Ariel Mundo

Graduate Research Assistant
Department of Biomedical Engineering · University of Arkansas · Fayetteville, AR
aimundo@uark.edu +1 479 800 8714 aimundo aimundo.rbind.io | *Updated:* Dec. 7, 2021

Research Interests

My research interests lie at the intersection of open science, computational tools, and Statistics in order to better understand biological processes. My PhD started by developing optical tools to study cancer progression, but evolved in a more Statistics-centered approach to analyze biological data. I have experience with R,

During my postdoctoral training, I expect to refine my computational and Statistical skills while working in a collaborative environment. # Education

University of Arkansas, PhD. Biomedical Engineering — Expected summer 2022

Universidad Rafael Landivar (Guatemala), B.S. Chemical Engineering (*cum laude*) — 2009

Research Experience

University of Arkansas

Graduate Research Assistant (University of Arkansas, Fayetteville, AR) — 2017-Present

Design and execute experiments in an animal model of colon cancer using optics and molecular biology to longitudinally quantify changes in perfusion and gene expression in response to therapy. Implement Statistical semi-parametric models (generalized additive models) to analyze longitudinal data.

Other Relevant Experience

Universidad Rafael Landivar

Teaching Assistant Professor — 2016-2017

Professor of Chemistry at the Environmental and Agricultural Sciences Department
Prepared lectures, supervised labs, mentored students, wrote lab manuals

Adjunct Professor — 2013-2017

Taught Introductory Chemistry in the Engineering, Environmental and Agricultural, and Health Sciences Departments

Lacteos Balcanicos Glad

Assistant Plant Engineer — 2012

In charge of the production of the main product (yogurt, ≈ 3000 L per week)

Publications

Journal Articles

Mundo, Ariel I., Timothy J. Muldoon. "Longitudinal study of metronomic and maximum-tolerated dose strategies reveals different molecular signatures in response to treatment in a primary model of colorectal cancer". (*In progress, expected date of publication Spring 2022*). In this paper, we use a combination of optics (spectroscopy), molecular biology (qPCR), and immunohistochemistry to examine the longitudinal changes caused by different chemotherapeutic dosing strategies, in order to explore the biology of tumor response in a primary model of colorectal cancer.

Mundo, Ariel I., John R. Tipton, and Timothy J. Muldoon. "Using generalized additive models to analyze biomedical non-linear longitudinal data." *bioRxiv* (2021). https://doi.org/10.1101/2021.06.10.447970 (This preprint is under revision in *Statistics in Medicine*)

Mundo, Ariel I., Gage J. Greening, Michael J. Fahr, Lawrence N. Hale, Elizabeth A. Bullard, Narasimhan Rajaram, and Timothy J. Muldoon. "Diffuse reflectance spectroscopy to monitor murine colorectal tumor progression and therapeutic response." *Journal of Biomedical Optics* (2020). https://doi.org/10.1117/1.JBO.25.3.035002

Conference Presentations

Mundo, Ariel I. "Why we need a better understanding of Statistics to bring reproducibility to biomedical research". Toronto Workshop on Reproducibility, University of Toronto, February 2022. *Accepted*. In this talk I present how biomedical research still struggles with reproducibility, and why I believe we need a "statistical rethinking" on the field in order to have reproducibility as a core component of any future research.

Mundo, Ariel I. "Using generalized additive models for biomedical longitudinal data. *When linear models don't work*". RMedicine 2021 Conference. Recording: https://tinyurl.com/39epnrp6 Repository (slides and data): https://aimundo.rbind.io/talks/gams-biomedical/

Mundo, Ariel I., Abdussaboor Muhammad, and Timothy J. Muldoon. "Optical and molecular longitudinal tracking of primary colorectal murine tumors shows differences in the angiogenic response to maximum-tolerated and metronomic approaches." In Label-free Biomedical Imaging and Sensing (LBIS) 2021, vol. 11655, p. 116551C. *International Society for Optics and Photonics*, 2021. https://doi.org/10.1117/12.2576906

Mundo, Ariel I., Elizabeth Bullard, Kyle P. Quinn, and Timothy J. Muldoon. "Optical spectroscopic and imaging biomarkers of ulcerative colitis disease progression and remission (Conference Presentation)." In Multiscale Imaging and Spectroscopy, vol. 11216, p. 1121605. *International Society for Optics and Photonics*, 2020. https://doi.org/10.1117/12.2543369

Mundo, Ariel I., Gage J. Greening, and Timothy Muldoon. "Characterization of a multimodal endoscopically deployable veterinary spectroscopy and imaging probe to determine therapeutic response in a murine orthotopic tumor model." In Label-free Biomedical Imaging and Sensing (LBIS) 2019, vol. 10890, p. 108901L. *International Society for Optics and Photonics*, 2019.

Awards and Recognition

Fulbright Faculty Development Scholarship 2017-2019

Only two scholarships awarded for that period in the whole country

OMNI Endowed International Scholarship 2020

Granted as a scholar fulfilling the mission of the OMNI Center in Fayetteville

Professional Awareness, Advancement, and Development (PADD) Scholar 2020-2021

Received funding and participated in the PAAD program to supplement my graduate education in persuasive speaking, commercialization, and data science.

Grants

Arkansas Biosciences Institute 2021 seed grant competition 2021

Main author on a proposal submitted with my advisor to examine gene expression and optically derived markers in a mouse model of colorectal cancer ($30,000 in funding). *Proposal scored in the top 2 of all the individual research projects for the cycle*.

Future applications

During my early postdoctoral training I plan to apply for the HHMI Hanna Gray Fellowship

References

Dr. Timothy Muldoon, Associate Professor, Department of Biomedical Engineering, University of Arkansas
tmuldoon@uark.edu

Dr. Christopher Nelson, Assistant Professor, Department of Biomedical Engineering, University of Arkansas
nelsonc@uark.edu

Dr. John R. Tipton, Assistant Professor, Department of Mathematical Sciences, University of Arkansas
jrtipton@uark.edu