

Daniel Palacios

| Phone: (832) 941-7893 | Daniel.Palacios@bcm.edu

Education

Ph. D. Quantitative & Computational Biosciences
Baylor College of Medicine | Houston, TX.

Aug 2022 - Present



Bachelor of Science, Physics
Bachelor of Science, Mathematics
University of Houston | Houston, TX.
GPA: 3.95/4.00

Aug 2018 - May 2022

Experience

Baylor College of Medicine. Houston, TX, *August 2022 - Present.*
Graduate Student.



Liu Lab, Pediatrics, Neurology Duncan Neurological Research Institute.

- Served as a Teaching Assistant for a Computational Methods class specializing in Machine Learning and Probability Theory applied to Bioinformatics. Responsibilities included grading homework and exams and preparing comprehensive supplementary materials to enhance student understanding and application of complex concepts.
- Conducted in-depth research on AI Foundation Models and AutoML techniques, focusing on their application in Clinical Informatics.
- Developed proficiency in basics of bioinformatics like standard RNAseq data processing pipelines, file conventions, shared databases, analysis, and tools.
- Nurtured a mature understanding of gene transcription, splicing, alternative polyadenylation, and how sequencing analysis relates to disease diagnosis.
- Investigated, tested, and created Machine Learning models like Convolutional Neural Networks, Deep Neural Networks, Transformers (DNA-BERT), and attention models to classify sequences to identify Single Nucleotide Polymorphisms that might cause changes in alternative polyadenylation leading to genetic diseases.

Han Liang Lab, Department of Bioinformatics and Computational Biology, The University of Texas MD Anderson Cancer Center.

- Worked with the DrBioRight development team assisting in constructing web browser visualization applications for single-cell analysis and unsupervised clustering such as UMAP, T-SNE, batch correction, track-plot, and dot-plot, among others.
- Performed multi-omics cancer subtyping integrative consensus clustering and identified differences in patient survivability with Kaplan-Meier curves using Cox model analysis.
- Implemented Reverse Phase Protein Array data baseline quality control and differential protein expression analysis identifying key regulated features in bladder tissue tumors.

Zhang Lab, Proteomics Data Analysis Center, Baylor College of Medicine.

- Consolidated a text mining pipeline tool that identifies phosphorylation sites and substrate relations from full-text and abstract PubMed articles with Clinical Language Annotation Modeling and Processing Toolkit (CLAMP) and Pre-trained biomedical language representation model for text mining: BioBERT.
- Identified and annotated thousands of phosphorylation sites with substrate relations by data mining PMC Open access subset.

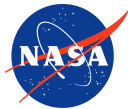




Ames Research Center, NASA, Mountain View, CA, *May 2022 - Present.*

Research Associate. Mentor: Jessica Lee.

- Supervised and guided two undergraduate students in developing a graphical user interface, modeling improvements, and statistical analysis, overseeing task assignments and resource allocation for effective project execution and knowledge sharing.
- Work on improving and modifying the Agent-Based Model for Microbial Populations Exposed to Radiation (AMMPER) which simulates microbe cells under ionizing deep-space radiation comparing experimental data with the Biosentinel and LEIA missions.
- Optimized AMMPER reduces the computational running time of simulation for several orders of magnitude by running visualizations and reactive oxygen species damaging mechanisms more efficiently.
- Incorporated gamma radiation and alamarBlue metabolic dye dynamics to AMMPER by creating a toy model using Michaelis-Menten kinetics and health cell information.
- Created a lifetime diffusion of free radicals model using Propagators in 3-dimensional space to implement it in AMMPER and measured cell health effects.
- Work with LabXchange and other research associates to create [space biology cluster](#) educational content on the platform, opening the doors to students worldwide to learn about space biology research.



Johnson Space Center, NASA, Houston, TX, *Jan 2021 - May 2022•1 yr 5 mos.*

Machine Learning Researcher Intern. Mentor: Terry Hill.

- Collaborated with data scientists across NASA centers to develop an in-depth understanding of machine learning tools in Natural Language Processing to create a taxonomy for space hardware failure discrepancy reporting from topic modeling and text classification techniques Latent Dirichlet Allocation-Bidirectional Encoder Representations and Transformers (LDA-BERT).
- Utilized statistical and data analytic tools, like Power BI dashboards and visualizations, to identify correlations, trends, and root causes of engineering processes among key topics and concepts from the LDA-BERT taxonomy.
- Explored and tested NLP commercial tools like IBM Watson Explorer, AWS Comprehend, NLP Cloud, and Google Cloud Platform as well as open-source ML techniques such as multinomial and logistic regression Naive Bayes classifiers, hierarchical clustering, convolutional, and recurrent neural networks classifiers, factor analysis, feature extraction clustering, Markov Chains, and many others.
- Developed interactive knowledge graphs from cause-effect relationships to identify root causes in engineering hardware space processes problems with INDRA-EIDOS, Spacy, and Bokeh-networkx.
- Use taxonomy to identify high trending and high relevance engineering process failures, phrases, and concepts to bring attention to engineering management and improve monitoring capabilities in the future.



Department of Physics, University of Houston, *May 2020 - Jan 2021•1 yr 9 mos*

Undergraduate Researcher. Advisor: Pavan Hosur.

- Showed by solving the time-dependent Schrodinger equation the existence of an asymmetric supercurrent when time-reversal symmetry and inversion symmetry are broken in a non-centrosymmetric superconductor and quantified its effect.

- Derived the Josephson effects of asymmetric superconductors and qualitatively explained their significance. The asymmetric supercurrent density was calculated over various parameters in a 3-D lattice.
- Explored Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state for asymmetric superconductors using mean-field theory approximation. Calculated the Helmholtz free energy from the Bdg Hamiltonian matrix to identify a phase transition.
- Utilized machine learning image recognition to identify local maximums from a momentum pair histogram to find nesting within the Fermi surface of asymmetric energy dispersion.



Department of Physics, University of Houston, Aug 2019 - Aug 2020•1 yr 1 mo
Undergraduate Researcher. Advisor: Anthony Timmins.

- Developed an understanding of different programming languages applied to scientific analysis.
- Simulated Pb-Pb events with hydrodynamic models and compared flow harmonics results to experimental data. Results were used in a CERN publication.
- Performed calculations to test simulations with Quark-Gluon Plasma properties and learned statistical error techniques such as bootstrapping and subsampling.



The Center for Theoretical Biological Physics, Rice University, May 2019-Aug 2019•4 mos

Research Fellow. Advisor: Margaret Cheung, Seth Coleman.

- Worked with a mentor to develop a gene regulatory network model that showed the strength of transcription factor, Cro, early influence in CI production using ultrasensitivity and Michaelis-Menten kinetics in bacteriophage lambda infections over various parameters.

Honors

National Library of Medicine (NLM) Fellowship T15LM007093-32, Dec 2023.

Lathisms Scholarship, Summer 2023.

American Society for Microbiology (ASM) Future Leaders Mentoring Fellowship, Summer 2023.

ADDSTEAM Scholarship, Summer 2022.

Space Life Science Training Program at NASA Ames Research Center, Summer 2022.

The Initiative for Maximizing Student Development | NIH-NIGMS grant 5R25GM056929-25, 2022.

Magna Cum Laude - UH, 2022.

Dean's Distinguished Scholar List - UH, 2018-2022.

Academic Excellence Scholarship - UH, 2018-2022.

Charles P. Benner Scholarship, Spring 2021.

Provost's Undergraduate Research Scholarship - UH, Spring 2021

The British American Foundation of Texas Scholarship, 2020-2021.

Summer Undergraduate Research Fellowship - UH, Summer 2020.

Frontiers in Research Summer Internship from the Center for Theoretical Biological Physics funded by the National Science Foundation, Summer 2019.

Publications

Palacios, D. Lee, J. "Implementing alamarBlue dynamics in a spatially explicit microbial radiation model" *In preparation for POLS*.

Palacios, D. Hill, T. "Taxonomical Modeling and Classification in Space Hardware Failure Reporting" *Under Review to Scientific Reports* [PrePrint](#)

Hosur, P., & **Palacios, D.** (2023). "Proximity-induced equilibrium supercurrent and perfect superconducting diode effect due to band asymmetry". *Physical Review B*, 108(9), 094513. [DOI](#)

Presentations

AMIA 2024

RECOMB 2024

American Society for Microbiology (ASM) Microbe, June 2023. Poster

Palacios, D. Lee, J. "Agent-Based Modeling Of Microbes In Deep-Space Radiation: Direct and Indirect Effects On Viability And Metabolism"

38th Annual Meeting for the American Society Gravitational Space Research (ASGSR), November 2022. Poster

Palacios, D. Lee, J. "Implementing alamarBlue dynamics in a spatially explicit microbial radiation model"

Final presentation to Space Biosciences Research Branch, Ames Research Center-NASA, August 2022. Talk

Palacios, D. Lee, J. "Implementing alamarBlue dynamics in a spatially explicit microbial radiation model"

Midterm presentation to Space Biosciences Research Branch, Ames Research Center-NASA, July 2022. Talk

Palacios, D. Lee, J. "Implementing alamarBlue dynamics in a spatially explicit microbial radiation model"

Presentation to EA Director Engineering, Johnson Space Center-NASA, May 2022. Talk

Palacios, D. Hill, T. "Spring 2022 Engineering Directorate Data Analytics: Natural Language Processing Research Exit Presentation"

Intern exit presentations, Johnson Space Center-NASA, May 2022. Talk

Palacios, D. Hill, T. "Spring 2022 Engineering Directorate Data Analytics: Natural Language Processing Research Exit Presentation"

2022 Heart of Texas: Undergraduate Research Conference, Baylor University, April 2022. Talk.

Palacios, D. Hill, T. "Engineering Directorate Data Analytics: Natural Language Processing Research Exit Presentation"

17th Annual Undergraduate Research Day, University of Houston, April 2022. Poster

Palacios, D. Hill, T. "Taxonomical Modeling and Classification in Space Hardware Failure Reporting"

Intern status presentations, Johnson Space Center-NASA, December 2021.

Talk

Palacios, D. Hill, T. "Fall 2021 Engineering Directorate Data Analytics: Natural Language Processing Research Exit Presentation"

Intern status presentations, Johnson Space Center-NASA, August 2021. Talk

Palacios, D. Hill, T. "Summer 2021 Engineering Directorate Data Analytics: Taxonomy from LDA-BERT for Discrepancy Reports"

Agency community group NASA Machine Learning and Artificial Intelligence in Google Cloud Platform, Langley Research Center-NASA, July 2021. Talk

Palacios, D. Hill, T. Liles, C. "Engineering Directorate Data Analytics: Natural Language Processing"

Intern status presentations, Johnson Space Center-NASA, May 2021. Talk

Palacios, D. Hill, T. "Spring 2021 Engineering Directorate Data Analytics: Topic Modeling and Text Classification for Discrepancy Reports"

16th Annual Undergraduate Research Day, University of Houston, April 2021. Poster

Palacios, D. Hosur, P. "Supercurrent without a spatially varying phase or a vector potential from time-reversal and inversion symmetries breaking in superconductors"

15th Annual Undergraduate Research Day, University of Houston, September 2020. Poster

Palacios, D. Coleman, S. Igoshin, O. "Developing a model of Cro regulation of early CI production in bacteriophage lambda infections."

Frontiers in Science Presentation, Center for Theoretical Biological Physics Rice University, August 2019. Talk and Poster.

Palacios, D. Coleman, S. Igoshin, O. "Developing a model of Cro regulation of early CI production in bacteriophage lambda infections."

Skills

Computational Languages: Python, R, Matlab, C++, Mathematica, DAX.

Software: Power BI, Minitab, Design-Expert, OrCad-PSPICE, MultSim, Orange.

Knowledge and usage: Linux, Parallel Computing, Virtual Machine, Cluster accessing, Pytorch, Tensorflow, Jupyter notebooks, Google Colab, GitHub, Bioinformatics, bash, Docker, MySQL, consensus integrative clustering, differential analysis.

Languages: Spanish (proficient native speaker and writer).

Other**Activities and Memberships**

Keck Seminar Committee Member

Lathism Committee Member

Mentor Postbaccalaureate Research Education Program (PREP) from Baylor College of Medicine. *Fall 2023-Current*

Volunteer at the Postbaccalaureate Research Education Program (PREP) at Baylor College of Medicine. *Fall 2022-Spring 2023*

- Helped college graduates from underrepresented backgrounds prepare for graduate school applications with mock interviews, and research poster revisions.

Scribe of the Lunar Biology Technology Workshop (LBTech) hosted by the NASA Space Biology Program. *Spring 2022*.

Support Undergraduate Officer of Society for the Advancement of

Chicanos/Hispanics and Native Americans in Science. *Spring 2021-Summer 2022*.

- Organized cultural events to promote STEM participation in minority-represented communities.

Member of UH Math organization. *Summer 2020 - Spring 2022.*

Member of Society of Physics Students. *Spring 2019 - Spring 2022.*

Phi Beta Kappa Honors Society. *Spring 2021*

Private Tutor in Math, and Physics classes. *2020-2021.*

- Tutored several college students in mathematics and science classes to ensure their learning and success.

CUNY Physics of Life Symposia Tutorial program. *Fall 2020.*

- Research genetics, evolutionary biology, and epidemiology discussions.

Multicultural success outreach initiative. *Summer 2020.*

- Student worker motivating minorities to pursue a physics career, translated Spanish-English documents and videos. Produced experiment demonstration videos for students to replicate at home during the COVID-19 pandemic.

Co-author presentations -

39th Annual Meeting for the American Society Gravitational Space Research (ASGSR), November 2023. Poster

Madeline V. Marous, Daniel Palacios, Jessica A. Lee "Graphical user interface implementation for agent-based microbial radiobiology model"

Jessica A. Lee, Daniel Palacios, et. al. "A user-friendly agent-based model that recapitulates simple metabolic responses of yeast deep-space radiation"

Certifications and Relevant Coursework.

Hewlett Packard Enterprise Data Science Institute - Machine Learning.

Amazon Web Services | NASA - Big Data Technology Fundamentals.

Percipio | NASA - Data Analysis Concepts.

ETS Major Field Test - Mathematics 198/200.