

# Ariel Mundo Ortiz

Postdoctoral Fellow

Département de médecine sociale et préventive and CReSP, Université de Montréal

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## Education

University of Arkansas, PhD. Biomedical Engineering

May 2022

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

2009

## Research Experience

Postdoctoral Fellow, Département de médecine sociale et préventive et au centre de recherche en santé publique (Université de Montréal, Montreal, QC) June 2023-Present

Working at the Nasri Lab at the School of Public Health (ESPUM) doing research in infectious disease modelling, including mpox. Duties include writing, editing, and revising academic manuscripts, doing literature searches, collaborating with different research groups, contributing to ongoing grant projects from the lab, writing code to clean and analyze data (in R), and using version control software (Git) for collaborative projects.

Postdoctoral Fellow, Centre de Recherches Mathématiques (Université de Montréal, Montreal, QC)

July 2022-June 2023

Worked at the Nasri Lab at the School of Public Health (ESPUM) doing research in infectious disease modelling (mpox, public health). Duties included writing, editing and revising academic manuscripts, doing literature searches, collaborating with different research groups, and contributing to grant applications from the lab.

Postdoctoral Fellow (University of Arkansas, Fayetteville, AR)

May 2022-July 2022

Worked at the Translational Biophotonics and Imaging Laboratory in the Department of Biomedical Engineering to analyze longitudinal optical and molecular data.

Graduate Research Assistant (University of Arkansas, Fayetteville, AR)

Aug 2017- May 2022

Designed and executed experiments in a mouse model of colon cancer using optics and molecular biology techniques to quantify changes in perfusion and gene expression in response to therapy. Implemented Statistical semi-parametric models (generalized additive models) to analyze longitudinal data.

Developed research questions, collected data, wrote, edited, revised and submitted deliverables that were product of the performed research (academic manuscripts, conference presentations, talks). Writing duties included as well a grant proposal in collaboration with the main supervisor, and PhD dissertation.

Laboratory work included small animal experiments, use of custom optics equipment (spectrometers, fiber-bundle probes), qPCR, white light microscopy, cell culture, DNA extraction and RNA purification.

Additionally, performed teaching assisting duties for two courses (Biomedical Instrumentation, and Design of Biomedical Experiments). In both instances duties included the inventory of laboratory materials, updating laboratory manuals, assisting students during the laboratory experience, grading, and reporting and communicating with Faculty through the duration of the course.

## Other Relevant Experience

### Universidad Rafael Landivar

Teaching Assistant Professor

2016-2017

Professor of Chemistry at the Environmental and Agricultural Sciences Department. Duties included developing lectures, laboratory supervision, student mentoring, updating laboratory manuals to reduce expenses and minimize ecological impact, and communicating with faculty.

Adjunct Professor

2013-2017

Taught Introductory Chemistry in the Engineering, Environmental and Agricultural, and Health Sciences Departments. Duties included developing lectures, laboratory supervision, student mentoring, updating laboratory manuals to reduce expenses and minimize ecological impact, and communicating with faculty.

In charge of the production of the main product (yogurt,  $\approx 3000$  L per week). Duties included personnel supervision, material inventory, production scheduling, quality control reporting.

## Publications

### JOURNAL ARTICLES

**Mundo Ortiz Ariel I.**, Nasri Bouchra. "Socio-demographic determinants of COVID-19 vaccine uptake in Ontario: Exploring differences across the Health Region model". Submitted to *Vaccine* on August of 2023. Preprint available on *medRxiv* <https://doi.org/10.1101/2023.08.04.23293662>.

El-Mousawi Fatima, **Mundo Ortiz Ariel I.**, Berkat Rawda, Nasri Bouchra. "The Impact of Flood Adaptation Measures on Affected Population's Mental Health: A mixed method Scoping Review". Revision requested in *Disaster Medicine and Public Health Preparedness* on September 2023. Preprint available on *medRxiv* <https://doi.org/10.1101/2023.04.27.23289166>

Molla Jeta, Sekkak Idriss, **Mundo Ortiz Ariel I.**, Moyles Iain, Nasri Bouchra. "Mathematical modeling of mpox: a scoping review". *One Health* (2023). <https://doi.org/10.1016/j.onehlt.2023.100540>

**Mundo Ortiz Ariel I.**, Muhammad Abdussaboer, Balza Kerlin, Nelson Christopher E., Muldoon Timothy J. "Longitudinal examination of perfusion and angiogenesis markers in primary colorectal tumors shows distinct signatures for metronomic and maximum-tolerated dose strategies". *Neoplasia* (2022). <https://doi.org/10.1016/j.neo.2022.100825>

**Mundo Ortiz Ariel I.**, Tipton John R., Muldoon Timothy J. "Generalized additive models to analyze non-linear trend sin biomedical longitudinal data using R: Beyond repeated measures ANOVA and Linear Mixed Models." *Statistics in Medicine* (2022). <https://doi.org/10.1002/sim.9505>

**Mundo Ortiz Ariel I.**, Greening Gage, Fahr Michael J., Hale Lawrence N., Bullard Elizabeth, Rajaram Narasimhan, and Muldoon Timothy J. "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>

Greening Gage, **Mundo Ortiz Ariel I.**, Rajaram Narasimhan, Muldoon Timothy J. "Sampling depth of a diffuse re-reflectance spectroscopy probe for in-vivophysiological quantification of murine subcutaneous tumor allografts". *Journal of Biomedical Optics* (2018). <https://doi.org/10.1117/1.JBO.23.8.085006>

### CONFERENCE PRESENTATIONS

**Mundo Ortiz, Ariel I.** "Reproducible papers in the life sciences using R". CANSSI Statistical Software Conference. November 2022. Recording: <https://www.youtube.com/watch?v=4yRAR9fS3pg>

**Mundo Ortiz, Ariel I.** "Statistics and Reproducibility in Biomedical Research". 2022 Toronto Workshop on Reproducibility. Toronto, ON. February 2022. Recording: <https://www.youtube.com/watch?v=Fvvp20X5xwA>

**Mundo Ortiz, Ariel I.**, Muldoon, Timothy J. "Longitudinal optical and molecular quantification provides insight into the effect of different dosing strategies in colorectal cancer". 2022 Biophotonics Congress: Biomedical Optics, Fort Lauderdale, FL, USA, April 2022.

**Mundo Ortiz, Ariel I.** "Statistics and Reproducibility in Biomedical Research: Why we need both". Toronto Workshop on Reproducibility, University of Toronto, February 2022. Recording available [here](#).

**Mundo Ortiz, Ariel I.** "Using generalized additive models for biomedical longitudinal data. *When linear models don't work*". RMedicine 2021 Conference. Recording: <https://tinyurl.com/39epnnp6> Repository (slides and data): <https://aimundo.rbind.io/talks/gams-biomedical/>

**Mundo Ortiz, Ariel I.**, Abdussaboer 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 Ortiz, 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 Ortiz, 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

*Fields Institute: Mathematics for Public Health Festival (MfPHFest)* October 2022

Received funding to attend the MfPHFest conference and present postdoctoral work done in the field of Statistics. (CAD 1,500)

*Centre de recherches mathématiques (CRM) MfPH-CRM Postdoctoral Fellowship* July 2022

Received postdoctoral fellowship for one year to analyze public health and behavioral data (CAD 50,000)

*BME Rising Scholar* June 2022

Selected by the committee of the BME Scholars Program at Washington University in St. Louis to receive mentorship about pathways and professional success in academic careers. Award included paid travel, conference attendance and honorarium.

*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 (USD 1,500).

*OMNI Endowed International Scholarship* 2020

Granted as a scholar fulfilling the mission of the OMNI Center in Fayetteville (USD 500)

*Fulbright Faculty Development Scholarship* 2017-2019

Scholarship covered all costs of my PhD for the first two years. Only two scholarships awarded for that period in the whole country. (USD 78,000)

## Grants

*Canada Institutes of Health Research (CIHR)* 2023

Co-investigator in the grant “epidemiological modelling of behavioural impact on mpox mitigation strategies” lead by Prof. Nasri from Université de Montréal. Involved in the writing of the grant proposal, performing literature review, communicating with team members, and revising the final grant draft. Funding secured: CAD 412,000. The proposal was in the 50% rank within the competition. Record of the grant can be found in the [CIHR funding decision database](#).

*Arkansas Biosciences Institute 2021 seed grant competition* 2021

Main author on a proposal co-submitted with Dr. Timothy Muldoon to examine gene expression and optically derived markers in a mouse model of colorectal cancer. Funding secured: USD 30,000. The proposal scored in the top 2 of all the individual research projects for the cycle.

## Languages

Spanish: Native speaker

English: Full professional competency

French: Intermediate (currently niveau 5 au Centre de Services Scolaires de Montréal)