

## CURRICULUM VITAE

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### **Daniel Joseph Gómez Santos**

**Structural Biology Graduate Student of Biological Sciences**

California State University, East Bay, Hayward, CA, USA

*and*

**Founder & Chief Scientist at Gomera**

R&D Division, Universal Virtual Biotechnology Laboratory (UVBL)

Gomera Health, Livermore, CA, USA

*and*

**Virtual Associate Fellow of Microbiology and Immunology, Neurobiology and Anatomy**

College of Medicine, Microbiology Control, Drexel University, Philadelphia, PA, USA

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### **Research Interests and Pursuits**

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As a Constructive Organismic Structural Biophysics Medical Researcher, my primary objective is to investigate protein-nutrient interactions and their impact on cellular growth and decision-making processes at the atomic and single-molecule levels. I aim to understand nutrient recognition by protein sensors, regulation of nutrient transport across membranes, and the integration of nutrient sensing with other chemical signals, such as hormones. By exploring these fundamental questions, I aspire to contribute to the development of targeted therapeutics for growth-related diseases, including cancer and tuberous sclerosis.

To achieve these goals, I will employ a comprehensive range of approaches, including structural biology, chemical biology, cell biology, biophysics, and biochemistry. Utilizing state-of-the-art techniques, such as OCT, NMR, X-ray crystallography, SAXS/SANS, and cryogenic microscopy and tomography (CryoEM, CryoET), I aim to gain a deeper understanding of protein structures and their interactions with nutrients and other molecules. Furthermore, I am passionate about leveraging computational biology and bioinformatics to support protein engineering and drug design, facilitating rational drug design for specific targets and providing new insights into nutrient sensing and cellular decision-making. By integrating these techniques, I hope to enhance our understanding of fundamental biological processes and contribute to the development of innovative treatments for growth-related diseases.

## Education & Research Experiences

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### **Current:**

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

2022/8–present, California State University, East Bay  
SSRL, LCLS, S<sup>2</sup>C<sup>2</sup>, SCSC  
SLAC National Accelerator Laboratory

**Molecular Biophysics I: 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  
(Professor: Victor Hsu, PhD)

**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)

**Virtual Associate Fellow**

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

### **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, hmbldt/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)*  
(Professors: Martin Rayner, PhD; Bruce Shiramizu, MD;  
Vivek Nerurkar, PhD; Linda Chang, MD)

**Johns Hopkins University School of Medicine (JHUSOM)  
Department of Neurology and Neurosurgery  
Division of Neuroimmunology and Neurological Infections**  
(Professors: 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**

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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, (" <a href="#">Gome-Writer</a> ")
2023-	CEO, Director, Gomera Health Inc. (" <a href="#">Gomera</a> ")
2022-	Founder/Chief Executive Officer, Gome Bio LLC (" <a href="#">GomeBio</a> ")
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 <sup>2</sup> C <sup>2</sup> )
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

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

## Competitions

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2023	22nd Microbiology Student Symposium, Microbiology Student Group (MSG), UC Berkeley and Stanford, <i>Poster presentation</i>
2023	Grand Slam Graduate Research Presentation Competition, Cal State East Bay Grand Slam 2023, CSU East Bay, <i>Poster presentation</i>
2022	6th Annual Cal State East Bay Hack Day, Hack the Outbreak, CSU East Bay, <i>Hackathon, and oral presentation</i>

## Editorial Team

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Academic Editor

- *Cancers: Neuro-oncology and neurotrauma*

Editorial Board Member

- *Bioengineering*

## Journal Referee

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

## First/Co-first Author Publications

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+: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\***. 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<sup>+</sup>, **D.J. Gomez<sup>+</sup>**, G. Sandel, P. Jain<sup>\*</sup>, **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

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**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

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**Design and Evaluation of a Multivalent Multi-Epitope Vaccine Targeting SARS-CoV-2 Nucleocapsid (N), Nsp3 (PLpro and Mac1) for Development of an Epitope-based Universal Vaccine**, 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

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### *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***

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**

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***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**

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2023 ( <i>pending</i> )	Deep Learning with PyTorch for Medical Image Analysis
2023 ( <i>pending</i> )	Reinforcement Learning beginner to master - AI in Python
2023 ( <i>pending</i> )	Modern Artificial Intelligence Masterclass: Build 6 Projects
2023 ( <i>pending</i> )	Deep Learning: Convolutional Neural Networks (CNN) in Python
2023 ( <i>pending</i> )	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 - <i>Biology, Cancers, Pharmaceuticals, IJMS, Viruses, Cells, Healthcare</i> )
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**

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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<sup>2</sup>C<sup>2</sup>), SCSC – Training on Electron Microscopes and Computers (Under the direction of Wah Chiu), cryo-FIB/SEM milling
- 2022 UW-Madison, Department of Biochemistry, 42<sup>nd</sup> Steenbock Symposium, Opening Doors to Cryo-EM, Titan Krios G3 and G4 workshop, Cryo-electron tomography, SerialEM

## Technical Strength

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**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

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### **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](mailto: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](mailto: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](mailto: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](mailto:nsave@sfsu.edu)