Jason Nomburg, Ph.D.

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EDUCATION

2017 – 2022 **Harvard University**, Boston, MA
Ph.D. in Virology from Harvard Medical School.

2013 – 2017 **University of California, Santa Barbara**, CA
Bachelor of Art in Biology. *High Honors*.

RESEARCH EXPERIENCE

2025- **Starting Principal Investigator, AITHYRA**, Vienna, Austria
Principal Investigator at AITHYRA. My lab uses structural bioinformatics, functional genomics, and artificial intelligence to study virus-host interactions across the tree of life.

2022-2025 **Postdoctoral Fellow**, **Gladstone Institutes**, San Francisco, CA and **UC Berkeley**, CA.
Research in Jennifer Doudna's laboratory. I used bioinformatics and molecular biology to identify and characterize viral anti-immune effectors.

2018-2022 **Graduate Thesis Research, Harvard Medical School**, Boston, MA
Research in the laboratories of James DeCaprio and Matthew Meyerson. I developed bioinformatics tools to understand the relationship between viruses, bacteria, and cancer. In addition, I used long-read transcriptomics to characterize the transcriptome diversity of SARS-CoV-2 and clinically relevant polyomaviruses.

2017 **Research Rotation, Harvard Medical School**, Boston, MA
Rotation in the laboratory of Benjamin Gewurz, where I investigated the remodeling of host metabolism in B-cells infected with Epstein-Barr virus.

2016 **Undergraduate Researcher, Osaka University**, Osaka, Japan
Undergraduate research in the laboratory of Tatsuo Shioda, where I studied the fitness of HIV-1 capsid variants.

2014-2017 **Undergraduate Researcher**, **University of California, Santa Barbara**, CA
Undergraduate research in the laboratory of Dzwokai (Zach) Ma at UCSB, where I investigated the interactions between the histone methyltransferase subunit WDR5 and measles virus.

PUBLICATIONS *(*DENOTES CO-FIRST AUTHORS)*

Doherty EE*, **Nomburg J***, Adler BA, Lopez S, Hsieh K, Beurnier S, Charles EJ, Colognori D, Lahiri A, Voelker A, Cui ML, Lee J, Trinidad M, Boger R, Kranzusch PJ, & Doudna JA. Divergent viral phosphodiesterases for immune signaling evasion. ***bioRxiv***. 2025.

Adler BA, Al-Shimary MJ, Patel JR, Armbruster EG, Colognori D, Charles EJ, Miller KV, Lahiri A, Cui ML, Oromí-Bosch A, Voelker A, Trinidad M, Lee J, Beurnier S, Boger R, **Nomburg J**, Barrangou R, Mutalik VK, Schoeniger JS, Pogliano JA, Savage DF, Doudna JA, & Cress BF. CRISPRi-ART enables functional genomics of diverse bacteriophages using RNA-binding dCas13d. ***Nature Microbiology***. 2025

Hobbs SJ, **Nomburg J**, Doudna JA, & Kranzusch PJ. Animal and bacterial viruses share conserved mechanisms of immune evasion. ***Cell***. 2024.

Nomburg J, Doherty EE, Price N, Bellieny-Rabelo D, Zhu YK, & Doudna JA. Birth of protein folds and functions in the virome. ***Nature***. 2024.

Adler BA, Al-Shimary MJ, Patel JR, Ambruster E, Colognori D, Charles EJ, Miller KV, Lahiri A, Trinidad M, Boger R, **Nomburg J**, Beurnier S, Cui ML, Barrangou R, Mutalik VK, Schoeniger JS, Pogliano JA, Savage DF, Doudna JA, &

Cress BF. Genome-wide characterization of diverse bacteriophages enabled by RNA-binding CRISPRi. ***bioRxiv***. 2023. *(In press at Nature Microbiology)*

Nomburg J, Bullman S, Nasrollahzadeh D, Collisson EA, Abedi‐Ardekani B, Akoko LO, Atkins JR, Buckle GC, Gopal S, Hu N, Kaimila B, Khoshnia M, Malekzadeh R, Menya D, Mmbaga BT, Moody S, Mulima G, Mushi BP, Mwaiselage J, Mwanga A, Newton Y, Ng DL, Radenbaugh A, Rwakatema DS, Selekwa M, Schüz J, Taylor PR, Vaske C, Goldstein A, Stratton MR, McCormack V, Brennan P, DeCaprio JA, Meyerson M, Mmbaga EJ, & Van Loon K. An international report on bacterial communities in esophageal squamous cell carcinoma. ***International Journal of Cancer***. 2022.

Lee PC, Klaeger S, Le PM, Korthauer K, Cheng J, Ananthapadmanabhan V, Frost TC, Stevens JD, Wong AYL, Iorgulescu JB, Tarren AY, Chea VA, Carulli IP, Lemvigh CK, Pedersen CB, Gartin AK, Sarkizova S, Wright KT, Li LW, **Nomburg J**, Li S, Huang T, Liu X, Pomerance L, Doherty LM, Apffel AM, Wallace LJ, Rachimi S, Felt KD, Wolff JO, Witten E, Zhang W, Neuberg D, Lane WJ, Zhang G, Olsen LR, Thakuria M, Rodig SJ, Clauser KR, Starrett GJ, Doench JG, Buhrlage SJ, Carr SA, DeCaprio JA, Wu CJ, & Keskin DB. Reversal of viral and epigenetic HLA class I repression in Merkel cell carcinoma. ***The Journal of Clinical Investigation***. 2022.

Nomburg J, Zou W, Frost TC, Datta C, Vasudevan S, Starrett GJ, Imperiale MJ, Meyerson M, & DeCaprio JA. Long-read sequencing reveals complex patterns of wraparound transcription in polyomaviruses. ***PLoS Pathogens***. 2022.

Mahale P*, **Nomburg J*,** Song JY, Steinberg M, Starrett G, Boland J, Lynch CF, Chadburn A, Rubinstein PG, Hernandez BY, Weisenburger DD, Bullman S, & Engels EA. Metagenomic analysis to identify novel infectious agents in systemic anaplastic large cell lymphoma. ***Infectious Agents and Cancer***. 2021.

Nelson ND, Meng W, Rosenfeld AM, Bullman S, Pedamallu CS, **Nomburg JL**, Wertheim GB, Paessler ME, Pinkus G, Hornick JL, Meyerson M, Luning Prak ET, & Pillai V. Characterization of plasmacytoid dendritic cells, microbial sequences, and identification of a candidate public T-cell clone in Kikuchi-Fujimoto disease. ***Pediatric and Developmental Pathology***. 2021.

Nomburg J, Meyerson M, & DeCaprio JA. Pervasive generation of non-canonical subgenomic RNAs by SARS-CoV-2. ***Genome Medicine***. 2020.

Starrett GJ, Thakuria M, Chen T, Marcelus C, Cheng J, **Nomburg J**, Thorner AR, Slevin MK, Powers W, Burns RT, Perry C, Piris A, Kuo FC, Rabinowits G, Giobbie-Hurder A, MacConaill LE, & DeCaprio JA. Clinical and molecular characterization of virus-positive and virus-negative Merkel cell carcinoma. ***Genome Medicine***. 2020.

Pleguezuelos-Manzano C, Puschhof J, Rosendahl Huber A, van Hoeck A, Wood HM, **Nomburg J**, Gurjao C, Manders F, Dalmasso G, Stege PB, Paganelli FL, Geurts MH, Beumer J, Mizutani T, Miao Y, van der Linden R, van der Elst S, Garcia KC, Top J, Willems RJL, Giannakis M, Bonnet R, Quirke P, Meyerson M, Cuppen E, van Boxtel R, & Clevers H. Mutational signature in colorectal cancer caused by genotoxic pks+ E. coli. ***Nature***. 2020.

Nomburg J, Bullman S, Chung SS, Togami K, Walker MA, Griffin GK, Morgan EA, LeBoeuf NR, DeCaprio JA, Meyerson M, & Lane AA. Comprehensive metagenomic analysis of blastic plasmacytoid dendritic cell neoplasm. ***Blood Advances***. 2020.

Wang LW, Shen H, Nobre L, Ersing I, Paulo JA, Trudeau S, Wang Z, Smith NA, Ma Y, Reinstadler B, **Nomburg J**, Sommermann T, Cahir-McFarland E, Gygi SP, Mootha VK, Weekes MP, & Gewurz BE. Epstein-Barr-virus-induced one-carbon metabolism drives B cell transformation. ***Cell Metabolism***. 2019.

Ma D, George CX, **Nomburg JL**, Pfaller CK, Cattaneo R, & Samuel CE. Upon infection, cellular WD repeat-containing protein 5 (WDR5) localizes to cytoplasmic inclusion bodies and enhances measles virus replication. ***Journal of Virology***. 2018.

Gebre M*, **Nomburg JL***, & Gewurz BE. CRISPR–Cas9 genetic analysis of virus–host interactions. ***Viruses***. 2018.

PRESENTATIONS

2025	**Systems Virology Journal Club**. Birth of protein folds and functions in the virome**.** (Invited Talk)
2024	**Western Bioinformatics Seminar Series**. Birth of protein folds and functions in the virome**.** (Invited Talk)
2024	**Systems Biology for Infectious Diseases Annual Meeting**. Eukaryotic and prokaryotic viruses use a conserved anti-immune effector to evade host immunity. (Invited Talk)
2024	**Gladstone Institutes Retreat.** Birth of protein folds and functions in the virome**.** (Invited Talk)
2024	**UCSF Host Pathogen Map Initiative Annual Retreat**. Birth of protein folds and functions in the virome**.** (Invited Talk)
2024	**Doudna Lab 30-Year Reunion**. Birth of protein folds and functions in the virome**.** (Poster)
2024	**American Society for Virology Annual Meeting**. Birth of protein folds and functions in the virome. (Talk)
2024	**Quantitative Biosciences Institute Coronavirus Research Group AViDD All-hands Meeting**. Birth of protein folds and functions in the virome. (Talk)
2024	**Gladstone Institute of Virology Scientific Advisory Board Meeting**. Birth of protein folds and functions in the virome. (Poster)
2023	**Gladstone Institute of Virology Research in Progress Seminar Series**. Birth of protein folds and functions in the virome. (Talk)
2021	**AORTIC - International Conference on Cancer in Africa**. An international report on bacterial communities in esophageal squamous cell carcinoma. (Invited Talk)
2021	**RNA Society Annual Meeting**. Short- and Long-read Sequencing Reveals Unexpected Complexity in Polyomavirus Transcriptomes. (Poster)
2020	**COVID19 Genomics Research Network**. Pervasive generation of non-canonical subgenomic RNAs by SARS-CoV-2. (Invited Talk)
2020	**Riboclub Forum – RNA Biology and Technology**. Pervasive generation of non-canonical subgenomic RNAs by SARS-CoV-2. (Talk)
2020	**Massachusetts Consortium for Pathogen Readiness**. Non-canonical junctions in subgenomic RNAs of SARs-CoV-2 lead to variant open reading frames. (Invited Talk)
2020	**Genome Informatics Conference**. Pervasive generation of non-canonical subgenomic RNAs by SARS-CoV-2. (Poster)
2020	**AACR – The Microbiome, Viruses, and Cancer**. A Cohort of Oral Bacteria is Present in Esophageal Squamous Cell Carcinomas in High-Incidence Regions of Africa. (Poster)
2019	**Harvard School of Public Health Microbiome in Public Health Symposium**. Microbiome analysis of Tanzanian Esophageal Cancer. (Poster)
2016	**University of California, Santa Barbara – Undergraduate research and creative activities Colloquium**. Host protein GEFH1 modulates measles virus infection. (Poster)

2016	**University of California, Santa Barbara – College of Creative Studies Science Week**. Optimization of Monkey-tropic HIV-1. (Poster)
2016	**Osaka University FronteirLab Symposium**. Interactions between HIV-1 capsid protein mutants and the host's cleavage and polyadenylation specific factor 6. (Talk)
2015	**University of California, Santa Barbara – Undergraduate research and creative activities Colloquium**. Host cell protein WDR5 localizes to viral inclusion bodies and interacts with viral proteins during MeV infection. (Poster)

AWARDS AND GRANTS

2024	Gladstone Institutes Distinguished Achievement in Science Award
2021	RNA Society Meeting 2021 Conference Award
2016	Undergraduate Research and Creative Activities (URCA) Grant
2016	University of California Education Abroad Program: Promise Award
2016	American Association of Teachers of Japanese: Bridging Scholarship
2014	Undergraduate Research and Creative Activities (URCA) Grant

TEACHING

2024	**Gladstone Institutes**, San Francisco, CA Directed and taught a 10-week course on "Python for Biologists" to members of the Doudna lab and other labs in the Gladstone Institutes of Virology.
2018	**Dana Farber Cancer Institute**, Boston, MA Taught a Skills and Solutions Course as part of the YES for CURE program, a National Cancer Institute-funded research training program for motivated high school and undergraduate students from populations underrepresented in science.
2017	**Department of Molecular and Cellular Biology, University of California, Santa Barbara**, CA Teaching assistant for General Animal Virology.
2015	**Department of Molecular and Cellular Biology, University of California, Santa Barbara**, CA Part of the BioMentor program, providing academic guidance and instruction to groups of introductory biology students.
2014	**Department of Chemistry, University of California, Santa Barbara**, CA Laboratory assistant during first-year chemistry labs.

MENTORSHIP (IN THE LAB)

2024-2024	**Karen Zhu**, Bioinformatician I
2023-Present	**Nathan Price**, Research Technician
2022	**Abhijay Mahil**, Summer Student as part of the Promoting Underrepresented Minority Advancement in the Sciences (PUMAS) Program. *Current Status: Undergraduate Student at Diablo Valley College*
2016-2017	**Sabrina Leong**, Undergraduate Student Researcher. *Current Status: Resident Physician at Children's Hospital of Orange County*
2016-2017	**Ashley Kawaguchi**, Undergraduate Student Researcher. *Current Status: Resident Physician at UCSF Benioff Children's Hospital*

DIVERSITY EFFORTS

2023	**Promoting Underrepresented Minority Advancement in the Sciences (PUMAS) Program** Scientific mentor of a visiting student for one summer as part of the Gladstone Institutes PUMAS program, aimed to increase the representation of underrepresented groups in the sciences.
Summer 2018, 2019	**Summer Honors Undergraduate Research Program (SHURP)** Peer mentor as part of Harvard Medical School's SHURP program, a 10-week summer research program to increase research exposure and provide mentorship to college students from backgrounds that are underrepresented in science.

SERVICE

2023-2024	**Coordinator, Gladstone Institute of Virology Research in Progress Seminar,** San Francisco, CA
2023-2024	**Coordinator, Doudna Lab Gene Fixers Subgroup Meeting,** San Francisco, CA