Justina Bonaventura

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Education

PhD in Optical Sciences, University of Arizona   2020- Anticipated 2025
    NIGMS Computational and Mathematical Modeling of Biomedical Systems NIH Trainee   2022-2023
BA in Physics; **BFA** in Visual Arts, Alfred University   2017

Research Experience

Graduate Research Assistant, University of Arizona   6/2021-Present
-Supervisor: Dr. Travis Sawyer- Biomedical Optics and Optical Measurements Lab
-Designed and assembled smartphone hardware attachment for spectroscopy and developed calibration software with the aim of creating a point-of-care melanoma detection tool.
-Developed Mueller Matrix decomposition software for analysis of polarized light imaging data with the goal of developing microstructural validation techniques for dMRI imaging.

Student Researcher, University of Arizona   1/2021-5/2021
-Supervisor: Dr. Tom Milster (rotation)
-Developed color correction algorithm for diffractive lens intended to reduce weight of optics in remote imaging systems.

Student Researcher, University of Arizona   9/2020-12/2020
-Supervisor: Dr. Pierre Blanche (rotation)
-Worked in Zemax Optics Studio to simulate and fine tune design of curved waveguide for heads up display.

Professional Experience

Software Development Intern   5/2022-12/2022

Airy Optics, Tucson AZ

-Developed polarization visualization functions for Mathematica based Polaris-M polarization ray tracing software.
-Debugging of software in order to make new functionality backwards compatible with work of other developers.

Fabrication Research and Development Intern   5/2023-8/2023

Arizona Optical Metrology, Tucson AZ

-Developed and fine tuned fabrication techniques for computer generated holograms

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Skills

Programing Languages and Modeling- Python, Mathematica, Matlab, Zemax Optics Studio, Blender
Metrology Proficiencies- White Light Interferometry, Profilometry, Polarized Light Microscopy, Optical Coherence Tomography
Technical Abilities- Reactive Ion Etching, 3d printing, Laser Cutting, Operating Kilns, Glass Casting, Mold Making, Experience with Circuitry and Arduino

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Scholarships and Awards

-Angus Macleod Scholarship Funded by VIAVI Solutions, Inc., 2023
-Mary Jo Lake Memorial Fellowship in Optical Sciences, 2022
-Louise A. Wyant Memorial Graduate Student Endowed Scholarship in Optical Sciences, 2020
-Natasha Goldowski Renner Prize in Physics, 2016

Personal Projects

University of Arizona Women in Optics Board Member- Social Chair, Outreach Chair   9/2021-Present
Exhibited artwork in Utah Arts Alliance Illuminate Festival and ongoing Dreamscapes Exhibition, SLC, Utah   10/2018-5/2019

Publications

Justina Bonaventura, Kellys Morara, Rhea Carlson, Courtney Comrie, Noelle Daigle, Elizabeth Hutchinson and Travis W. Sawyer (2022) Backscattering Mueller Matrix polarimetry on whole brain specimens shows promise for minimally invasive mapping of microstructural orientation features. Front. Photonics 3:1034739. doi: 10.3389/fphot.2022.1034739

Justina Bonaventura, Thomas Knapp, John Koshel, and Travis Sawyer "Smartphone spectroscopy for melanoma detection", Proc. SPIE 11950, Optics and Biophotonics in Low-Resource Settings VIII, 1195004 (2 March 2022); https://doi.org/10.1117/12.2608867

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Patents

UA21-241 Advanced Spectroscopy Using A Camera Of A Personal Device- Provisional

UA21-242 Self-Calibrating Spectrometer With Adjustable Spectral Resolution and Spectral Range- Provisional