

CURRICULUM VITAE

Daniel Joseph Gómez Santos

Structural Biology Graduate Student of Biological Sciences

California State University, East Bay, USA
Stanford Synchrotron Radiation Lightsource (SSRL)
Linac Coherent Light Source (LCLS)
SLAC National Accelerator Laboratory, USA

and

Research Associate of Microbiology and Immunology, Neurobiology and Anatomy

College of Medicine, Drexel University, USA

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🧪 Research Interests and Pursuits

As a dedicated researcher, my goal is to gain admission into a PhD program in Biochemistry, Biophysics and Structural Biology with a focus on Cellular and Molecular Biology. My aim is to acquire the necessary skills and knowledge to develop novel therapies for diseases using a combination of cutting-edge techniques in structural biology and bioengineering principles. My research interests align with the mission statements of several innovative companies such as Gomera Health, GomeBio, Gome Writings, and Structure Universe. At Gomera Health, I am interested in the Multi-omics Structural Biology and Network Physiology Division, specifically the Neuro-Spatial Multi-Omics Structural Biology (NSMOSB) Unit, where I believe my skills and expertise in structural and computational biology, neurochemistry, and neuroimaging can contribute to the development of advanced diagnostics and effective therapies for serious life-threatening conditions. At GomeBio, I am interested in the research units in Neurology, Immunology, Bioengineering, and Structural and Computational Biology, particularly the Immunoengineering (ImmPhysEng) innovations that teach the immune system to fight disease. My skills in molecular biology, immunology, and protein engineering could contribute to the development of personalized vaccines and nanoparticle vaccines.

Gome Writings' mission to advance scientific understanding of genome engineering through large-scale synthesis and editing of the human and other species genome aligns with my interest in computational biology and bioinformatics. I believe my skills in structural bioinformatics and biochemistry can contribute to the development of novel biomaterials and biologic solutions. Finally, at Structure Universe, my interest in advancing scientific understanding of the structure of the universe, macromolecules, and universal vaccines through innovative research, education, and collaboration aligns with my research interests in macromolecular structure and photon science.

Specifically, my research interests are focused on studying the dynamics of protein structures in response to ligand binding and enzymatic reactions. I plan to apply a range of time-resolved structural biology techniques such as NMR, x-ray crystallography, cryogenic microscopy and tomography, and HDX-MS to gain a comprehensive understanding of protein structures and their interactions, with the ultimate goal of developing new and more effective therapeutics for diseases.

Furthermore, I am interested in exploring novel approaches such as computational biology and bioinformatics to aid in protein engineering and drug design. This will enable a deeper understanding of the mechanisms involved in protein-ligand interactions and help in the rational design of drugs for specific targets. In addition to my interest in time-resolved structural biology, I am also fascinated by the study of organelles and their roles in cellular function and disease. I believe that combining nanofluidics with cutting-edge imaging techniques such as x-ray crystallography and cryogenic

tomography will allow for high-resolution imaging of organelles in live cells and enable new diagnostic and therapeutic approaches for diseases such as cancer, neurodegenerative disorders, and infectious diseases.

Overall, my research interests are centered around the application of a range of cutting-edge techniques in structural biology and bioengineering to address the challenges of developing new therapies for diseases. By integrating these novel techniques, I hope to contribute to the development of new and more effective treatments for a range of diseases, while also advancing our understanding of fundamental biological processes. My skills in structural biochemistry, molecular techniques, neuroscience, immunology, and imaging will be utilized to achieve these goals.

Education & Research Experiences

Current:

**M.S. Biological Sciences:
Structural Molecular Biology**
Graduate Student

2022/8–present, **California State University, East Bay**
SSRL, LCLS, S²C², SCSC
SLAC National Accelerator Laboratory

Macromolecular Structure
Non-Degree Graduate Student

2023/4–2023/6, **Oregon State University**
College of Science, School of Life Sciences
Department of Biochemistry and Biophysics

Research Associate

2022/6–present, **Drexel University**
College of Medicine (DUCOM)
Departments of Microbiology and Immunology,
Neurobiology and Anatomy
(Advisor: Pooja Jain, PhD)

Medical Neuroscience
Certificate Program

2023/3–present, **Duke University**
Department of Neurobiology
Department of Neurology
Department of Psychology and Neuroscience
Professor: Leonard E. White, PhD

Particle Physics: an Introduction
Certificate Program

2023/3–present, **University of Geneva**
Department of Nuclear and Particle Physics
Professors: Martin Pohl, PhD; Anna Sfyrla, PhD

Getting started in Cryo-EM
Certificate Program

2023/3–present, **California Institute of Technology (Caltech)**
Department of Biology and Bioengineering
(Professor: Grant Jensen, PhD)

Near Future:

Physical Chemistry
Non-Degree Graduate Student

2023/8–2023/12, **Oregon State University**
College of Science
Department of Chemistry

Bioengineering

Non-Degree Graduate Student

Biological cryogenic electron microscopy and tomography

2023/4–2023/12, **Stanford University**

Schools of Engineering & Medicine

Department of Bioengineering

(Professor: Wah Chiu, PhD)

Past:

RapiData 2023

Data Collection and Structure Solving

Macromolecular X-Ray Diffraction Measurement

2023/3–2023/4, **SLAC National Accelerator Laboratory**

Stanford Synchrotron Radiation Lightsource (SSRL)

Structure Molecular Biology (SMB) program

U.S. Department of Energy (DOE) Office of Science

Stanford University

B.S. Biology:

Cell and Molecular Biology

2020/8–2022/5, **San Francisco State University**

College of Science & Engineering

Department of Biology

(Advisors: Nicole Salazar Velmeshev, PhD;

Michael Goldman, PhD; Scott Roy, PhD)

Research Assistant

2020/1–2020/3, **University of Florida**

College of Veterinary Medicine (UFCVM),

Department of Physiological Sciences

(Advisors: Chris Vulpe, MD, PhD; Rola Zeidan, PhD)

R&D Coordinator

2015/12–2016/3, **dosist**

Research Assistant

2014/1–2014/6, **UCSD School of Medicine,**

VA San Diego Health Care,

Department of Anesthesia, Division of Neuroanesthesia

(Advisors: Hemal Petal, PhD; Jan Schilling, MD; Brian Head, PhD)

Graduate Coursework

Neurosciences, Neurovirology

2012/8–2013/6, **John A. Burns**

School of Medicine (JABSOM)

University of Hawaii at Manoa

Department of Tropical Medicine,

Medical Microbiology, and Pharmacology (DTMMMP)

Johns Hopkins University

School of Medicine (JHUSOM),

Department of Neurology and Neurosurgery,

Division of Neuroimmunology and Neurological Infections

(Professors: Martin Rayner, PhD; Bruce Shiramizu, MD; Vivek Nerurkar, PhD; Linda Chang, MD; Amanda

Brown, PhD, Avindra Nath, MD)

Research Assistant

2012/8–2013/7, **JABSOM, DTMMMP**

(Advisors: Bruce Shiramizu, MD; Vivek Nerurkar, PhD)

Molecular Cell Biology

2010/8–2013/6, **University of Hawaii at Manoa**

Department of Microbiology

(Advisor: Paul Patek, PhD)

Positions & Employment

2023-	Founder, Structural Molecular Biologist, Structure Universe LLC
2023-	Director of Multiomics, Biomedical Research Engineering-Scientist (ML Scientist/AI Engineer), Gomera Health
2023-	Head of Neuroinformatics and Clinical Biomarkers Program, GomeBio
2023-	VP of STEM Programs, Myplaceisahappy1 (MPH1)
2023-	Research Assistant (co-author), Department of Neurosurgery, UF College of Medicine (Dr. Hoh's Cerebrovascular Research Lab)
2023-	Expert Consultant, Coleman Research
2023-	Chairman, President, Gome Writings Inc, (" Gome-Writer ")
2023-	CEO, Director, Gomera Health Inc. (" Gomera ")
2022-	Founder/Chief Executive Officer, Gome Bio LLC (" GomeBio ")
2022-	Founding Board Member, Myplaceisahappy1 (MPH1)
2022	Teaching Associate, Department of Biological Sciences, College of Science, California State University, East Bay
2022-	Graduate Student Researcher, Department of Biology, CSUEB
2022-	Visiting scientist"user", SLAC National Laboratory
2022-	Research Associate, Department of Microbiology & Immunology, Neurobiology and Anatomy, Drexel University College of Medicine (DUCOM)
2022	Lab Assistant II/Production Supervisor, Roche Diagnostics (RTD)
2022	Person of Interest, Stanford-SLAC Cryo-EM Center (S ² C ²)
2021-22	Formulations Operator II, TAPP Robotics, Thermo Fisher Scientific
2021	Staff Research Assistant, Department of Bioengineering and Therapeutic Sciences, University of California, San Francisco (UCSF)
2020-21	Research Assistant, Department of Biology, SFSU
2020	Research Assistant, Department of Physiological Sciences, Toxicology, University of Florida College of Veterinary Medicine (UFCVM)
2019	Manufacturing Associate I, Custom Primers, Thermo Fisher Scientific
2018	Client Relationship Manager, Software Developer, PoshProfiles (BAWF)
2015-16	R&D Coordinator, hmbldt/dosist
2015	Assistant General Manager, Amoura International
2014	Research Assistant, Department of Anesthesia, Division of Neuroanesthesia, UCSD School of Medicine, VA Hospital
2013	Research Associate, DTMMMP, JABSOM, UHM

2012-13 Biology Assistant, DTMMMP, JABSOM, UHM
2011 Teaching Assistant, Department of Chemistry, UHM

Honors & Awards

2022 Faculty Member, Graduate, Department of Biological Sciences, CSUEB
2020 DiVERGE Awardee, Scripps Research Institute
2013 Grant Awardee, Undergraduate Research Opportunity Program (UROP), UHM

Editorial Team

Academic Editor

- *Cancers: Neuro-oncology and neurotrauma*

Editorial Board Member

- *Bioengineering*

Journal Referee

- *Biology*
- *Cancers*
- *Cells*
- *Healthcare*
- *International Journal of Molecular Sciences (IJMS)*
- *Pharmaceuticals*
- *Viruses*

First/Co-first Author Publications

+:Co-first Author. *: Co-Corresponding Author

D.J. Gómez*. Untangling the Microscopic World of Organelles, Cells, Tissues, and Organs: A Focus on the Dysfunctional Golgi Apparatus in Disease Research. *Biology and Life Sciences Forum*. 2023

D.J. Gomez, G. Sandel, R. Kulkarni, J. Joseph, S. Maher, P. Jain*. **Epitope-Based Vaccines and Immunotherapy for Infection-Related Cancers in People Living with HIV: Current Status, Challenges, and Future Directions.** *Frontiers in Microbiology*. 2023 (In preparation)

D.J. Gomez-Santos* and M. Borja. **Ribozymes as Precision Weapons: Revolutionizing Gene Therapy for Incurable Diseases.** *International Journal of Molecular Sciences*. 2023 (In preparation)

D.J. Gomez*. Immunoreagent Design and Production in Vaccine Development: Rational Design, High-Throughput Production, and Integration of Structure and Computation. *Vaccines*. 2023 (In preparation)

D.J. Gomez-Santos, B. Lucke-Wold*. Neuroendovascular embolization procedure optimization for aneurysm subarachnoid hemorrhage healing by drug eluting biomedical devices, robotics, and artificial intelligence. *Bioengineering*. 2023 (In preparation)

D. Gomez*. Unraveling the Structural Dynamics of Human Pegivirus-1 RNA-Dependent RNA Polymerase Using Computational Methods. *ResearchGate* 2022. DOI: [10.13140/RG.2.2.11957.35041](https://doi.org/10.13140/RG.2.2.11957.35041)

D. Gomez*, Pioneering Organelle Structural Biology: Golgi apparatus dysfunction in Parkinson's Disease, Neurodevelopmental Disorders, and Cancer. *Preprints*, 2022, 2022100383. doi: [10.20944/preprints202210.0383.v2](https://doi.org/10.20944/preprints202210.0383.v2).

T.H. Mulherkar⁺, **D.J. Gomez⁺**, G. Sandel, P. Jain^{*}, Co-infection and cancer: Host-Pathogen Interaction between Dendritic Cells and HIV-1, HTLV-1, and Other Oncogenic Viruses. *Viruses*. 2022 Sep 14;14(9):2037. doi: [10.3390/v14092037](https://doi.org/10.3390/v14092037). PMID: 36146843; PMCID: PMC9503663.

Oral Presentations

Immunoreagent Design and Production in Vaccine Development: Rational Design, High-Throughput Production, and Integration of Structure and Computation, 2023/06, Virtual meeting. Vaccines Research 2023 eConference (Vaccines-eCon2023). The Research Catalyst.

Pioneering organelle structural biology: Golgi apparatus dysfunction and cascades of fatal pathways in cancer, 2023/03, Virtual meeting. Cells 2023 Conference. MDPI. sciforum.

Landscape of Myeloid and Astrocyte phenotypes in acute MS lesions + Future Technological Directions, 2023/01, Virtual presentation. Drexel University College of Medicine, Department of Microbiology and Immunology, Neurobiology and Anatomy. (Jain Lab)

Structure-based discovery of RdRp NS5B in HPgV (GBV-C) by macromolecular crystallography (MX), 2022/12, In-person & Virtual presentation. Cell and Molecular Biology Seminar: CSU East Bay.

Retron Library Recombineering (RLR): Going beyond CRISPR, 2022/11, In-person & Virtual presentation. Cell and Molecular Biology Journal Club: CSU East Bay.

Ribozyme mechanisms and Clinical Gene Therapy, 2022/10, Virtual meeting. Chemistry 2022, Global Virtual Summit on Chemistry & Pharmaceutical Chemistry.

A Human Retrovirus in Neuro-Oncology, Interventional Conductome Studies, and Theranostics in Nuclear Medicine, 2022/10, Virtual meeting. 5th International Webinar on Cancer Research and Oncology.

Cancers: PCNSL outcome in EBV+/HIV Confection and HTLV connection in HIV/AIDS patients, 2022/10, Virtual presentation. Drexel University College of Medicine, Department of Microbiology and Immunology, Neurobiology and Anatomy. (Jain Lab)

HTLV-1: From neuroimaging to neurosurgery and biomarkers of neuroinflammation and neurodegeneration in HAM/TSP progression, 2022/10, Virtual seminar. Cell and Molecular Biology Seminar: CSU East Bay.

Hackathon “Hack the Outbreak”: PathAR, 2022/10, In-person & Virtual presentation. CSU East Bay.

An intasome story: Structural basis of host protein hijacking in human T-cell leukemia virus integration, 2022/09, Virtual seminar. Cell and Molecular Biology Seminar: CSU East Bay.

Deltaretrovirus: HTLV, 2022/09, Virtual seminar. Cell and Molecular Biology Seminar: CSU East Bay.

Data Driven Discovery of Computational Oncology and Modern Molecular Biology, 2022/5, Virtual seminar. Data Science Research and Career Seminar: CSU Northridge.

Poster Presentations

Design and Evaluation of an Epitope-based Universal Vaccine Targeting SARS-CoV-2 Nucleocapsid (N), PLpro, and Mac1 of Nsp3, 2023/4, Berkeley, CA. 22nd Annual UC Berkeley Microbiology Student Symposium.

Co-infection and cancer: Viral oncogenesis in humans result in liver, blood, and brain cancer by host-pathogen interactions, 2022/12, Honolulu, HI. 12th Annual American Association for Cancer Research (AACR) - Japanese Cancer Associate (JCA) Joint Conference.

Teaching, Training, Mentoring Experience

University Service (University of Florida)

2023- UF MHPMP mentor, Minority Health Professional Mentorship Program (MHPMP),
Pre-Health Club

Instructional Activities (CSUEB)

Fall 2022 BIOL230 (Clinical Microbiology), (4 unit course) - 2 sections
Fall 2022 BIOL270 (Human Anatomy & Physiology I), (4 unit course) - 1 section

Instructional Activities (University of Hawaii)

Spring 2011 CHEM161L (General Chemistry I Laboratory), (1 unit course) - 2 sections

University Service (University of Hawaii)

2011 Tutor, Chemistry, Biology, Organic Chemistry (Emporium)

University Service (Modesto Junior College)

2005 Teacher, English Language; Thailand, Laos (Study Abroad)

Interns

2023- Salma Maher, CMB & Physical Biochemistry Intern at Gomera Health Inc.
2022 Chier Hu, PhD, Computer Engineer Intern at Gome Bio LLC

Undergraduate Student Mentees

2023- Emmanuel Espinoza, Biochemistry, University of Florida (UF)
2022 Courtney-Jane Lopez, CNA, CSUEB, Pre-Nursing
2022 Daniil Mudrov, CSUEB, Cell and Molecular Biology (RA, MEDGENOME > Genentech)
2022 Yongtao Guan, CSUEB, Ohlone College, Pre-med (MCB)
2022 Arielle Vue, CSUEB, Pre-Nursing

Volunteering

Professional Service

2023- Editorial Board Member, *Bioengineering* MDPI,
2023- Academic Editor, *Cancers* MDPI, Special Issue: Neuro-oncology and neurotrauma
2022- Founding Board Member, VP of STEM Programs, Myplaceisahappy1 (MPH1)
2022- Volunteer Reviewer (VR), MDPI
2012 Volunteer, Physician Shadowing, Dr. Thomas Slavin, Pediatrics and Clinical Genetics,
Medical Genetics section, City of Hope

Community Service

2022 Volunteer, St. Michael's Church
2022 Lighting Designer, Fountain Church

2014 Market Research, Berkeley Human Society
2014 Community Wellness Advocate, American Cancer Society
2014 Anesthesiology Technician, VA San Diego Health Care, VA Medical-Center

University Service (University of Florida)

2019-20 Scientific Ambassador, Microbiology

University Service (University of Hawaii)

2011 Tutor, Chemistry, Biology, Organic Chemistry (Learning Emporium)

Certifications & Licensure

2023 (*pending*) Deep Learning with PyTorch for Medical Image Analysis
2023 (*pending*) Reinforcement Learning beginner to master - AI in Python
2023 (*pending*) Modern Artificial Intelligence Masterclass: Build 6 Projects
2023 (*pending*) Deep Learning: Convolutional Neural Networks (CNN) in Python
2023 (*pending*) A deep understanding of deep learning (DL)
2023 The Complete Quantum Computing Course
2023 Scientific Computing with NumPy - Python Data Science
2023 Writing High Performance Python
2023 Database Design
2023 Beginning C++ Programming - From Beginner to Beyond
2023 Complete linear algebra: theory and implementation in code
2023 Reviewer Certificate (MDPI Journal - *Biology, Cancers, Pharmaceuticals, IJMS, Viruses, Cells, Healthcare*)
2022 Cyber Security for Lab Users, SLAC National Accelerator Laboratory
2019 IRB Training
2019 Life Sciences Responsible Conduct of Research Course (RCR)
2018 Medical School Pathology – Certificate of Achievement
2018 Modern Golang Programming, Packt Publishing
2018 Learning Path: Go: Building Cloud Native Go Applications, Packt
2018 Mastering Go Programming, Packt Publishing
2017 DNA Research with Biopython
2017 Data Science and Machine Learning Bootcamp with R
2017 Google's Go (golang) Programming Language
2017 Python for Data Science and Machine Learning
2016 Intro to SQL for Data Science Course - DataCamp

Professional Trainings & Workshops

2023	Vaccine Technology Workshop. World Vaccine Congress, Washington, DC.
2023	HIV Workshop. World Vaccine Congress, Washington, DC.
2023	Biodefense: Vaccines & Antibodies. World Vaccine Congress, Washington, DC.
2023	RapiData 2023 at SSRL: Data Collection and Structure Solving: A Practical Course in Macromolecular X-Ray Diffraction Measurement, SLAC National Accelerator Laboratory, Stanford Synchrotron Radiation Lightsource (SSRL), SMB, U.S. Department of Energy, Office of Science
2022	5th Annual Cal State East Bay Hack Day (Hack the Outbreak): Created an AR prototype of a epitope based measles vaccine to MV-H:SLAM fusion
2022	The Upside of Downturns Summit, Startup Grind Silicon Valley, SF Bay Area
2022	IEDB Virtual User Workshop La Jolla Institute for Immunology Immune Epitope Database and Analysis Resource, Funded by the National Institute of Allergy and Infectious Diseases (NIAID)
2022	SSRL/LCLS Users' Meeting Stanford-SLAC National Accelerator Laboratory
2022	Stanford-SLAC Cryo-EM Center (S ² C ²), SCSC – Training on Electron Microscopes and Computers (Under the direction of Wah Chiu), cryo-FIB/SEM milling
2022	UW-Madison, Department of Biochemistry, 42 nd Steenbock Symposium, Opening Doors to Cryo-EM, Titan Krios G3 and G4 workshop, Cryo-electron tomography, SerialEM

Technical Strength

Languages: English (Native), Spanish (Communicative), Arabic (Novice), Hebrew (Beginner)

Skills: Strong background in biology, biochemistry, and/or biophysics. Knowledge of protein structure and function, as well as other biomolecules such as nucleic acids and carbohydrates. Familiarity with experimental techniques used in structural biology, such as x-ray crystallography, NMR spectroscopy, electron microscopy, hybrid structural mass spectrometry (HDX-MS, etc), and computational modeling. Ability to perform protein expression, purification, and characterization, including chromatography, electrophoresis, and spectrophotometry. Competence in computer programming and data analysis, as well as experience with data visualization and statistical analysis, Familiarity with laboratory safety protocols and good laboratory practices, including handling of hazardous materials and biological samples. Strong problem-solving and critical thinking skills, including the ability to troubleshoot experimental issues and design creative solutions. Excellent communication and collaboration skills, including the ability to work effectively in a team environment and to present research findings to diverse audiences.

Digital Proficiency: Benchling, Photoshop, Illustrator, Biorender, Linux, GitHub, Shell scripting, Shiny

Programming Languages: Go , R , Python , C++ , HTML, MATLAB, Bash.

Bioinformatic Tools and Databases: BioPerl, Biopython, IGV, APE, BLAST, Bedtool, Bioconductor, RNAseq, scRNAseq, Seurat, 10X Genomics pipelines, Proteomics, The Cancer Genome Atlas (TCGA), nucamino, COSMIC, Roche Cancer Genome Database (RCGDB)

References

Professor Amanda Brown

Neurovirology Professor and Director, Advisor
Associate Professor of Neurology and Neuroscience
Department of Neurology - Neuroimmunology and Neurological Infections, Neuroscience Johns Hopkins Medicine
Phone number: +1 (410) 614-2429
Email: abrown76@jhmi.edu

Professor Michael Goldman

Genetics & Honors Genetics Professor and Advisor
Former Chair, Department of Biology, San Francisco State University
Phone number: +1 (415) 388-7671
Email: goldman@sfsu.edu

Avindra Nath, M.D.

Professor, Advisor
Senior Investigator, Section of Infections of the Nervous System
Clinical Director, NINDS/NIH
Phone number: +1 (301) 496-1561
Email: natha@mail.nih.gov

Professor Nicole Salazar Velmeshev

Cancer Biology Professor and Advisor
Assistant Professor, Department of Biology, San Francisco State University
Phone number: +1 (415) 388-1184
Email: nsave@sfsu.edu