

Daniel Bautista

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Education

University of California, Berkeley

B.A. Astrophysics, Physics, GPA: 3.64

Berkeley, CA

August 2019 – December 2021

Monterey Peninsula College

A.S-T Physics, Math, GPA: 4.00

Monterey, CA

August 2016 – May 2019

Publications

Choza, Carmen, **Daniel Bautista**, Steve Croft, et al. "The Breakthrough Listen Search for Intelligent Life: Technosignature Search of 97 Nearby Galaxies". In: *The Astronomical Journal* 167.1 (Dec. 2023), p. 10. DOI: 10.3847/1538-3881/acf576. URL: <https://dx.doi.org/10.3847/1538-3881/acf576>.

Jacobson-Bell, Ben, Steve Croft, Carmen Choza, Alex Andersson, **Daniel Bautista**, Vishal Gajjar, Matthew Lebofsky, David H. E. MacMahon, Caleb Painter, and Andrew P. V. Siemion. "Anomaly Detection and RFI Classification with Unsupervised Learning in Narrowband Radio Technosignature Searches". In: (2024). arXiv: 2411.16556 [astro-ph.IM]. URL: <https://arxiv.org/abs/2411.16556>.

Presentations

Bautista, Daniel. "Breakthrough Listen Technosignature Search of 97 Nearby Galaxies". Presentation of recent Breakthrough Listen paper to GBO and NRAO staff. Feb. 2024.

Employment

Green Bank Observatory

Scientific Data Analyst

Green Bank, WV

October 2023 - Present

Assist observatory users by performing routine to complex data reduction, data quality assessment and preparation of observing scripts.

Assist scientific staff with testing or software and procedures for user support and/or telescope operations.

Assist in the reduction and analysis of data taken to assess the impact of RFI on observatory telescopes.

Maintain documentation/archives and web pages of data products; assists users by having a working knowledge of all relevant user software for NRAO instruments for proposal submission, observation preparation, and post-processing data reduction.

Ensure appropriate and timely responses to user queries to the helpdesk by providing response, referral, and follows up on open queries.

Train new users on how to perform observations using the Green Bank Telescope.

Research

Berkeley SETI Research Center: The Breakthrough Listen Project

Advisor: Dr. Steve Croft, [GitHub](#)

Berkeley, CA

September 2020 - December 2022

Led the analysis of the RFI environment at the Green Bank Observatory using thousands of observations amounting to 798 TB of data. Developed algorithms to quantify trends in the origin and distribution of the spectral occupancy of RFI with time, direction, and frequency. Developed scoring systems for candidate signals of interest from the Breakthrough Listen backend across billions of frequency channels.

Second author on a paper published in *The Astronomical Journal* reporting the details of this work.

Georgia Institute of Technology: Tissue Mechanics Lab

PI: Dr. Wei Sun, [GitHub](#) poster

Remote Research

Summer 2021

Summer REU via the Summer Undergraduate Research in Engineering/Sciences (SURE program)

Participated in a project working to automate the segmentation of the whole human heart using a deep learning model.

Learned about the anatomy of the human heart as well as common causes of cardiovascular disease.

Used 3D Slicer to label the dataset by going through CT scan images and tracing out the segments of the heart. These labeled scans will go on to be used to train the deep learning model to automate the process.

Presented process of heart segmentations in a virtual research symposium at the end of the summer.

Undergraduate Laboratory at Berkeley: Physics and Astronomy

Berkeley, CA

Research Mentee, [GitHub](#) poster

September 2019 - May 2020

Wrote python program to read GLEAM data and calculate parameters of radio sources to be used in a simulation of the antenna response of a radio interferometer array.

Presented results to other research teams and ULAB staff.

Additional Skills

Telescope Observer Training: Green Bank Telescope – **96 hours** experience as primary observer on call

Software: Python, Latex, GitHub, Linux, TensorFlow, Google Cloud Platform, GNU Radio, [3D Slicer](#), Java, LabVIEW

Relevant Coursework

Physics: Classical Mechanics, Quantum Mechanics, Statistical Mechanics, Classical Electromagnetism, Instrumentation Lab, Experimentation Lab

Astrophysics: Special and General Relativity, Astronomy Data Science Lab, Stellar Physics, Cosmology and Relativity

Mathematics: Multivariable Calculus, Linear Algebra, Ordinary Differential Equations

Computer Science: Python, Bayesian Data Analysis and Machine Learning, Java

Coursework Related Projects

Galaxy Image Classification and Merger Rate

Berkeley, CA

Astronomy Data Lab – Data Analysis, [GitHub](#) Jupyter Notebook

Spring 2021

Built a convolutional neural net using TensorFlow to classify images from the GalaxyZoo dataset across 37 labels with a classification accuracy of 79.9%

Used fraction of classified galaxy mergers to estimate the fractional merger rate within an order of magnitude.

Investigating Differences in the Evolutionary Tracks of High Mass Stars

Berkeley, CA

Stellar Physics – Literature Review

Fall 2020

Worked in a group with two fellow students to read scientific articles and synthesize information investigating factors other than initial mass that determine the type of stellar remnant.

Analysis of Gravitational Wave Events

Berkeley, CA

Cosmology and Relativistic Astrophysics – Data Analysis, [GitHub](#) write-up

Spring 2020

Wrote python program analyze LIGO data for gravitational wave events GW150914 and GW170814.

Used a Newtonian approximation of the relation between gravitational wave frequency and mass to estimate the “chirp” mass of the merging black holes.

Leadership

Letters to a Pre-Scientist

Green Bank, WV

Pen Pal

2024/25

STEM professionals send and receive letters throughout a school year from a middle school student.

Pairs build a meaningful relationship by discussing STEM career pathways, higher education journeys, and how they've each overcome obstacles.

Pen pals plant seeds that help students discover possibilities in STEM.

Physicists Inspiring the Next Generation and West Virginia Governor's School

Green Bank, WV

Mentor

Summer 2024

Rising 9th graders will be on location at the Green Bank Observatory for two weeks, and immersed in the research activities of this national research center.

Mentored a small group (6-8 students) in the fundamentals of radio astronomy and provided scientific support to prepare them to carry out observations on the GBT and 40 ft educational telescope on GBO grounds.

Helped the students organize findings to present at the end of the two week session.

Foundational Course for Physical Science Transfer Students

Berkeley, CA

Mentor

Fall 2020, 2021

Helped facilitate a course aimed at assisting physical science transfer students adjust to being a Berkeley student, and connecting them with fellow students in transfer cohort.

Fielded questions during Q&A sessions with professors and graduate students, offered my experiences with getting involved with research and studying techniques, and helped make the transfer students aware of campus resources.

Astronomy Scholars Program

Berkeley, CA

Mentor

Spring 2021

Contributed to the diversity UC Berkeley's astro community by being hand-selected to be a peer advisor mentor to prospective astro majors.

Weekly check-ins with astro buddy to see how they are doing, answer questions about the major, help with study strategies or answer astro related questions they may have.

Activities

NASA's L'SPACE Mission Virtual Concept Academy

Online Academy

Summer 2019

Researched and selected probe instruments to perform experiments and collect data.

Characterized one of the hydrocarbon lakes on Saturn's moon, Titan.

Learned and exercised NASA mission protocols, procedures, and practices.

NASA Community College Aerospace Scholar

Scholar

Summer - Fall 2017

Participated in an online course in which I learned about current and future NASA projects, culminating in a research paper proposing a propulsion system for future Mars supply delivery.

Selected to travel to Stennis Space Center to participate in a rover design competition with other community college students. My role was designing and testing rover models.

Rover performance was ranked 2nd overall.