, Ford H Jr, Mitsuya H, Le R, Kodama E, Meier C, Knispel T, Anderson L, Barchi JJ and Marquez VE. 2000. "Interactions of conformationally biased north and south 2'-fluoro-2',3'-dideoxynucleoside 5'triphosphates with the active site of HIV-1 reverse transcriptase." <u>Biochemistry</u> 39, 11205-11215.
- Sarafianos SG, Das K, Tantillo C, Clark Jr AD, Ding J, Whitcomb JM, Boyer PL, Hughes SH and Arnold E. 2001. "Crystal structure of HIV-1 reverse transcriptase in complex with a polypurine tract RNA:DNA." <u>EMBO</u> <u>J</u> 20, 1449-1461. PMCID: PMC145536.
- Das K, Xiong S, Yang H, Westland CE, Gibbs CS, Sarafianos SG and Arnold E. 2001. "Molecular modeling and biochemical characterization reveal the mechanism of hepatitis B virus polymerase resistance to lamivudine (3TC) and emtricitabine (FTC)." <u>J Virol</u> 75, 4771-4779. PMCID: PMC114232.
- 20. Tachedjian G, Orlova M, **Sarafianos SG**, Arnold E and Goff SP. 2001. "Nonnucleoside reverse transcriptase inhibitors are chemical enhancers of dimerization of the HIV type 1 reverse transcriptase." <u>Proc. Natl. Acad.</u> <u>Sci. USA</u> 98, 7188-7193. PMCID: PMC34644.

Prefaced by S.H. Hughes. 2001. "Molecular matchmaking: NNRTIs can enhance the dimerization of HIV-1 reverse transcriptase." *Proc Natl Acad Sci USA* 98, 6991-6992.

- 21. Gao H, **Sarafianos SG,** Arnold E and Hughes SH. 2001. "RNase H cleavage of the 5' end of the human immunodeficiency virus type 1 genome." *J Virol* 75, 11874-11880. PMCID: PMC114774.
- 22. Boyer PL, Gao HQ, Clark PK, Sarafianos SG, Arnold E and Hughes SH. 2001. "YADD mutants of human immunodeficiency virus type 1 and Moloney murine leukemia virus reverse transcriptase are resistant to lamivudine triphosphate (3TCTP) in vitro." <u>J Virol</u> 75, 6321-6328. PMCID: PMC114354.
- 23. Boyer PL, **Sarafianos SG**, Arnold E and Hughes SH. 2002. "The M184V mutation reduces the selective excision of zidovudine 5'-monophosphate (AZTMP) by the reverse transcriptase of human immunodeficiency virus type 1." <u>J Virol</u> 76, 3248-3256. PMCID: PMC136050.
- 24. Julias JG, McWilliams MJ, Sarafianos SG, Arnold E and Hughes SH. 2002. "Mutations in the RNase H domain of HIV-1 reverse transcriptase affect the initiation of DNA synthesis and the specificity of RNase H cleavage in vivo" <u>Proc Natl Acad Sci U S A</u> 99, 9515-9520. PMCID: PMC123172.
- 25. Boyer PL, **Sarafianos SG**, Arnold E and Hughes SH. 2002. "Nucleoside analog resistance caused by insertions in the fingers of human immunodeficiency virus type 1 reverse transcriptase involves ATP-mediated excision." *J Virol* 76, 9143-9151. PMCID: PMC136461.
- 26. Sarafianos SG, Clark Jr AD, Das K, Tuske S, Birktoft JJ, Ilankumaran P, Ramesha AR, Sayer JM, Jerina DM, Boyer PL, Hughes SH and Arnold E. 2002. "Structures of HIV-1 reverse transcriptase with pre- and post-translocation AZTMP-terminated DNA". <u>EMBO J</u> 21, 6614-6624. PMCID: PMC136941.
- 27. Das K, **Sarafianos SG**, Hughes SH and Arnold E. 2003. "HIV-1 RT structure". In Encyclopedia of Biological Chemistry. W.J. Lennarz and M.D. Lane, editors. *Elsevier Academic Press Publisher.*
- 28. **Sarafianos SG**, Clark Jr AD, Tuske S, Squire CJ, Das K, Sheng D, Ilankumaran P, Ramesha AR, Kroth H, Sayer JM, Jerina DM, Boyer PL, Hughes SH and Arnold E. 2003. "Trapping HIV-1 RT before and after translocation on DNA". *J Biol Chem* 278, 16280-8.
- 29. Julias JG, McWilliams MJ, **Sarafianos SG**, Alvord WG, Arnold E and Hughes SH. 2003. "Mutation of amino acids in the connection domain of human immunodeficiency virus type 1 reverse transcriptase that contact the template-primer affects RNase H activity". *J Virol*. 77, 8548-8554. PMCID: PMC165255.
- McWilliams MJ, Julias JG, Sarafianos SG, Alvord, WG, Arnold E, and Hughes SH. 2003. "Mutations in the 5' end of the human immunodeficiency virus type 1 polypurine tract affect RNase H cleavage specificity and virus titer." <u>J Virol</u> 77, 11150-7. PMCID: PMC224987.
- 31. Xu X, Liu Y, Weiss SR, Arnold E, Sarafianos SG\$, Ding J\$. 2003. "Molecular model of SARS coronavirus polymerase: implications for biochemical functions and drug design". <u>Nucleic Acids Res</u> 31, 7117-7130. (corresponding author) PMCID: PMC291860.
- 32. Mulky A, **Sarafianos SG**, Arnold, E, Wu, X, Kappes, JC. 2004. "Subunit-specific analysis of the human immunodeficiency virus type 1 reverse transcriptase in vivo." *J Virol.* 78, 7089-7096. PMCID: PMC421671.
- Boyer PL, Imamichi T, Sarafianos SG, Arnold E, Hughes SH. 2004. "Effects of the Delta67 complex of mutations in human immunodeficiency virus type 1 reverse transcriptase on nucleoside analog excision." <u>J</u> <u>Virol.</u> 78, 9987-9997. PMCID: PMC515022.

- 34. Sarafianos SG\$, Hughes SH and Arnold E. 2004. "Designing anti-AIDS drugs targeting the major mechanism of HIV-1 RT resistance to nucleoside analog drugs". *Int. J. Biochem. Cell Biol.* 36, 1706-15 (invited review; corresponding author).
- 35. Tuske S, Sarafianos SG, Clark, Jr AD, Ding J, Naeger LK, White KL, Miller MD, Gibbs CS, Boyer PL, Clark P, Wang G, Gaffney BL, Jones RA, Jerina DM, Hughes SH, and Arnold E. 2004. "Structures of HIV-1 RT-DNA complexes before and after incorporation of the anti-AIDS drug tenofovir". <u>Nature Struct Mol Biol</u> 11, 469-474.
- Siddiqui MA, Hughes SH, Boyer PL, Mitsuya H, Van QN, George C, Sarafinanos SG, and Marquez VE. 2004. "A 4'-C-Ethynyl-2',3'-Dideoxynucleoside Analogue Highlights the Role of the 3'-OH in Anti-HIV Active 4'-C-Ethynyl-2'-deoxy Nucleosides". <u>J Med Chem</u> 47, 5041-5048.
- 37. Julias JG, McWilliams MJ, **Sarafianos SG**, Alvord WG, Arnold E and Hughes SH. 2004. "Effect of mutations in the G-tract of the human immunodeficiency virus type 1 polypurine tract on virus replication and RNase H cleavage". <u>J Virol</u> 78, 13315-24. PMCID: PMC524982.
- 38. **Sarafianos SG**, Das K, Hughes SH and Arnold E. 2004. "Taking aim at a moving target: designing drugs to inhibit drug-resistant HIV-1 reverse transcriptases.". <u>*Current Opin Struct Biol*</u> 14, 716-730 (invited review).
- Mulky A, Sarafianos SG, Jia Y, Arnold E, Kappes J. 2005. "The Human Immunodeficiency Virus Type-1 Reverse Transcriptase Trp-motif is critical for inter-subunit interaction, function, and virus infection". <u>J Mol Biol</u> 349, 673-684.
- 40. Zuo X, Mattern MR, Tan R, Li S, Hall J, Sterner DE, Shoo J, Tran H, Lim P, Sarafianos SG, Kazi L, Navas-Martin S, Weiss SR, Butt TR. 2005. "Expression and purification of SARS coronavirus proteins using SUMOfusions." Protein Expr Purif. 42, 100-110. PMCID: PMC7129641.
- 41. Cheng A, Zhang W, Xie Y, Jiang W, Arnold E, **Sarafianos SG** and Ding J. 2005. "Expression, purification, and characterization of SARS coronavirus RNA polymerase". *Virology* 335, 165-176. PMCID: PMC7111802.
- 42. McWilliams MJ, Julias JG, **Sarafianos SG**, Alvord WG, Arnold E, Hughes SH. 2006. "Combining mutations in HIV-1 reverse transcriptase with mutations in the HIV-1 polypurine tract affects RNase H cleavages involved in PPT\_utilization". <u>Virology</u> 348, 378-388.
- 43. Tuske<sup>#</sup> S, Sarafianos SG<sup>#</sup>, Wang X<sup>#</sup>, Hudson B, Sineva E, Mukhopadhay J, Leroy O, Ismail S, Clark Jr AD, Birktoft J J, Dharia C, Napoli A, Laptenko O, Lee J, Berman H, Borukhov S, Ebright RH and Arnold E. 2005. "Inhibition of bacterial RNA polymerase by streptolydigin: Stabilization of a straight-bridge-helix active-center conformation". <u>*Cell*</u> 122, 541-552. (# : shared first authorship) PMCID: PMC2754413.
- 44. Hamburgh ME, Curr KA, Monaghan M, Rao VR, Tripathi S, Preston BD, Sarafianos SG, Arnold E, Darden T, and Prasad VR. 2006. "Structural Determinants of Slippage-mediated Mutations by Human Immunodeficiency Virus Type 1 Reverse Transcriptase". J Biol Chem 281, 7421-7428.
- 45. Boyer PL, **Sarafianos SG**, Clark PK, Arnold E, Hughes SH. 2006. "Why Do HIV-1 and HIV-2 Use Different Pathways to Develop AZT Resistance?" <u>PLoS Pathogens</u> 2, e10. PMCID: PMC1364504.
- 46. Himmel<sup>#</sup> DM, Sarafianos SG<sup>#</sup>, Dharmasena S, Hossain MM, McCoy-Simandle K, Ilina T, Clark Jr AD, Knight JL, Julias JG, Clark PK, Krogh-Jespersen K, Levy RM, Hughes SH, Parniak MA, and Arnold E. 2006. "HIV-1 Reverse Transcriptase Structure with RNase H Inhibitor Dihydroxy Benzoyl Naphthyl Hydrazone Bound at a Novel Site". ACS Chem Biol 1, 702–712. PMCID: PMC2963427.
- 47. Hang HC, Warthaka M, Worthington A, Savut DJ, Himmel DH, and **Sarafianos SG**. 2007. "Introducing our authors". <u>ACS Chem Biol</u> 1, 670–671.
- Das K, Sarafianos SG, Clark Jr AD, Boyer PL, Hughes SH, and Arnold E. 2007. "Crystal structures of clinically relevant Lys103Asn/Tyr181Cys double mutant HIV-1 reverse transcriptase in complexes with ATP and non-nucleoside inhibitor HBY 097". <u>J Mol Biology</u> 365, 77-89.
- 49. Dharmasena S, Pongracz Z, Arnold E, Sarafianos SG, Parniak MA. 2007. "3'-Azido-3'-deoxythymidine-(5')tetraphospho-(5')-adenosine, the product of ATP-mediated excision of chain-terminating AZTMP, is a potent chain-terminating substrate for HIV-1 reverse transciptase." <u>Biochemistry</u> 46, 828-36.
- 50. Han Q, Sarafianos SG, Arnold E, Parniak MA, Gaffney BL, Jones RA. 2007. "Synthesis of AZTp(S)p(CX2)pp(S)A and AZTp(S)p(CX2)pp(S)AZT: Hydrolysis-Resistant Potential Inhibitors of the AZT Excision Reaction of HIV-1 RT". <u>Organic Lett</u> 9, 5243-5246.
- Kaushik-Basu N, Bopda-Waffo A, Talele TT, Basu A, Costa PR, da Silva AJ, Sarafianos SG, Noël F. 2008. "Identification and characterization of coumestans as novel HCV NS5B polymerase inhibitors". <u>Nucleic Acids</u> <u>Res</u> 36, 1482-1496. PMCID: PMC2275130.

- 52. Hachiya A, Kodama, EN, **Sarafianos SG**, Schuckmann MM, Sakagami Y, Matsuoka M, Takiguchi M, Gatanaga H, Oka S. 2008. "Amino acid mutation N348I in the connection subdomain of human immunodeficiency virus type 1 reverse transcriptase confers multiclass resistance to nucleoside and nonnucleoside reverse transcriptase inhibitors". *J Virol* 82, 3261-3270. PMCID: PMC2268505.
- 53. Saneyoshi H, Vu BC, Hughes SH, Boyer PL, **Sarafianos SG**, Marquez VE. 2008. "Synthesis of conformationally locked carbocyclic nucleoside phosphonates to probe the active site of HIV-1 RT". <u>Nucleic Acids Symp Ser (Oxf)</u> 52, 623-4. PMCID: PMC2727548.
- 54. Kawamoto A, Kodama E, Sarafianos SG, Sakagami Y, Kohgo S, Kitano K, Ashida N, Iwai Y, Hayakawa H, Nakata H, Mitsuya H, Arnold E, Matsuoka M. 2008. "2'-Deoxy-4'-C-ethynyl-2-halo-adenosines active against drug-resistant human immunodeficiency virus type 1 variants". *Int J Biochem Cell Biol* 40, 2410-20.
- 55. Arnold E and Sarafianos SG\$. 2008. "Molecular biology: an HIV secret uncovered". <u>Nature</u> 453, 169-170.
- Mukhopadhay J, Das K, Ismael S, Koppstein D, Jang M, Hudson B, Sarafianos SG, Tuske S, Patel J, Jansen R, Hofle G, Arnold E, and Ebright RH. 2008. "The RNA polymerase "switch region" is a target for inhibitors". <u>Cell</u> 135, 295-307. PMCID: PMC2580802.
- 57. Sarafianos SG\$ and Arnold E\$. 2008. "Biochemistry: RT slides home..." Science 322, 1059-60.
- 58. Marchand B and **Sarafianos SG\$**. 2009. "Reverse transcriptase inhibitors and resistance." *Invited Review*: In *Viral Genome Replication*, ed. C. Cameron and M. Götte. Springer, New York, pp. 517.
- 59. **Sarafianos SG,** Marchand B, Das K, Himmel D, Parniak MA, Hughes SH, Arnold E. 2009. "Structure and Function of HIV-1 Reverse Transcriptase: Molecular Mechanisms of Polymerization and Inhibition." <u>J Mol Biol</u> 385, 693-713. PMCID: PMC2881421. (invited review)
- 60. Izumi K, Kodama E, Shimura K, Sakagami Y, Watanabe K, Ito S, Watabe T, Terakawa Y, Nishikawa H, Sarafianos SG, Kitaura K, Oishi S, Fujii N, Matsuoka M. 2009. "Design of peptide-based inhibitors for human immunodeficiency virus type 1 strains resistant to T-20." <u>J Biol Chem</u> 284, 4914-20. PMCID: PMC2643509.
- 61. Naito T, Izumi K, Kodama E, Sakagami Y, Kajiwara K, Nishikawa H, Watanabe K, Sarafianos SG, Oishi S, Fujii N, Matsuoka M. 2009. "SC29EK, a peptide fusion inhibitor with enhanced alpha-helicity, inhibits replication of human immunodeficiency virus type 1 mutants resistant to enfuvirtide." <u>Antimicrob Agents</u> <u>Chemother</u> 53,1013-8. PMCID: PMC2650564.
- Michailidis E, Marchand B, Kodama EN, Singh K, Matsuoka M, Kirby KA, Ryan EM, Sawani AM, Nagy E, Mitsuya H, Parniak, M.A., Sarafianos, SG\$. 2009. "Mechanism of inhibition of HIV-1 Reverse Transcriptase by 4'-Ethynyl-2-Fluoro-2'-deoxyadenosine triphosphate, a Translocation Defective Reverse Transcriptase Inhibitor." <u>J Biol Chem</u> 284, 35681-91. PMCID: PMC2790999.
- 63. Hachiya A, Shimane K, Sarafianos SG, Kodama EN, Sakagami Y, Negishi F, Koizumi H, Gatanaga H, Matsuoka M, Takiguchi M, Oka S. 2009. "Clinical relevance of substitutions in the connection subdomain and RNase H domain of HIV-1 reverse transcriptase from a cohort of antiretroviral treatment-naïve patients." <u>Antiviral Res</u> 82,115-21. PMCID: PMC3481171.
- 64. Das K, Bandwar RP, White KL, Feng JY, **Sarafianos SG**, Tuske S, Tu X, Clark AD Jr, Boyer PL, Hou X, Gaffney BL, Jones RA, Miller MD, Hughes SH, and Arnold E. 2009. "Structural basis for the role of the K65R mutation in HIV-1 reverse transcriptase polymerization, excision antagonism, and tenofovir resistance." <u>J.</u> <u>Biol. Chem.</u> 284, 35092-100. PMCID: PMC2787370.
- 65. Han Q, **Sarafianos SG**, Arnold E, Parniak MA, Gaffney BL, and Jones RA. 2009. "Synthesis of boranoate, selenoate, and thioate analogs of AZTp(4)A and Ap(4)A." <u>Tetrahedron</u> 65, 7915-7920. PMCID: PMC2898137.
- Götte M, Rausch J, Marchand B, Sarafianos SG, and LeGrice SFJ. 2010. "Reverse Transcriptase in motion: Conformational dynamics of Enzyme-Substrate Interactions." <u>Biochim Bioph Acta</u> 1804, 1202-12. PMCID: PMC2930377.
- 67. Abram ME, **Sarafianos SG**, and Parniak MA. 2010. "The mutation T477A in HIV-1 reverse transcriptase (RT) restores normal proteolytic processing of RT in virus with Gag-Pol mutated in the p51-RNH cleavage site." <u>Retrovirology</u>. 7,6. PMCID: PMC2831009.
- 68. Singh K, Marchand B, Kirby KA, Michailidis E, and **Sarafianos SG\$.** 2010. "Structural aspects of drug resistance and inhibition of HIV-1 reverse transcriptase." *Viruses* 2, 606-638. PMCID: PMC2850067.
- Tebit DM, Lobritz M, Lalonde M, Immonen T, Singh K, Sarafianos S, Herchenröder O, Kräusslich HG, Arts EJ. 2010. "Divergent evolution in reverse transcriptase (RT) of HIV-1 group O and M lineages: impact on structure, fitness, sensitivity to non-nucleoside RT inhibitors." <u>J Virol</u> 84, 9817-30. PMCID: PMC2937803.
- 70. Shimane K, Kodama EN, Nakase I, Futaki S, Sakurai Y, Sakagami Y, Li X, Hattori T, Sarafianos SG, Matsuoka M. 2010. "Rev-derived peptides inhibit HIV-1 replication by antagonism of Rev and a co-receptor, CXCR4." <u>Int J Biochem Cell Biol</u> 42, 1482-8.

- 71. Shimura K, Nameki D, Kajiwara K, Watanabe K, Sakagami Y, Oishi S, Fujii N, Matsuoka M, Sarafianos SG, Kodama EN. 2010. "Resistance profiles of novel electrostatically constrained HIV-1 fusion inhibitors." <u>J Biol</u> <u>Chem</u> 280, 39471-80. PMCID: PMC2998136.
- Durk RC, Singh K, Cornelison CA, Rai DK, Matzek KB, Leslie MD, Schafer E, Marchand B, Moran J, Adedeji AO, Michailidis E, Dorst CA, Moran J, Pautler C, Rodriguez L, McIntosh M, Rieder E, Sarafianos SG\$. 2010 "Inhibition of Foot and Mouth disease Virus RNA-dependent RNA polymerase." <u>PLoS ONE</u> 5, e15049. PMCID: PMC3006429.
- Hachiya A, Kodama EN, Schuckmann MM, Kirby KA, Michailidis E, Sakagami Y, Oka S, Singh K, Sarafianos SG\$. 2011. "K70Q adds high-level tenofovir resistance to "Q151M complex" HIV RT through the enhanced discrimination mechanism." <u>PLoS ONE</u> 6, e16242. PMCID: PMC3020970.
- 74. Schuckmann MM, Marchand B, Hachiya A, Kodama EN, Kirby KA, Singh K, Sarafianos SG\$. 2010. "The N348I Mutation at the Connection Subdomain of HIV-1 Reverse Transcriptase Decreases Binding to Nevirapine." <u>J Biol Chem.</u> 285, 38700-9. PMCID: PMC2992303.
- 75. Tu X, Das K, Han Q, Bauman JD, Clark AD Jr, Hou X, Frenkel YV, Gaffney BL, Jones RA, Boyer PL, Hughes SH, Sarafianos SG, Arnold E. 2010. "Structural basis of HIV-1 resistance to AZT by excision." <u>Nat Struct Mol Biol.</u> 17, 1202-9. PMCID: PMC2987654.
- 76. Kirby KA, Singh K, Michailidis E, Marchand B, Kodama EN, Ashida N, Mitsuya H, Parniak MA, Sarafianos SG\$. 2011. "The sugar ring conformation of 4'-ethynyl-2-fluoro-2'-deoxyadenosine and its recognition by the polymerase active site of HIV reverse transcriptase." <u>Cell Mol Biol</u> 57, 40-46. PMCID: PMC3119259.
- 77. Ditzler MA, Bose D, Shkriabai N, Marchand B, Sarafianos SG, Kvaratskhelia M, Burke DH. 2011. "Broad-spectrum aptamer inhibitors of HIV reverse transcriptase closely mimic natural substrates." <u>Nucleic Acids</u> <u>Res</u> 39, 8237-47. PMCID: PMC3185408.
- Izumi K, Watanabe K, Oishi S, Fujii N, Matsuoka M, Sarafianos SG, Kodama EN. 2011. "Potent anti-HIV-1 activity of N-HR-derived peptides including a deep-pocket-forming region without antagonistic effects on T-20." <u>Antivir Chem Chemother</u> 22, 51-5. PMCID: PMC4584145.
- Michailidis E, Singh K, Kirby K, Hachiya A, Yoo W, Hong SP, Kim S-O, Folk WR, Sarafianos SG\$. 2011. "Hepatitis B Virus genotypic differences map structurally close to NRTI resistance hot spots." <u>International</u> <u>Journal of Current Chemistry</u> 2, 253-260. PMCID: PMC3325108.
- Ndongwe TP, Adedeji AO, Michailidis E, Ong YT, Hachiya A, Marchand B, Ryan EM, Rai DK, Kirby KA, Whatley AS, Burke DH, Johnson M, Ding S, Zheng YM, Liu SL, Kodama EI, Delviks-Frankenberry KA, Pathak VK, Mitsuya H, Parniak MA, Singh K, Sarafianos SG\$. 2012. "Biochemical, inhibition and inhibitor resistance studies of xenotropic murine leukemia virus-related virus reverse transcriptase." <u>Nucleic Acids Res</u> 40, 345-59. PMCID: PMC3245923.
- 81. Sohl CD, Singh K, Kasiviswanathan R, Copeland WC, Mitsuya H, Sarafianos SG, Anderson KS. 2012. "Mechanism of interaction of human mitochondrial DNA polymerase gamma with the novel nucleoside reverse transcriptase inhibitor 4'ethynyl-2-Fluoro-2'-deoxyadenosine indicates a low potential for host toxicity." <u>Antimicrob Agents Chemother</u> 56, 1630-34. PMCID: PMC3294915.
- 82. Kirby KA, Marchand B, Ong YT, Ndongwe T, Hachiya A, Michailidis E, Leslie MD, Sietsema DV, Fetterly TL, Dorst CA, Singh K, Wang Z, Parniak MA, and Sarafianos SG\$. 2012. "Structural and Inhibition Studies of the RNase H function of Xenotropic Murine Leukemia Virus-Related Virus Reverse Transcriptase." <u>Antimicrob Agents Chemother</u> 56, 2048-61. PMCID: PMC3318313.
- 83. Adedeji AO, Marchand B, J te Velthius A, Snijder EJ, Weiss S, Eoff R, Singh K, **Sarafianos SG\$.** 2012. "Mechanism of nucleic acid unwinding by SARS-CoV helicase". *PLoS ONE* 7, e36521. PMCID: PMC3352918.
- Michailidis E, Kirby KA, Hachiya A, Yoo W, Hong SP, Kim SO, Folk WR, Sarafianos SG\$. 2012. "Antiviral therapies: focus on Hepatitis B reverse transcriptase." <u>Int J Biochem & Cell Biol</u> 44,1060-71. PMCID: PMC3522522. (invited review)
- 85. Hachiya A, Marchand B, Kirby KA, Michailidis E, Tu X, Palczewski K, Ong YT, Li Z, Griffin DT, Schuckmann MM, Tanuma J, Oka S, Singh K, Kodama EN, Sarafianos SG\$. 2012. "HIV-1 reverse transcriptase (RT) polymorphism 172K, suppresses the effect of clinically relevant drug resistance mutations to both nucleoside and nonnucleoside RT inhibitors." <u>J Biol Chem</u>, 287, 29988-99. PMCID: PMC3436141.
- 86. Murphey-Corb M, Rajakumar PA, Michael H, Nyaundi J, Didier PJ, Reeve AB, Mitsuya H, **Sarafianos SG**, and Parniak M. 2012. "Response of simian immunodeficiency virus to the novel nucleoside reverse transcriptase 1 inhibitor 4'-2 ethynyl-2-fluoro-2'-deoxyadenosine in vitro and in vivo." <u>Antimicrob Agents</u> <u>Chemother</u> 56, 4707-4712. PMCID: PMC3421895.

- Adedeji AO, Singh K, Calcaterra N, DeDiego M, Enjuanes L, Weiss S, Sarafianos SG\$. 2012. "Severe Acute Respiratory Syndrome Coronavirus Replication Inhibitor that Interferes with the Nucleic Acid Unwinding of the Viral Helicase". <u>Antimicrob Agents Chemother</u> 56, 4718-28. PMCID: PMC3421890.
- Singh K, Marchand B, Rai DK, Sharma B, Michailidis E, Ryan EM, Matzek KB, Leslie MD, Hagedorn AN, Li Z, Norden PR, Hachiya A, Parniak MA, Xu HT, Wainberg MA, Sarafianos SG\$. 2012. "Biochemical Mechanism of HIV-1 Resistance to Rilpivirine". *J Biol Chem*, 287, 38110-23. PMCID: PMC3488081.
- Ong YT, Kirby KA, Hachiya A, Chiang LA, Marchand B, Yoshimura K, Murakami T, Singh K, Matsushita S, Sarafianos SG\$. 2012. "Preparation of biologically active single-chain variable antibody fragments that target the HIV-1 gp120 V3 loop". <u>Cell Mol Biol</u> 58, 71-79. PMCID: PMC3612353.
- Adedeji AO, Singh K, Sarafianos SG\$. 2012. "Structural and biochemical basis for the difference in the helicase activity of two different constructs of SARS-CoV helicase". <u>Cell Mol Biol</u> 58, 114-121. PMCID: PMC3612351.
- Michailidis E, Singh K, Ryan EM, Hachiya A, Ong YT, Kirby KA, Marchand B, Kodama EN, Mitsuya H, Parniak MA, Sarafianos SG\$. 2012. "Effect of translocation defective reverse transcriptase inhibitors on the activity of N348I, a connection subdomain drug resistant HIV-1 reverse transcriptase mutant". <u>*Cell Mol Biol*</u> 58, 187-195. PMCID: PMC3551986.
- 92. Ilina T, Labarge K, **Sarafianos SG**, Ishima R, and Parniak MA. 2012. "Inhibitors of HIV-1 reverse transcriptase-associated ribonuclease H activity". *Biology (Basel)* 1, 521-541. PMCID: PMC3627382.
- 93. Tavis JE, Cheng X, Hu Y, Totten M, Cao F, Michailidis E, Aurora R, Meyers MJ, Jacobsen J, Parniak MA, Sarafianos SG. 2013. "The Hepatitis B Virus Ribonuclease H is Sensitive to Inhibitors of the Human Immunodeficiency Virus Ribonuclease H and Integrase Enzymes". <u>PLoS Pathogens</u> 9, e1003125. PMCID: PMC3551811.
- 94. Izumi K, Kawaji K, Miyamoto F, Shimane K, Shimura K, Sakagami Y, Hattori T, Watanabe K, Oishi S, Fujii N, Matsuoka M, Kaku M, Sarafianos SG, Kodama EN. 2013. "Mechanism of resistance to S138A substituted enfuvirtide and its application to peptide design." *Int J Biochem Cell Biol.* 45, 908-15. PMCID: PMC4136414.
- 95. Rai DK, Schafer E, Singh K, McIntosh MA, Sarafianos SG\$, Rieder E\$. 2013. "Repeated exposure to 5D9, an inhibitor of 3D polymerase, effectively limits the replication of foot-and-mouth disease virus in host cells". <u>Antiviral Res</u>. 98, 380-5. PMCID: PMC4141565.
- 96. Lee JH, Hachiya A, Shin SK, Lee J, Gatanaga H, Oka S, Kirby KA, Ong YT, Sarafianos SG, Folk WR, Yoo W, Hong SP, Kim SO. 2013. "Restriction Fragment Mass Polymorphism (RFMP) Analysis Based on MALDI-TOF Mass Spectrometry for Detecting Antiretroviral Resistance in HIV-1 Infected Patients." <u>Clinical Microbiology and Infection.</u> 19, E263-70. PMCID: PMC7121230.
- 97. Xu H, Colby-Germinario SP, Asahchop EL, Oliveira M, McCallum M, Schader SM, Han Y, Quan Y, Sarafianos SG, Wainberg MA. 2013. "Effect of Mutations at Position E138 in HIV-1 Reverse Transcriptase and their Interactions with the M184I Mutation in Defining Patterns of Resistance to the Non-Nucleoside Reverse Transcriptase Inhibitors Rilpivirine and Etravirine." <u>Antimicrob Agents Chemother</u> 57, 3100-9. PMCID: PMC3697388.
- Adedeji AO, Severson W, Jonsson C, Singh K, Weiss SR, and Sarafianos SG\$. 2013. "Novel Inhibitors of Severe Acute Respiratory Syndrome Coronavirus Entry that Act by Three Distinct Mechanisms". <u>J Virol</u> 87, 8017-28. PMCID: PMC3700180.
- Shimane K, Kawaji K, Miyamoto F, Oishi S, Watanabe K, Sakagami Y, Fujii N, Shimura K, Matsuoka M, Kaku M, Sarafianos SG, and Kodama EN. 2013. "HIV-1 resistance mechanism to an electrostatically constrained peptide fusion inhibitor that is active against T-20-resistant strains". <u>Antimicrob. Agents Chemother</u>. 57, 4035-8. PMCID: PMC3719727.
- Hachiya A, Reeve AB, Marchand B, Michailidis E, Ong YT, Kirby KA, Leslie MD, Oka S, Kodama EN, Rohan LC, Mitsuya H, Parniak MA, and Sarafianos SG\$. 2013. "Evaluation of combinations of 4'-ethynyl-2-fluoro-2'-deoxyadenosine with clinically used antiretroviral drugs". <u>Antimicrob. Agents Chemother.</u> 57, 4554-4558. PMCID: PMC3754316.
- 101. Michailidis E, Ryan EM, Hachiya A, Kirby KA, Marchand B, Leslie MD, Huber AD, Ong YT, Jackson JC, Singh K, Kodama EN, Mitsuya H, Parniak MA, and Sarafianos SG\$. 2013. "Hypersusceptibility mechanism of Tenofovir-resistant HIV to EFdA". <u>*Retrovirology*</u> 10, 65. PMCID: PMC3695782.
- 102. Kirby KA, Michailidis E, Fetterly TL, Steinbach MA, Singh K, Marchand B, Leslie MD, Hagedorn AN, Kodama EN, Marquez VE, Hughes SH, Mitsuya H, Parniak MA, and **Sarafianos SG\$**. 2013. "Effects of substitutions

at the 4' and 2 positions on the bioactivity of 4'-ethynyl-2-fluoro-2'-deoxyadenosine". <u>Antimicrob. Agents</u> <u>Chemother.</u> 57, 6254-6264. PMCID: PMC3837839.

- 103. Adedeji AO and **Sarafianos SG\$**. 2013. "Future treatment strategies for novel Middle East respiratory syndrome coronavirus infection". *Future Med. Chem.* 5, 2119-22. PMC4085789.
- 104. Das K, **Sarafianos SG**, and Arnold E. 2013. "Structural requirements for RNA degradation by HIV-1 reverse transcriptase." *Nat Struct Mol Biol.* 20, 1341-1342.
- Zhang W, Parniak MA, Mitsuya H, Sarafianos SG, Graebing PW, and Rohan LC. 2014.
  "Preformulation studies of EFdA, a novel nucleoside reverse transcriptase inhibitor for HIV prevention". <u>Drug</u> <u>Dev. Ind. Pharm.</u> 40, 1101-1111. PMCID: PMC4136418.
- 106. Zhang W, Parniak MA, Sarafianos SG, Cost MR, and Rohan LC. 2014. "Development of a vaginal delivery film containing EFdA, a novel anti-HIV nucleoside reverse transcriptase inhibitor." <u>Int J Pharm.</u> 461, 203-13. PMCID: PMC3976986.
- 107. Muftuoglu Y, Sohl CD, Mislak AC, Mitsuya H, Sarafianos SG, and Anderson KS. 2014. "Probing the molecular mechanism of action of the HIV-1 reverse transcriptase inhibitor 4'-ethynyl-2-fluoro-2'deoxyadenosine (EFdA) using pre-steady-state kinetics." <u>Antiviral Res.</u> 106, 1-4. PMCID: PMC4020981.
- Zhang W, Parniak MA, Sarafianos SG, Empey PE, and Rohan LC. 2014. "In vitro transport characteristics of EFdA, a novel nucleoside reverse transcriptase inhibitor using Caco-2 and MDCKII cell monolayers". <u>Eur</u> <u>J Pharmacol.</u> 732C, 86-95. PMCID: PMC4074512.
- Adedeji AO, Singh K, Kassim A, Coleman CM, Elliott R, Weiss SR, Frieman MB, and Sarafianos SG\$.
  2014. "Evaluation of SSYA10-001 as a replication inhibitor of Severe Acute Respiratory Syndrome, Mouse Hepatitis, and Middle East Respiratory Syndrome Coronaviruses." <u>Antimicrob. Agents Chemother</u>. 58, 4894-4898. PMCID: PMC4136041.
- Huber AD, Michailidis E, Schultz ML, Ong YT, Bloch N, Puray-Chavez MN, Leslie MD, Ji J, Lucas AD, Kirby KA, Landau NR, and Sarafianos SG\$. 2014. "SAMHD1 has differential impact on the efficacies of HIV nucleoside reverse transcriptase inhibitors." <u>Antimicrob. Agents Chemother.</u> 58, 4915-4919. PMCID: PMC4136039.
- 111. Michailidis E, Huber AD, Ryan EM, Ong YT, Leslie MD, Matzek KB, Singh K, Marchand B, Hagedorn AN, Kirby KA, Rohan LC, Kodama EN, Mitsuya H, Parniak MA, Sarafianos SG\$. 2014. "4'-ethynyl-2-fluoro-2'-deoxyadenosine (EFdA) inhibits HIV-1 RT with multiple mechanisms." <u>J Biol Chem</u> 289, 24533-24548. PMCID: PMC4148878.
- 112. Adedeji AO and **Sarafianos SG\$**. 2014. "Antiviral Drugs Specific for Coronaviruses in Preclinical Development". <u>Curr Opin Virol</u>, 8C, 45-53. PMCID: PMC4195804.
- Singh K, Flores JA, Kirby KA, Neogi U, Sonnerborg A, Hachiya A, Das K, Arnold E, McArthur C, Parniak M, and Sarafianos SG\$. 2014. "Drug Resistance in Non-B Subtype HIV-1: Impact of HIV-1 Reverse Transcriptase Inhibitors." <u>Viruses.</u> 6, 3535-3562. PMCID: PMC4189038.
  Sarafianos SG\$. 2014. "Remembering Professor Walter A. Scott." <u>Viruses</u> 6, 3873-3874. PMCID:
- 114. Sarafianos SG\$. 2014. "Remembering Professor Walter A. Scott." <u>Viruses</u> 6, 3873-3874. PMCID: PMC4213567.
- 115. Kirby KA<sup>#</sup>, Ong YT<sup>#</sup>, Hachiya A, Laughlin TG, Chiang LA, Pan Y, Moran JL, Marchand B, Singh K, Gallazzi F, Quinn TP, Yoshimura K, Murakami T, Matsushita S, and **Sarafianos SG\$**. 2015. "Structural basis of clade-specific HIV-1 neutralization by humanized anti-V3 monoclonal antibody KD-247." <u>FASEB J</u>. 29, 70-80. PMCID: PMC4285544.
- 116. Vernekar SK, Liu Z, Nagy E, Miller L, Kirby KA, Wilson DJ, Kankanala J, Sarafianos SG, Parniak MA, and Wang Z. 2015. "Design, Synthesis, Biochemical, and Antiviral Evaluations of C6 Benzyl and C6 Biarylmethyl Substituted 2-Hydroxylisoquinoline-1,3-diones: Dual Inhibition against HIV Reverse Transcriptase-Associated RNase H and Polymerase with Antiviral Activities." <u>J. Med. Chem.</u> 58, 651-664. PMCID: PMC4306517.
- 117. Strauss KA, Jinks RN, Puffenberger EG, Venkatesh S, Singh K, Cheng I, Mikita N, Thilagavathi J, Lee J, Sarafianos S, Benkert A, Koehler A, Zhu A, Trovillion V, McGlincy M, Morlet T, Deardorff M, Innes AM, Prasad C, Chundley AE, Lee IN, and Suzuki CK. 2015. "CODAS Syndrome is Associated with Mutations of LONP1, Encoding Mitochondrial AAA(+) Lon Protease." <u>Am. J. Hum. Genet.</u> 96, 121-135. PMCID: PMC4289676.
- 118. Zhang W, Hu M, Shi Y, Gong T, Dezzutti CS, Moncla B, Sarafianos SG, Parniak MA, Rohan LC. 2015. "Vaginal Microbicide Film Combinations of Two Reverse Transcriptase Inhibitors, EFdA and CSIC, for the Prevention of HIV-1 Sexual Transmission". <u>Pharm Res.</u> 32, 2960-72. PMCID: PMC4529374.

- 119. Liu D, Ji J, Ndongwe TP, Michailidis E, Rice CM, Ralston R, Sarafianos SG\$. 2015. "Fast Hepatitis C Virus RNA elimination and NS5A redistribution by NS5A inhibitors studied by a multiplex assay approach". <u>Antimicrob Agents Chemother.</u> 59, 3482-92. PMCID: PMC4432190.
- Ferrer-Orta C, de la Higuera I, Caridi F, Sánchez-Aparicio MT, Moreno E, Perales C, Singh K, Sarafianos SG, Sobrino F, Domingo E, Verdaguer N. 2015. "Multifunctionality of a picornavirus polymerase domain: nuclear localization signal and nucleotide recognition". <u>J Virol.</u> 89, 6848-59. PMCID: PMC4468482.
- 121. Stoddart CA, Galkina SA, Joshi P, Kosikova G, Moreno ME, Rivera JM, Sloan B, Reeve AB, Sarafianos SG, Murphey-Corb M, Parniak MA. 2015. "Oral Administration of the Nucleoside EFdA (4' -Ethynyl-2-Fluoro-2' -Deoxyadenosine) Provides Rapid Suppression of HIV Viremia in Humanized Mice and Favorable Pharmacokinetic Properties in Mice and the Rhesus Macaque." <u>Antimicrob. Agents Chemother</u>. 59, 4190-4198. PMCID: PMC4468726.
- 122. Gres AT, Kirby KA, KewalRamani VN, Tanner JJ, Pornillos O, and Sarafianos SG\$. 2015. "X-ray Crystal Structures of Native HIV-1 Capsid Protein Reveal Conformational Variability." <u>Science</u>. 349, 99-103. PMCID: PMC4584149.
- 123. Takamatsu Y, Tanaka Y, Kohgo S, Murakami S, Singh K, Das D, Venzon DJ, Amano M, Kuwata N, Aoki M, Delino NS, Hayashi S, Takahashi S, Sukenaga Y, Haraguchi K, Sarafianos SG, Maeda K, and Mitsuya H. 2015. "4'-Modified nucleoside analogs: Potent inhibitors active against entecavir-resistant hepatitis B virus." *Hepatology* 62, 1024-1036. PMCID: PMC4589464.
- 124. Neogi U, Häggblom A, Singh K, Rogers LC, Rao SD, Amogne W, Schülter E, Zazzi M, Arnold E, Sarafianos SG, Sönnerborg A. 2016. "Factors influencing the efficacy of rilpivirine in HIV-1 subtype C in low- and middle-income countries." <u>J Antimicrob Chemother.</u> 71, 367-371. PMCID: PMC4710214.
- 125. Tang J, Liu F, Nagy E, Miller L, Kirby KA, Wilson DJ, Wu B, Sarafianos SG, Parniak MA, and Wang Z. 2016. "3-Hydroxypyrimidine-2,4-diones as selective active site inhibitors of HIV reverse transcriptase-associated RNase H: Design, synthesis, and biochemical evaluations." <u>J. Med. Chem</u>. 59, 2648-2659. PMCID: PMC4871627.
- 126. Kankanala J, Kirby KA, Liu F, Miller L, Nagy E, Wilson DJ, Parniak MA, Sarafianos SG, and Wang Z. 2016. "Design, synthesis, and biological evaluations of hydroxypyridonecarboxylic acids as inhibitors of HIV reverse transcriptase associated RNase H." <u>J. Med. Chem.</u> 59, 5051-5062. PMCID: PMC4882222.
- Wu B, Tang J, Wilson DJ, Huber AD, Casey MC, Ji J, Kankanala J, Xie J, Sarafianos SG, Wang Z. 2016.
  "3-Hydroxypyrimidine-2,4-dione-5-N-benzylcarboxamides Potently Inhibit HIV-1 Integrase and RNase H." <u>J.</u> <u>Med. Chem.</u> 59, 6136-6148. PMCID: PMC4945466.
- 128. Salie ZL, Kirby KA, Michailidis E, Marchand B, Singh K, Rohan LC, Kodama EN, Mitsuya H, Parniak MA, and Sarafianos SG\$. 2016. "Structural basis of HIV inhibition by translocation defective RT inhibitor 4'-ethynyl-2-fluoro-2'-deoxyadenosine (EFdA)." <u>Proc. Natl. Acad. Sci. USA</u> 113, 9274-9279. PMCID: PMC4995989.
- 129. Aralaguppe SG, Winner D, Singh K, Sarafianos SG, Quiñones-Mateu ME, Sönnerborg A, and Neogi U. 2017. "Increased replication capacity following evolution of PYxE insertion in Gag-p6 is associated with enhanced virulence in HIV-1 subtype C from East Africa". <u>J Med Virol.</u> 89, 106-111.
- 130. Tang J, Kirby KA, Huber AD, Casey MC, Ji J, Wilson DJ, Sarafianos SG, and Wang Z. 2017. "6-Cycloheylmethyl-3-hydroxypyrimidine-2,4-dione as an inhibitor scaffold of HIV reversase transcriptase: Impacts of the 3-OH on inhibiting RNase H and polymerase." <u>Eur J Med Chem.</u> 128, 168-179. PMCID: PMC5384110.
- 131. Kimani SG, Kumar S, Bansal N, Singh K, Kholodovych V, Comollo T, Peng Y, Kotenko SV, Sarafianos SG, Bertino JR, Welsh WJ, and Birge RB. 2017. "Small molecule inhibitors block Gas6-inducible TAM activation and tumorigenicity." <u>Sci Rep.</u> 7, 43908. PMCID: PMC5341070.
- 132. Huber AD, Michailidis E, Tang J, Puray-Chavez MN, Boftsi M, Wolf JJ, Boschert KN, Sheridan MA, Leslie MD, Kirby KA, Singh K, Mitsuya H, Parniak MA, Wang Z, and Sarafianos SG\$. 2017. "3-hydroxypyrimidine-2,4-diones as novel hepatitis B virus antivirals targeting the viral ribonuclease H." <u>Antimicrob. Agents Chemother.</u> 61, e00245-17. PMCID: PMC5444124.
- 133. Tang J, Vernekar SK, Chen YL, Miller L, Huber AD, Myshakina N, Sarafianos SG, Parniak MA, and Wang Z. 2017. "Synthesis, biological evaluation and molecular modeling of 2-Hydroxyisoquinoline-1,3-dione analogues as inhibitors of HIV reverse transcriptase associated ribonuclease H and polymerase." <u>Eur. J.</u> <u>Med. Chem.</u> 133, 85-96. PMCID: PMC5539924.
- 134. Tedbury PR and **Sarafianos SG\$**. 2017. "Exposing HIV's weaknesses." <u>J. Biol. Chem.</u> 292, 6027-6028. PMCID: PMC5392592.

- 135. de la Higuera I, Ferrer-Orta C, de Avila AI, Perales C, Sierra M, Singh K, Sarafianos SG, Dehouck Y, Bastolla U, Verdaguer N, and Domingo E. 2017. "Molecular and functional bases of selection against a mutation bias in an RNA virus." <u>Genome Biol. Evol.</u> 9, 1212-1228. PMCID: PMC5433387.
- 136. Vernekar SKV, Tang J, Wu B, Huber AD, Casey MC, Myshakina NS, Wilson DJ, Kankanala J, Kirby KA, Parniak MA, Sarafianos SG, and Wang Z. 2017. "Double-winged 3-Hydroxypyrimidine-2,4-diones: Potent and Selective Inhibition against HIV-1 RNase H with Significant Antiviral Activity." <u>J. Med. Chem.</u>, 60, 5045-5056. PMCID: PMC5526604.
- 137. Hachiya A, Kirby KA, Ido Y, Shigemi U, Matsuda M, Okazaki R, Imamura J, **Sarafianos SG**, Yokomaku Y, and Iwatani Y. 2017. "Impact of HIV-1 integrase L74F and V75I mutations from a clinical isolate on resistance to second-generation integrase strand transfer inhibitors." <u>Antimicrob. Agents Chemother.</u>, 61, e00315-17. PMCID: PMC5527620.
- 138. Kirby KA\$, Myshakina NA, Christen MT, Chen YL, Schmidt HA, Huber AD, Xi Z, Kim S, Rao RK, Kramer ST, Yang Q, Singh K, Parniak MA, Wang Z, Ishima R, and Sarafianos SG\$. 2017. "A 2-hydroxyisoquinoline-1,3-dione active site RNase H inhibitor binds in multiple modes to HIV-1 reverse transcriptase." <u>Antimicrob. Agents Chemother.</u>, 61, e01351-17. PMCID: PMC5610509.

### AFTER JOINING EMORY UNIVERSITY

- 139. Kankanala J, Kirby KA, Huber AD, Casey MC, Wilson DJ, Sarafianos SG, and Wang Z. 2017. "Design, synthesis and biological evaluations of N-hydroxythienopyrimidine-2,4-diones as inhibitors of HIV reverse transcriptase-associated RNase H." <u>Eur. J. Med. Chem.</u> 141, 149-161. PMCID: PMC5682218.
- Puray-Chavez M, Tedbury PR, Huber AD, Ukah OB, Yapo V, Liu D, Ji J, Wolf JJ, Engelman AN, and Sarafianos SG\$. 2017. "Multiplex single-cell visualization of nucleic acids and protein during HIV infection." *Nat. Commun.* 8, 1882. PMCID: PMC5709414.
- 141. Neogi U, Singh K, Aralaguppe SG, Rogers LC, Njenda DT, Sarafianos SG, Hejdeman B, Sonnerborg A. 2018. "Ex vivo antiretroviral potency of newer integrase strand transfer inhibitors cabotegravir and bictegravir in HIV-1 nob-B subtypes." <u>AIDS.</u> 32, 469-476. PMCID: PMC5790636.
- 142. Huber AD, Wolf JJ, Liu D, Gres AT, Tang J, Boschert KN, Puray-Chavez MN, Pineda DL, Laughlin TG, Coonrod EM, Yang Q, Ji J, Kirby KA, Wang Z, and Sarafianos SG\$. 2018. "The heteroaryldihydropyrimidine Bay 38-7690 induces hepatitis B virus core protein aggregates associated with promyelocytic leukemia nuclear bodies in infected cells." <u>mSphere</u>, 3, e00131-18. PMCID: PMC5907649.
- Markowitz M\$ and Sarafianos SG\$. 2018. "4'-Ethynyl-2-fluoro-2'-deoxyadenosine, MK-8591: a novel HIV-1 reverse transcriptase translocation inhibitor." <u>Curr. Opin. HIV AIDS</u>, 13, 294-299. PMCID: PMC6449048. (invited review)
- 144. Ilina TV, Slack RL, Elder JH, **Sarafianos SG**, Parniak MA, and Ishima R. 2018. "Effect of tRNA on the maturation of HIV-1 reverse transcriptase." *J. Mol. Biol.*, 430, 1891-1900. PMCID: PMC5988984.
- 145. Wang L, Tang J, Huber AD, Casey MC, Kirby KA, Wilson DJ, Kankanala J, Xie J, Parniak MA, Sarafianos SG, and Wang Z. 2018. "6-Arylthio-3-hydroxypyrimidine-2,4-diones potently inhibited HIV reverse transcriptase-associated RNase H with antiviral activity." <u>Eur. J. Med. Chem</u>. 156, 652-665. PMCID: PMC6112573.
- 146. Wang L, Tang J, Huber AD, Casey MC, Kirby KA, Wilson DJ, Kankanala J, Xie J, Parniak MA, Sarafianos SG, and Wang Z. 2018. "6-Biphenylmethyl-3-hydroxypyrimidine-2,4-diones potently and selectively inhibited HIV reverse transcriptase-associated RNase H." <u>Eur. J. Med. Chem</u>. 156, 680-691. PMCID: PMC6114935.
- 147. Njenda DT, Aralaguppe SG, Singh K, Rao R, Sönnerborg A, Sarafianos SG, and Neogi U. 2018. "Antiretroviral potency of 4'-ethynyl-2-fluoro-2'-deoxyadenosine, tenofovir alafenamide and secondgeneration NNRTIs across diverse HIV-1 subtypes." <u>J Antimicrob Chemother.</u> 73, 2721-2728. PMCID: PMC6148215.
- 148. de la Higuera I, Ferrer-Orta C, Moreno E, de Ávila AI, Soria ME, Singh K, Caridi F, Sobrino F, Sarafianos SG, Perales C, Verdaguer N, and Domingo E. 2018. "Contribution of a Multifunctional Polymerase Region of Foot-and-Mouth Disease Virus to Lethal Mutagenesis." <u>J Virol</u>. 92, e01119-18. PMCID: PMC6158410.
- Rogers L, Obasa AE, Jacobs GB, Sarafianos SG, Sonnerborg A, Neogi U, and Singh K. 2018. "Structural implications of genotypic variations in HIV-1 integrase from diverse subtypes." <u>Front. Microbiol.</u> 9, 1754. PMCID: PMC6083056.
- 150. Achuthan V, Perreira JM, Sowd GA, Puray-Chavez M, McDougall WM, Paulucci-Holthauzen A, Wu X, Fadel HJ, Poeschla EM, Multani AS, Hughes SH, **Sarafianos SG**, Brass AL, and Engelman AN. 2018. "Capsid-

CPSF6 Interaction Licenses Nuclear HIV-1 Trafficking to Sites of Viral DNA Integration." <u>*Cell Host Microbe.*</u> 24, 392-404.e8. PMCID: PMC6368089.

- 151. Takamatsu Y, Das D, Kohgo S, Hayashi H, Delino NS, Sarafianos SG, Mitsuya H, and Maeda K. 2018. "The High Genetic Barrier of EFdA/MK-8591 Stems from Strong Interactions with the Active Site of Drug-Resistant HIV-1 Reverse Transcriptase." <u>Cell Chem Biol.</u> 25, 1268-1278.e3. PMCID: PMC6261781.
- 152. Ukah OB, Puray-Chavez M, Tedbury PR, Herschhorn A, Sodroski JG, and Sarafianos SG\$. 2018. "Visualization of HIV-1 RNA Transcription from Integrated HIV-1 DNA in Reactivated Latently Infected Cells." <u>Viruses</u>. 10, E534. PMCID: PMC6212899.
- 153. Novikova M, Adams LJ, Fontana J, Gres AT, Balasubramaniam M, Winkler DC, Kudchodkar SB, Soheilian F, Sarafianos SG, Steven AC, and Freed EO. 2018. "Identification of a Structural Element in HIV-1 Gag Required for Virus Particle Assembly and Maturation." <u>mBio.</u> 9, e01567-18. PMCID: PMC6191540.
- 154. Wu X, Xu G, Li X, Xu W, Li Q, Liu W, Kirby KA, Loh ML, Li J, Sarafianos SG, and Qu CK. 2019. "Small molecule inhibitor that stabilizes the autoinhibited conformation of the oncogenic tyrosine phosphatase SHP2." <u>J Med Chem.</u> 62, 1125-1137. PMCID: PMC6467801.
- 155. Hill KJ, Rogers LC, Njenda DT, Burke DH, Sarafianos SG, Sönnerborg A, Neogi U, and Singh K. 2019. "Strain-specific effect on biphasic DNA binding by HIV-1 integrase." <u>AIDS</u>. 33, 588-592. PMCID: PMC6472922.
- 156. Huber AD, Pineda DL, Liu D, Boschert KN, Gres AT, Wolf JJ, Coonrod EM, Tang J, Laughlin TG, Yang Q, Puray-Chavez M, Ji J, Singh K, Kirby KA, Wang Z, and Sarafianos SG\$. 2019. "Novel Hepatitis B Virus Capsid-Targeting Antiviral that Aggregates Core Particles and Inhibits Nuclear Entry of Viral Cores." <u>ACS</u> <u>Infect Dis.</u> 10, 750-758. PMCID: PMC6510658.
- Tang J, Huber AD, Pineda DL, Boschert KN, Wolf JJ, Kankanala J, Xie J, Sarafianos SG, and Wang Z. 2019. "5-Aminothiophene-2,4-dicarboxamide analogues as hepatitis B virus capsid assembly effectors." <u>Eur</u> <u>J Med Chem.</u> 164, 179-192. PMCID: PMC6362850.
- 158. Higashi-Kuwata N, Hayashi S, Das D, Kohgo S, Murakami S, Hattori SI, Imoto S, Venzon DJ, Singh K, Sarafianos SG, Tanaka Y, and Mitsuya H. 2019. "CMCdG, a Novel Nucleoside Analog with Favorable Safety Features, Exerts Potent Activity against Wild-Type and Entecavir-Resistant Hepatitis B Virus." <u>Antimicrob Agents Chemother.</u> 63, e02143-18. PMCID: PMC6437475.
- 159. Tang J, Do HT, Huber AD, Casey MC, Kirby KA, Wilson DJ, Kankanala J, Parniak MA, Sarafianos SG, and Wang Z. 2019. "Pharmacophore-based design of novel 3-hydroxypyrimidine-2,4-dione subtypes as inhibitors of HIV reverse transcriptase-associated RNase H: Tolerance of a nonflexible linker." <u>Eur J Med</u> <u>Chem.</u> 166, 390-399. PMCID: PMC6459026.
- 160. Craveur P, Gres AT, Kirby KA, Liu D, Hammond JA, Deng Y, Forli S, Goodsell DS, Williamson JR, Sarafianos SG\$, and Olson AJ\$. 2019. "Novel intersubunit interaction critical for HIV-1 core assembly defines a potentially targetable inhibitor binding pocket." <u>mBio.</u> 10, e02858-18. PMCID: PMC6414707.
- Singh K, Sarafianos SG, and Sonnerborg A. 2019. "Long-acting anti-HIV drugs targeting HIV-1 reverse transcriptase and integrase." <u>Pharmaceuticals (Basel)</u>. 12, E62. PMCID: PMC6631967.
- 162. Puray-Chavez MN, Farghali MH, Yapo V, Huber AD, Liu D, Ndongwe TP, Casey MC, Laughlin TG, Hannink M, Tedbury PR, and Sarafianos SG\$. 2019. "Effects of Moloney Leukemia Virus 10 Protein on Hepatitis B Virus Infection and Viral Replication." <u>Viruses</u>. 11, E651. PMCID: PMC6669478.
- Slack RL, Ilina TV, Xi Z, Giacobbi NS, Kawai G, Parniak MA, Sarafianos SG, Sluis Cremer N, and Ishima R. 2019. "Conformational Changes in HIV-1 Reverse Transcriptase that Facilitate Its Maturation." <u>Structure</u>. 27, 1581-1593. PMCID: PMC6774901.
- 164. Martinez-Lopez A, Persaud M, Chavez MP, Zhang H, Rong L, Liu S, Wang TT, Sarafianos SG, and Diaz-Griffero F. 2019. "Glycosylated diphyllin as a broad-spectrum antiviral agent against Zika virus." <u>EBioMedicine</u>. 47, 269-283. PMCID: PMC6796538.
- 165. Xi Z, Wang Z, Sarafianos SG, Myshakina NS, and Ishima R. 2019. "Determinants of Active-Site Inhibitor Interactions with HIV-1 RNase H." <u>ACS Infect. Dis.</u> 5, 1963-1974. PMCID: PMC6842066.
- 166. Liu D, Tedbury PR, Lan S, Huber AD, Puray-Chavez MN, Ji J, Michailidis E, Saeed M, Ndongwe TP, Bassit LC, Schinazi RF, Ralston R, Rice CM, Sarafianos SG. 2019. "Visualization of Positive and Negative Sense Viral RNA for Probing the Mechanism of Direct-Acting Antivirals against Hepatitis C Virus." <u>Viruses</u>. 11, E1039. PMCID: PMC6893808.
- 167. Wang L, Sarafianos SG, Wang Z. 2020. "Cutting into the Substrate Dominance: Pharmacophore and Structure-Based Approaches toward Inhibiting Human Immunodeficiency Virus Reverse Transcriptase-Associated Ribonuclease H." <u>ACC Chem Res.</u> 53, 218-230. PMCID: PMC7144833.

- 168. Hayashi S, Higashi-Kuwata N, Das D, Tomaya K, Yamada K, Murakami S, Venzon DJ, Hattori SI, Isogawa M, Sarafianos SG, Mitsuya H, Tanaka Y. 2020. "7-Deaza-7-fluoro modification confers on 4'-cyano-nucleosides potent activity against entecavir/adefovir-resistant HBV variants and favorable safety." <u>Antiviral Res.</u> 176, E104744. PMCID: PMC7164687.
- 169. Vernekar SKV, Sahani RL, Casey MC, Kankanala J, Wang L, Kirby KA, Du H, Zhang H, Tedbury PR, Xie J, Sarafianos SG, Wang Z. 2020. "Toward Structurally Novel and Metabolically Stable HIV-1 Capsid-Targeting Small Molecules." <u>Viruses.</u> 12, E452. PMCID: PMC7232165.
- Neogi U, Hill KJ, Ambikan AT, Heng X, Quinn TP, Byrareddy SN, Sönnerborg A, Sarafianos SG, Singh K. 2020. "Feasibility of Known RNA Polymerase Inhibitors as Anti-SARS-CoV-2 Drugs." <u>Pathogens</u> 9, E320. PMCID: PMC7281371.
- 171. Wang L, Casey MC, Vernekar SKV, Do HT, Sahani RL, Kirby KA, Du H, Hachiya A, Zhang H, Tedbury PR, Xie J, Sarafianos SG, Wang Z. 2020. "Chemical Profiling of HIV-1 Capsid-Targeting Antiviral PF74." <u>Eur.</u> <u>J. Med. Chem.</u> 200, 112427. PMCID: PMC7492092.
- 172. Liu D, Ndongwe TP, Puray-Chavez M, Casey MC, Izumi T, Pathak VK, Tedbury PR, **Sarafianos SG**. 2020. "Effect of P-body component Mov10 on HCV virus production and infectivity." <u>FASEB J.</u> PMCID: In Progress.
- 173. Francis AC, Marin M, Singh PK, Achuthan V, Prellberg MJ, Palermino-Rowland K, Lan S, Tedbury PR, Sarafianos SG, Engelman AN, Melikyan GB. 2020. "HIV-1 replication complexes accumulate in nuclear speckles and integrate into speckle-associated genomic domains." <u>Nat Commun.</u> 11, 6165. PMCID: PMC7360574.
- 174. Wang L, Casey MC, Vernekar SKV, Sahani RL, Kankanala J, Kirby KA, Du H, Hachiya A, Zhang H, Tedbury PR, Xie J, Sarafianos SG, Wang Z. 2020. "Novel HIV-1 capsid-targeting small molecules of the PF74 binding site." <u>Eur J Med Chem.</u> 204, 112626. PMCID: PMC7530112.
- 175. Wang L, Casey MC, Vernekar SKV, Sahani RL, Kankanala J, Kirby KA, Du H, Zhang H, Tedbury PR, Xie J, Sarafianos SG, and Wang Z. 2020. "Novel PF74-like small molecules targeting the HIV-1 capsid protein: balance of potency and metabolic stability." <u>Acta Pharmaceutica Sinica B</u>, Epub July 31. NIHMS: NIHMS1629383.
- 176. Cilento ME, Kirby KA, Tedbury PR, and Sarafianos SG. 2020. "Structural basis of HIV reverse transcription, inhibition, and drug resistance." <u>Reference Module in Life Sciences</u> in <u>Encyclopedia of Biochemistry 3<sup>rd</sup> edition</u>, Elsevier. PMCID N/A. (invited review)
- 177. Shah R, Lan S, Puray-Chavez MN, Liu D, Tedbury PR, Sarafianos SG. 2020. "Single-cell Multiplexed Fluorescence Imaging to Visualize Viral Nucleic Acids and Proteins and Monitor HIV, HTLV, HBV, HCV, Zika Virus, and Influenza Infection." <u>J Vis Exp</u>. 164, 10.3791/61843. PMCID: PMC7774762.
- 178. Cilento ME, Kirby KA, and **Sarafianos SG**. 2021. "Avoiding drug resistance in HIV reverse transcriptase" <u>Chem. Rev.</u> Epub Jan 28. (invited review)

### DEPOSITED STUCTURES IN THE PROTEIN DATA BANK (PDB)

- Ding J, Das K, Hsiou Y, Sarafianos SG, Clark AD Jr, Jacobo-Molina A, Tantillo C, Hughes SH, and Arnold E. 1998. 2HMI. HIV-1 Reverse Transcriptase Complexed with a Double-Stranded DNA and Fab28.
- Sarafianos SG, Das K, and Arnold E. 1999. 1J50: Crystal Structure Of Met184lle Mutant Of HIV-1 Reverse Transcriptase In Complex With Double Stranded DNA Template- Primer *Classification* Transferase/Immune System/DNA.
- 3. **Sarafianos SG,** Das K, and Arnold E. 1999. **1QE1**: Crystal Structure of 3TC-Resistant HIV-1 Reverse Transcriptase.
- 4. **Sarafianos SG**, Das K, Tantillo C, Clark Jr. AD, Ding J, Whitcomb J, Boyer PL, Hughes SH and Arnold E. 2001. **1HYS**. Crystal Structure of HIV-1 Reverse Transcriptase in complex with a Polypurine Tract RNA/DNA.
- 5. **Sarafianos SG** and Arnold E. 2002. **1N5Y**. HIV-1 Reverse Transcriptase Cross-linked To Post-Translocation AZTMP-Terminated DNA (Complex P).
- 6. **Sarafianos SG** and Arnold E. 2002. **1N6Q** HIV-1 Reverse Transcriptase Cross-linked To Pre- Translocation Aztmp-Terminated DNA (Complex N).
- 7. Tuske S, **Sarafianos SG**, and Arnold E. 2004. **1T03** HIV-1 Reverse Transcriptase Cross-linked To Tenofovir Terminated Template-Primer (Complex P).

- 8. Tuske S, **Sarafianos SG**, and Arnold E. 2004. **1T05** HIV-1 Reverse Transcriptase Cross-linked to Template-Primer With Tenofovir-Diphosphate Bound As The Incoming Nucleotide Substrate.
- 9. Tuske S, **Sarafianos SG**, Hudson B, and Arnold E. 2005. **1ZYR**. Structure of Thermus thermophilus RNA polymerase holoenzyme in complex with the antibiotic streptolydigin.
- 10. Tuske S, **Sarafianos SG**, Hudson B, and Arnold E. 2005. **2CW0**. Crystal structure of Thermus thermophilus RNA polymerase holoenzyme at 3.3 angstroms resolution.
- 11. Himmel DM, **Sarafianos SG**, Knight JL, Levy RM, and Arnold E. 2006. **2I5J**. Crystal structure of HIV-1 reverse transcriptase (RT) in complex with DHBNH, an RNase H inhibitor.
- 12. Kirby KA and **Sarafianos SG.** 2010. **3NTC**. Crystal structure of the Fab fragment of KD-247, a monoclonal antibody inhibitor of HIV entry in clinical trials (1.55 Å resolution).
- 13. Tu X, Das K, **Sarafianos SG**, and Arnold E. 2010. **3KLE**. Crystal structure of AZT-resistant HIV reverse transcriptase crosslinked to a dsDNA with a bound excision product, AZTPPPPA.
- 14. Tu X, Das K, **Sarafianos SG**, and Arnold E. 2010. **3KLF**. Crystal structure of wild-type HIV reverse transcriptase crosslinked to a dsDNA with a bound excision product, AZTPPPPA.
- 15. Tu X, **Sarafianos SG**, and Arnold E. 2010. **3KLG**. Crystal structure of AZT-resistant HIV reverse transcriptase crosslinked to pre-translocation dsDNA (COMPLEX N).
- 16. Tu X, **Sarafianos SG**, and Arnold E. 2010. **3KLH**. Crystal structure of AZT-resistant HIV reverse transcriptase crosslinked to pre-translocation dsDNA (COMPLEX P).
- 17. Tu X, **Sarafianos SG**, and Arnold E. 2010. **3KLI**. Crystal structure of unliganded AZT-resistant HIV reverse transcriptase.
- 18. Kirby KA and **Sarafianos SG**. 2010. **3P1G**. Crystal structure of the RNase H domain of Xenotropic Murine Leukemia Virus Related Virus (1.5 Å resolution).
- 19. Tu X, Kirby KA, Marchand B, **Sarafianos SG**. 2012. **4DG1**. Crystal structure of polymorphic drug resistant HIV reverse transcriptase.
- 20. Gres AT, Kirby KA, Sarafianos SG. 2015. 4XFX. Structure of the native full-length HIV-1 capsid protein.
- 21. Gres AT, Kirby KA, **Sarafianos SG**. 2015. **4XFY**. Structure of the native full-length dehydrated HIV-1 capsid protein.
- 22. Gres AT, Kirby KA, **Sarafianos SG**. 2015. **4XFZ**. Structure of the native full-length HIV-1 capsid protein in complex with PF-3450074 (PF74).
- 23. Kirby KA, **Sarafianos SG**. 2016. **5HBM**. Crystal Structure of a Dihydroxycoumarin RNase H Active-Site Inhibitor in Complex with HIV-1 Reverse Transcriptase.
- 24. Kirby KA, **Sarafianos SG**. **5J1E**, Crystal Structure of a Hydroxypyridone Carboxylic Acid Active-Site RNase H Inhibitor in Complex with HIV Reverse Transcriptase, 2.9 Å resolution, released 06/15/2016.
- 25. Li Z, Kirby KA, **Sarafianos SG**. **5J2M**. HIV-1 reverse transcriptase in complex with DNA and EFdAtriphosphate, a translocation-defective RT inhibitor, 2.4 Å resolution, released 08/03/2016.
- 26. Li Z, Kirby KA, **Sarafianos SG**. **5J2N**. HIV-1 reverse transcriptase in complex with DNA that has incorporated EFdA-MP at the P-(post-translocation) site and dTMP at the N-(pre-translocation) site, 2.9 Å resolution, released 08/03/2016.
- 27. Li Z, Kirby KA, **Sarafianos SG**. **5J2P**. HIV-1 reverse transcriptase in complex with DNA that has incorporated EFdA-MP at the P-(post-translocation) site and a second EFdA-MP at the N-(pre-translocation) site, 2.5 Å resolution, released 08/03/2016.
- 28. Li Z, Kirby KA, **Sarafianos SG**. **5J2Q**. HIV-1 reverse transcriptase in complex with DNA that has incorporated a mismatched EFdA-MP at the N-(pre-translocation) site, 2.8 Å resolution, released 08/03/2016.
- 29. Kirby KA, **Sarafianos SG**. **5TUQ**. Crystal Structure of a 6-Cyclohexylmethyl-3-hydroxypyrimidine-2,4-dione Inhibitor in Complex with HIV Reverse Transcriptase, 2.7 Å resolution, released 06/28/2016.
- 30. Kirby KA, **Sarafianos SG**. **5UV5**. Crystal Structure of a 2-Hydroxyisoquinoline-1,3-dione RNase H Active Site Inhibitor with Multiple Binding Modes to HIV Reverse Transcriptase, 3.0 Å resolution, released 08/16/2017.

- 31. Gres AT, Kirby KA, **Sarafianos SG**. **5W4O**. Structure of the R18A mutant of the HIV-1 capsid protein, 2.1 Å resolution, released 06/20/2018.
- 32. Gres AT, Kirby KA, **Sarafianos SG**. **5W4P**. Structure of the E28A mutant of the HIV-1 capsid protein, 2.2 Å resolution, released 06/20/2018.
- 33. Gres AT, Kirby KA, **Sarafianos SG**. **5W4Q**. Structure of the R18A/E28A mutant of the HIV-1 capsid protein, 2.3 Å resolution, released 06/20/2018.
- 34. Kirby KA, **Sarafianos SG**. **6AOC**. Crystal structure of an N-Hydroxythienopyrimidine-2,4-dione RNase H active site inhibitor with multiple binding modes to HIV reverse transcriptase, 1.8 Å resolution, released 08/08/2018.
- 35. Gres AT, Kirby KA, **Sarafianos SG**. **6AXR**. Structure of the P122A mutant of the HIV-1 capsid protein, 2.3 Å resolution, deposited 09/07/2017.
- 36. Gres AT, Kirby KA, **Sarafianos SG**. **6AXS**. Structure of the V11I/T58A/P122A mutant of the HIV-1 capsid protein, 2.4 Å resolution, deposited 09/07/2017.
- 37. Gres AT, Kirby KA, **Sarafianos SG**. **6AXT**. Structure of the T58S/T107I/P122A mutant of the HIV-1 capsid protein, 2.4 Å resolution, deposited 09/07/2017.
- 38. Gres AT, Kirby KA, **Sarafianos SG**. **6AXV**. Structure of the T58S/T107I/P122A mutant of the HIV-1 capsid protein in complex with PF-3450074 (PF74), 2.77 Å resolution, deposited 09/07/2017.
- 39. Gres AT, Kirby KA, **Sarafianos SG**. **6AXW**. Structure of the I124A mutant of the HIV-1 capsid protein, 2.4 Å resolution, deposited 09/07/2017.
- 40. Gres AT, Kirby KA, **Sarafianos SG**. **6AXX**. Structure of the T58A/I124A mutant of the HIV-1 capsid protein, 2.6 Å resolution, deposited 09/07/2017.
- 41. Gres AT, Kirby KA, **Sarafianos SG**. **6AXY**. Structure of the V11I/T58A/I124A mutant of the HIV-1 capsid protein, 2.78 Å resolution, deposited 09/07/2017.
- 42. Gres AT, Kirby KA, **Sarafianos SG**. **6AY9**. Structure of the native full-length HIV-1 capsid protein in complex with CPSF6 peptide, 2.5 Å resolution, deposited 09/07/2017.
- 43. Gres AT, Kirby KA, **Sarafianos SG**. **6AYA**. Structure of the native full-length HIV-1 capsid protein in complex with Nup153 peptide, 2.4 Å resolution, deposited 09/07/2017.
- 44. Gres AT, Kirby KA, **Sarafianos SG**. **6B2G**. P38A mutant of the HIV-1 capsid protein, 2.4 Å resolution, deposited 09/20/2017.
- 45. Gres AT, Kirby KA, **Sarafianos SG**. **6B2H**. P38A/T216I mutant of the HIV-1 capsid protein, 2.6 Å resolution, deposited 09/20/2017.
- 46. Gres AT, Kirby KA, **Sarafianos SG**. **6B2I**. E45A mutant of the HIV-1 capsid protein, 2.5 Å resolution, deposited 09/20/2017.
- 47. Gres AT, Kirby KA, **Sarafianos SG**. **6B2J**. E45A mutant of the HIV-1 capsid protein (other crystal form), 2.21 Å resolution, deposited 09/20/2017.
- 48. Gres AT, Kirby KA, **Sarafianos SG**. **6B2K**. E45A/R132T mutant of the HIV-1 capsid protein, 2.0 Å resolution, deposited 09/20/2017.

#### PATENTS

- World Intellectual Property Organization No. WO2012068390 A1, "Inhibitors of Foot and Mouth Disease Virus targeting the RNA-dependent polymerase activity of 3Dpol." Filed November 17, 2011; Published May 24, 2012.
- 2. US Patent No. US20140005241 A1, "Suppression of SARS, MERS and other coronaviruses replication by helicase inhibitors." Filed June 17, 2013; Published January 2, 2014.
- 3. Invention Disclosure No. 10UMC015, at University of Missouri, "Suppression of HBV replication by a specific anti-viral compound," January 8, 2010. No patent application filed.

- 4. Invention Disclosure No. 12UMC074, at University of Missouri, "Suppression of SARS replication by SARS entry inhibitors," April 16, 2012. No patent application filed.
- 5. Invention Disclosure No. 17UMC117 at University of Missouri, Title: "Novel compounds for the Treatment of Hepatitis B Virus Infection," June 2, 2017. Patent application submitted September 28, 2017.
- 6. US provisional patent application 62/564,865, Title: "Inhibitors of hepatitis B virus targeting capsid assembly" was filed on September 28, 2017. Converted to US non-provisional patent application 16/144,274 on September 27, 2018.
- 7. Invention Disclosure No. 2020-278 at University of Minnesota, Title: "Novel Antivirals Targeting HIV-1 Capsid", March 23, 2020.
- 8. Invention Disclosure No. GTRC ID#8572 at Georgia Tech, Title: "Marine natural products as therapeutic lead candidates against SARS-CoV-2", August 13, 2020.
- 9. Invention Disclosure No. 21046 at Emory University, Title: "SARS-CoV-2 Subgenomic Replicon (SARS2-Rn)", December 9, 2020.