

# Zachary A. Silver, M.D., Ph.D.

Pulmonary & Critical Care physician-scientist at the University of California, San Francisco, in the laboratory of Anthony Shum – studying COPA syndrome and STING-driven interstitial lung disease. Board-certified internist and MD/PhD; NIH-funded (F30) HIV glycobiologist and first-author of work in *Cell Reports* and the *Journal of Virology*.

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## 01 EDUCATION & TRAINING

### University of California, San Francisco

2024 – Present

Fellowship, Pulmonary & Critical Care Medicine · Shum Lab

### Duke University Hospital

2021 – 2024

Residency, Internal Medicine · Physician-Scientist Training Program

Durham, NC

### University of Miami Miller School of Medicine

2014 – 2021

MD & PhD · Medical Scientist Training Program (MSTP)

PhD: “O-glycosylation of HIV-1 Envelope” · Ronald C. Desrosiers  
Laboratory

### Hebrew University–Hadassah Medical Center

2014

Sanford Kuvim Travelling Fellowship · Ron Dzikowski Laboratory

Jerusalem, Israel · *Plasmodium falciparum* antigenic variation

### Christian Medical College, Vellore

2012 – 2013

Fulbright–Nehru Full Research Fellowship · Gagandeep Kang Laboratory

Tamil Nadu, India · Childhood immune responses to cryptosporidiosis

### Tufts University

2008 – 2012

B.Sc., Biology · *Magna Cum Laude* with Highest Thesis Honors

GPA 3.70 · Dean’s List (8 semesters) · Edouard Vannier Laboratory

Diplomate, American Board of Internal Medicine

Board-certified in Internal Medicine

Physician & Surgeon License — State of California

Licensed to practice medicine in California

Zachary A. Silver, M.D., Ph.D., Inc.

2026 – Present

Founder & Principal – California professional medical corporation (medical & scientific consulting)

The Robert J. Lefkowitz Society

2021

Duke University School of Medicine

F30 Ruth L. Kirschstein  
NRSA

2018 – 2022

NIAID / NIH

Louis J. Elsas Research Award in  
Biochemical Genetics

2019

Dr. John T. Macdonald Foundation,  
U. Miami

Best Talk, Annual MSTP Research  
Symposium

2019

University of Miami MSTP

Finalist, Graduate Student Award  
of Excellence

2019

Miller School of Medicine, U.  
Miami

Sanford Kuvin Travelling  
Fellowship

2014

Kuvin Center, Hebrew University

Fulbright–Nehru Full Research  
Fellowship

2012

U.S. Department of State

*Magna Cum Laude*, Highest Thesis  
Honors

2012

Tufts University

**Shum Lab — UCSF**

2024 – Present

Clinical-research Fellow

COPA syndrome and STING-driven interferonopathies: mapping how disruptions in COPI-coatome trafficking of STING drive type I interferon and interstitial lung disease, using spatial transcriptomics and single-cell RNA sequencing.

**Desrosiers Laboratory — U. Miami (Pathology)**

2015 – 2021

PhD Candidate

Discovered that a subset of HIV-1 strains elongate the Env V1 domain and shield it with O-linked glycans – conferring >1000-fold resistance (IC50) to V3-glycan broadly neutralizing antibodies. Established an elite-controller cohort and CRISPR/Cas9 O-glycosylation-deficient cell lines.

**Watkins Laboratory — U. Miami (Pathology)**

2014 – 2015

Rotating Student

SIV vaccine work in rhesus macaques; showed that Mamu-B\*17:01 vs \*17:03 variants differ within the epitope-binding domain and differentially prime Nef-IW9 CD8+ T-cell responses.

**Dzikowski Laboratory — Hebrew University**

2014

Kuvín Fellow

Role of nuclear-envelope proteins SunB and Sec13 in *Plasmodium falciparum* var-gene antigenic variation; generated fluorescently tagged strains for nuclear-architecture imaging.

**Kang Laboratory — Christian Medical College, Vellore**

2012 – 2013

Fulbright–Nehru Scholar

Flow-cytometry assays characterizing children’s memory immune responses to *Cryptosporidium*; systematic review of soil-transmitted helminth infection across South & Southeast Asia.

**Vannier Laboratory — Tufts Medical Center**

2010 – 2012

Undergraduate Thesis Researcher

Forward-genetic mapping of host resistance to babesiosis to a seven-gene interval on mouse chromosome 9; defined roles for C3, IFN-γ, IL-21, B cells and DN T cells in parasite clearance.

05 PEER-REVIEWED PUBLICATIONS

- 1 **Silver ZA**, Antonopoulos A, Haslam SM, Dell A, Dickinson GM, Seaman MS, Desrosiers RC. Discovery of O-linked carbohydrate on HIV-1 envelope and its role in shielding against one category of broadly neutralizing antibodies. *Cell Reports*. 2020;30(6):1862–1869. doi:10.1016/j.celrep.2020.01.056

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- 2 **Silver ZA**, Dickinson GM, Seaman MS, Desrosiers RC. A highly unusual V1 region of Env in an elite controller of HIV infection. *Journal of Virology*. 2019;93(10):e00094-19. doi:10.1128/JVI.00094-19

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- 3 Termini JM, Church ES, **Silver ZA**, Haslam SM, Dell A, Desrosiers RC. HIV and SIV maintain high levels of infectivity in the complete absence of mucin-type O-glycosylation. *Journal of Virology*. 2017;91(19):e01228-17. doi:10.1128/JVI.01228-17

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- 4 **Silver ZA**, Watkins DI. The role of MHC class I gene products in SIV infection of macaques. *Immunogenetics*. 2017;69(8–9):511–519. doi:10.1007/s00251-017-0997-3

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- 5 Termini JM, **Silver ZA**, Connor B, Antonopoulos A, Haslam SM, Dell A, Desrosiers RC. HEK293T cell lines defective for O-linked glycosylation. *PLOS ONE*. 2017;12(6):e0179949. doi:10.1371/journal.pone.0179949

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- 6 **Silver ZA**, Kaliappan SP, Samuel P, Venugopal S, Kang G, Sarkar R, Ajjampur SSR. Geographical distribution of soil-transmitted helminths and the effects of community type in South Asia and South East Asia – a systematic review. *PLOS Neglected Tropical Diseases*. 2018;12(1):e0006153. doi:10.1371/journal.pntd.0006153

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- 7 Schwarz D, Sharma R, Bashyal C, et al. (incl. **Silver ZA**). Strengthening Nepal’s female community health volunteer network through public sector accompaniment. *BMC Health Services Research*. 2014;14:473.

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- 8 Basnet B, Gauchan B, Shrestha R, Baruwal A, Karcles G, **Silver ZA**. Strengthening free healthcare in rural Nepal. *JNMA J Nepal Med Assoc*. 2014;52(194):856–861.

Doctoral thesis: “O-glycosylation of HIV-1 Envelope,” University of Miami, 2019. Full record on ORCID.

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## 06 RESEARCH FUNDING

### 1F30AI134381 — “Virologic determinants of HIV elite control”

2018 – 2022

Ruth L. Kirschstein NRSA (F30) · NIAID / NIH · PI (100%), mentor R. Desrosiers

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### Louis J. Elsas Research Award in Biochemical Genetics

2019 – 2021

Dr. John T. Macdonald Foundation, University of Miami

**Sanford Kuvin Travelling Fellowship**  
Kuvin Center for the Study of Infectious & Tropical Diseases

2014

**Fulbright–Nehru Full Research Fellowship**  
U.S. Department of State

2012 – 2013

07 SCIENTIFIC SOFTWARE & RESOURCE SHARING

**O-glycosylation analysis toolkit**  
Rare Missense Mutation Analyzer · NetOGlyc4.0 Bulk Analyzer · Furin-Cleavage & O-Glycosylation Site Proximity Analyzer · HIV-1 Env V1 O-glycosylation Analyzer  
  
Open-source Python tools for population sequence analysis and glycosylation prediction (GitHub).  
Invention disclosures filed with the University of Miami.

2020

**O-glycosylation-deficient cell lines**  
Gale-KO, Galk1-KO, Galk2-KO, GaleGalk1-KO, GaleGalk2-KO (deposited at ATCC)

2018

**Research instruments (current)**  
Coil (plasmid & molecular-cloning workbench) · Colony (vivarium management) · and other in-house scientific software  
  
See Software.

2025 – Present

08 SERVICE, LEADERSHIP & MENTORSHIP

**SARS-CoV-2 Assessment of Viral Evolution (SAVE)**  
NIAID consortium · Duke

2021 – 2024

**Lincoln Community Health Center**  
Care for underserved patients · Duke

2021 – 2024

**Apollo Society at U. Miami**  
Founder & President

2018 – 2020

**Annual MSTP Symposium**  
Chair (2019–20), Committee (2018–19)

2018 – 2020

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| <b>American Physician Scientists Association, U. Miami</b><br>Co-founder & Vice President | 2015 – 2017 | <b>GlobeMed at Tufts / Possible Health</b><br>Co-founder; Data Scientist (rural Nepal) | 2011 – 2014 |
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09 MEMBERSHIPS

- Robert J. Lefkowitz Society
- Sigma Xi
- American Physician Scientists Association
- American Medical Association
- Fulbright Association
- Eureka / International Apollo Society

10 SKILLS

- Python & data analysis
- Spatial transcriptomics · scRNA-seq
- Flow cytometry
- CRISPR/Cas9
- Structural & computational modeling
- Spanish · Hebrew