Miguel Carballo

Music Technologist - Software Developer - Pianist
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EDUCATION

Indiana University Indianapolis, Indianapolis IN - USA —
PhD in Music Technology

August 2023 - In progress - current GPA : 4.0

University of Central Arkansas, Conway AR - USA —
Master of Science/ Computer Science

August 2021 - May 2023 - GPA : 4.0

University of Central Arkansas, Conway AR - USA —
Master of Music/ Piano Performance

August 2018 - May 2020. GPA: 3.9

Universidad Privada Boliviana, Cochabamba BOLIVIA —
Bachelor Degree/ Computer Systems Engineering

February 2010 - December 2015. GPA: 3.6

EXPERIENCE

Indiana University Indianapolis - Music and Arts Technology,
Indiana IN-USA — *Research Assistant*

August 2024 - Present

Developed interactive music technology projects emphasizing programming in Scratch and hardware integration for educational applications.

Indiana University Bloomington - Jacobs Virtual Academy,
Indiana IN-USA — *Senior Piano Instructor*

January 2024 - Present

Teach piano and music technology courses integrating traditional and digital methodologies.

Acxiom, Conway AR-USA — *Solution Developer Intern*

January 2023- May 2023

Developed and maintained projects utilizing Oracle SQL, Perl scripts, FUSE, and ASC, focusing on data management and optimization.

Central Baptist College, Conway AR-USA — *Piano Accompanist*

August 2020 - May 2021

Accompanied soloists, choirs, and ensembles in class, lesson, recitals, musicals, competitions, and juries.

Young Musicians of America, Little Rock AR — *Piano Teacher*

July 2020 - May 2021

Taught piano technique and interpretation to beginner and intermediate K-12 students preparing for state and national recitals and competitions.

SKILLS

Programming/scripting languages: MATLAB, Swift, Java, Python, Kotlin, JavaScript, C#, PHP, Perl, C++, C.

Databases: Oracle SQL, MySQL, SQLite, MongoDB

VR Development / Unity3D

Audio Production: Logic Pro, Audacity, Reaper64

Advanced music Sight-reading, music theory and Score Analysis

Piano Pedagogy/Concert Pianist

AWARDS

2nd Place in the Plurinational Prize for Science and Technology - Bolivia 2016 in the category *Industrial Transformation.*

2nd Place in the Plurinational Prize for Science and Technology - Bolivia 2015 in the category *Information and Communication Technologies*

UPB "The Best 100" Scholarship (2010 - 2015) - Assigned to the top 100 students of Cbba. State.

UCA Music Scholarship (2017 -2020)

Selected Pianist of Teatro del Lago International Academy Orchestra - Chile 2015

1st Prize National Piano Competition - Bolivia 2007

LANGUAGES

English, Spanish

Scan to access website.

Centro de Investigaciones en Nuevas Tecnologías Informáticas, Cochabamba BOLIVIA — *Research Assistant*

March 2016 - July 2017

Worked on various projects related to Software Development, including Java projects, Android App Development, embedded systems, Web Data Visualization, and Databases.

Academia Nacional de Música Man Césped, Cochabamba BOLIVIA — *Piano Teacher*

February 2010 - September 2016

Taught piano technique and interpretation to students of various levels, from beginner to advanced.

MAIN PROJECTS

A MATLAB System for Expressive Algorithmic Composition *(2025)*

Object-oriented MATLAB framework for algorithmic music composition, integrating additive, subtractive, wavetable, and noise synthesis with custom audio effects (vibrato, chorus, reverb), motif-driven generation, and gain/pan automation across multi-voice structures.

MUSIC TO COLORS: VR Synesthesia Experience — *VR App (2022)*

Oculus Quest 2 app that transforms MIDI music files into a visual experience, converting sound into 3D objects and effects. Users can listen to MIDI music while viewing the corresponding colors and shapes that represent the notes played, creating a synesthetic experience in a virtual environment.

VR Game: A Prima Vista — *VR App (2021 - 2022)*

A VR Educational/Rhythm Single Player game prototype for Oculus Quest 2 headset that teaches how to sight-read music from a music score. The development of this game involved the conversion of MIDI files to a VR Music Score and the creation of a functional VR Keyboard using Unity3D.

Music Reading Training Using Minimax — *Webpage (2022)*

Simple web page developed as a tool that helps in the basic reading music training process using the decision rule Minimax and it was programmed/scripted in JavaScript following the concept of music notation flashcards.

Handwritten Music Symbol Recognition -*Neural Network (2022)*

A Convolutional Neural Network (Python) that recognizes 32 handwritten music symbols with 86% accuracy. Models were evaluated with self-generated images, showing promising results for future research.

Smartphone Spectrometer: SpectraUPB App — *Android App (2017)*

Android App that enables wavelength calibration, which allows to obtain values of absorbance, transmittance and obtains spectral curves in real-time using a low-cost 3D printed spectrometer attached to an Android Smartphone camera.

FiMAN: A system for Finger Motion Analysis — *Desktop App (2015)*

A desktop app that captures, records, and analyzes finger and hand motion in 3D using a Leap Motion sensor and Java SDK. Demonstrated modularity and extensibility for various motion analysis applications.