

Osita E. Onyejekwe

Assistant Teaching Professor: Department of Computer Science: University of Colorado Boulder

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Education

- **Florida Institute of Technology** **Melbourne, FL**
PH.D., Operations Research 2012–2017
- **Florida Institute of Technology** **Melbourne, FL**
M.Sc., Applied Mathematics 2010–2012
- **Northern Arizona University** **Flagstaff, AZ**
B.Sc., Environmental Engineering 2006–2009
- **New England College** **Henniker, NH**
B.A., Mathematics 2004–2006

Academic Appointment

- **University of Colorado Boulder** **Boulder, CO**
Assistant Teaching Professor, Department of Computer Science August 2022 – Present
- **University of Colorado Boulder** **Boulder, CO**
Admissions committee member: Applied Math Masters Program August 2020 – August 2022
- **University of Colorado Boulder** **Boulder, CO**
Assistant Teaching Professor, Department of Applied Mathematics January 2020 – August 2022
- **University of Colorado Denver** **Denver, CO**
Lecturer, Department of Mathematical and Statistical Sciences August 2019 – August 2020
- **University of Colorado Boulder** **Boulder, CO**
Lecturer, Department of Mathematics August 2018 – December 2019
- **Front Range Community College** **Westminster, CO**
Adjunct Instructor, Mathematics Department February 2018 – August 2018
- **Burgio Enterprises, Ltd** **Palm Bay, FL**
Research Associate (burgiomedicalresearch.com) May 2017 – August 2017

Refereed Journal Publications

- Kachouie, N.N.; **Onyejekwe, O.E.** (2020). Climate Change Study via the Centennial Trend of Climate Factors. *Hydrology* 2020, 7, 25. <https://doi.org/10.3390/hydrology7020025>
- Burgio M, **Onyejekwe OE** (2018). Diagnoses of Young Trauma Victims with Disc Desiccation a Quadruple-Blind Methodology. *J Bioequiv Availab* 10: 011-013. Doi: 10.4172/jbb.1000368
- Burgio M, **Onyejekwe OE** (2017). Degenerative Disc Disease in the Active Military Special Forces and the Financial Benefits of Early Detection Using a Quadruple Blind-Study. *J Bioequiv Availab* 10: 004-006. Doi: 10.4172/jbb.1000366
- **Onyejekwe, Osita** Holman, Bryan Kachouie, Nezamoddin. (2017). Multivariate models for predicting glacier termini. *Environmental Earth Sciences*. 76. 10.1007/s12665-017-7135-2.

Work In Progress

- **Research Title:** Prediction of Extreme Precipitation Events in Mauna Loa, Hawaii using multivariate models
Journal : Nature (In Review)
- **Research Title:** Ensemble Bandwidth Optimization for Denoising
Journal : IEEE Transactions on Signal Processing

Courses Taught

- **CSCI 5622 - Machine Learning**

Primary Instructor: UCB - Spring 2023

Trains students to build computer systems that learn from experience. Includes the three main subfields: supervised learning, reinforcement learning and unsupervised learning. Emphasizes practical and theoretical understanding of the most widely used algorithms (neural networks, decision trees, support vector machines, Q-learning). Covers connections to data mining and statistical modeling. A strong foundation in probability, statistics, multivariate calculus, and linear algebra is highly recommended..

- **INFO 4652-5652 - Statistical Programming in R**

Primary Instructor: UCB - Fall 2022

This intensive course covers foundational data science tools and techniques in the R programming language, including acquiring, cleaning, exploring, and analyzing data, programming, and conducting reproducible research. The course will emphasize the use of data management best practices such as the tidyverse toolkit in R. Same as INFO 5652.

- **STAT 5010 - Statistical Methods and Applications II**

Primary Instructor: UCB - Fall 2022 / Spring 2023

Expands upon statistical techniques introduced in STAT 4000. Topics include modern regression analysis, analysis of variance (ANOVA), experimental design, nonparametric methods, and an introduction to Bayesian data analysis. Considerable emphasis on application in the R programming language. Same as STAT 4010..

- **STAT 5600 - Methods in Statistical Learning**

Primary Instructor: UCB - Fall 2022

Provides an introduction to methods in the field of statistical learning. Topics include a review of multiple regression, assessing model accuracy, classification, resampling methods, model selection and regularization, nonlinear regression, tree-based methods, support vector machines and unsupervised learning. Involves hands-on data analysis using the R programming language..

- **STAT 2600 - Introduction to Data Science**

Primary Instructor: UCB - Spring 2021/ Fall 2021/ Spring 2022

Introduces students to importing, tidying, exploring, visualizing, summarizing, and modeling data and then communicating the results of these analyses to answer relevant questions and make decisions. Students will learn how to program in R using reproducible workflows. During weekly lab sessions students will collaborate with their teammates to pose and answer questions using real-world data-sets.

- **STAT 3400 - Applied Regression**

Primary Instructor: UCB - Spring 2020 / Fall 2020 / Spring 2021/ Fall 2021/ Spring 2022

Introduces methods, theory, and applications of linear statistical models, covering topics such as estimation, residual diagnostics, goodness of fit, transformations, and various strategies for variable selection and model comparison. Examples will be demonstrated using statistical programming language R.

- **APPM 1360 - Calculus 2 for Engineers**

Primary Instructor: UCB - Spring 2020 / Fall 2020/ Fall 2021

Focuses on applications of the definite integral, methods of integration, improper integrals, Taylor's theorem, and infinite series.

- **APPM 2360 - Introduction to Differential Equations with Linear Algebra**

Primary Instructor: UCB - Summer 2020/ Summer 2021/ Summer 2022

Introduces ordinary differential equations, systems of linear equations, matrices, determinants, vector spaces, linear transformations, and systems of linear differential equations.

- **MATH 1012 - Quantitative Reasoning and Mathematical Skills**

Primary Instructor: UCB - Fall 2018

Promotes mathematical literacy among liberal arts students. Teaches basic mathematics, logic, and problem-solving skills in the context of higher level mathematics, science, technology, and/or society. This is not a traditional math class, but is designed to stimulate interest in and appreciation of mathematics and quantitative reasoning as valuable tools for comprehending the world in which we live.

- **MATH 2300 - Calculus 2**

Primary Instructor: UCB - Fall 2019

Topics include transcendental functions, methods of integration, polar coordinates, differential equations, improper integrals, infinite sequences and series, Taylor polynomials and Taylor series.

- **MATH 2510 - Introduction to Statistics**

Primary Instructor: UCB - Fall 2018 / Spring 2019 / Summer 2019 / Fall 2019

Elementary statistical measures. Introduces statistical distributions, statistical inference, hypothesis testing and linear regression. Department enforced prerequisite: two years of high school algebra.

- **MATH 3195 - Linear Algebra/Differential Equations**

Primary Instructor: UCD - Summer 2020

Presents the essential ideas and methods of linear algebra and differential equations, emphasizing the connections between and the applications of both subjects. The course is designed for students in the sciences and engineering.

- **MATH 3430 - Ordinary Differential Equations**

Primary Instructor: UCB - Spring 2019

Involves an elementary systematic introduction to first-order scalar differential equations, n th order linear differential equations, and n -dimensional linear systems of first-order differential equations. Additional topics are chosen from equations with regular singular points, Laplace transforms, phase plane techniques, basic existence and uniqueness and numerical solutions.

- **APPM 4840 - Reading and Research in Applied Mathematics**

Primary Instructor: UCB - Summer 2020/ Fall 2020

Introduces undergraduate students to the research foci of the Department of Applied Mathematics.

- **MAT 135 - Introduction to Statistics**

Primary Instructor: FRCC - Spring 2018 / Summer 2018

Introduces descriptive and inferential statistics, with an emphasis on critical thinking and statistical literacy. Topics include methods of data collection, presentation and summarization, introduction to probability concepts and distributions, and statistical inference of one and two populations. This course uses real world data to illustrate applications of a practical nature

- **MAT 202 - Calculus 2**

Primary Instructor: FRCC - Summer 2018

Continues the study of single variable calculus which will include techniques of integration, polar coordinates, analytic geometry, improper integrals, and infinite series.

Graduate Research

- **Zack Jensen, (MS Applied Mathematics: UCB)** Graduate Research study pertaining to the use of the Southern Oscillation Index (SOI) as a way of predicting extreme weather patterns in Mauna loa, Hawaii using R Programming. Fall 2021
- **Ziyu Li, (MS Applied Mathematics: UCB)** Graduate Research study pertaining to ocean circulation patterns and the Coriolis effect due to Greenhouse Gas Variables. Fall 2021, Spring 2022.
- **Laurette Hamlin, (MS Applied Mathematics: UCB)** Graduate Research study pertaining to machine learning algorithms to optimize and verify predictive climate models using multivariate linear regression with interaction. Fall 2020, Spring 2021, Fall 2021, Spring 2022.

Undergraduate Research

- **Abigal Moonam, Undergraduate Research Opportunities Program (UROP)** Mentor and advisor for Abigail Moonan's 2022 Summer UROP pertaining to the application of the Fresnel Water Treatment System (FWTS) to Low-Income Rural Communities. I advised her during the design phase of the water filtration system. Summer 2022
- **Abigail Moonan, Undergraduate Independent Study: UCB (APPM 4840).** "Prediction of Extreme Precipitation Events in Mauna Loa, Hawaii using Multivariate Models. Summer 2020, Fall 2020.
- **Adam Hoerger, Research Project: UCB (STAT 3400).** "Prediction of Extreme Precipitation Events in Mauna Loa, Hawaii using Multivariate Models. Spring 2020.
- **Armen Davis, Research Project: UCB (STAT 3400).** "Prediction of Extreme Precipitation Events in Mauna Loa, Hawaii . Spring 2020
- **Srihari Srinivasan, Research Project: UCB (STAT 2600).** "Predicting the price of Bitcoin", Fall 2022.
- **Luna Kostic, Research Project: UCB (STAT 2600).** "Predicting the price of Bitcoin", Fall 2022.
- **Cole Campagnolo, Research Project: UCB (STAT 2600).** "Predicting the price of Bitcoin", Fall 2022.

Professional Service Activities

- **Admissions Committee member of the Masters of Science in Data Science (MSDS) Program.** Spring 2023-Present. UCB.
- **Faculty Evaluation Subcommittee of the APPM (Applied Mathematics) Undergraduate Committee: Spring 2022.** Work in this committee includes but is not limited to re-structuring the manner in which instructors under the teaching track are evaluated. Goal of this committee is to tailor instructor evaluations to reflect a teaching philosophy based on self reflection and goal orientation. UCB
- **Admissions Committee member of the Applied Mathematics Masters Degree Program.** Spring 2020-Spring 2022. UCB.
- **SIAM Chapter for Data Science (Applied Mathematics).** Began assembling speakers to present their industry experience to undergraduate (and/or graduate) students focusing in engineering or the mathematical sciences. Program was left in hiatus due to COVID-19 pandemic. UCB.
- **Undergraduate Student Mentor: Summer 2020/Fall 2020.** Mentored undergraduate aerospace engineering student Abigail Moonan in APPM 4840 for two semesters. She also took two more courses under me, namely, MATH 2510 and APPM 2360. We are currently collaborating on a paper I will release for peer review this year focusing on extreme climate weather patterns in Mauna Loa Hawaii. UCB.
- **Course Coordinator: APPM 1360/Calculus 2: UCB: Summer 2021, Summer 2022.**
 - Duties included posting on Canvas for all sections with news feedback, gradebook, and contents. Has integrated MyMathlab online homeworks with Canvas, writing exams and quizzes with solutions using LATEX. Installing common CANVAS page for all course sections. UCB.
 - Weekly meetings with undergraduate learning assistants and graduate teaching assistants. Also held separate meetings with the other course instructor. UCB.
- **Admitted Students Day: Spring 2022.** My colleague and Associate Department Chair Anne Dougherty and I attended admitted students' day to represent information about our Statistics and Data Science BA degree to interested and admitted students. UCB.
- **Admitted Students Day: Spring 2021.** My colleagues Brian Zaharatos, Eric Vance and I attended admitted students' day to represent information about our Statistics and Data Science BA degree to interested and admitted students. UCB.
- **New Course Development: STAT 5005.** Introduction to Data Science course. Students would then choose either STAT 5000 or STAT 5005 as a first course for the Masters in Applied Mathematics/Statistics Data Science core redesign program (both followed by STAT 5010). UCB.
- **College of Arts and Sciences Welcome Fair: Fall 2021.** My colleague Brian Zaharatos and I represented the BA in Statistics and Data Science at the welcome fair on Friday 08/20/2021. UCB.

Conferences

- **UC Berkely: 2020 National Workshop on Data Science Education.** I was selected and partook in the 2020 National Workshop on Data Science Education at UC Berkley. This conference was organized by UC Berkeley's Division of Computing, Data Science, and Society with support from Microsoft and the West Big Data Innovation Hub and covered materials pertaining to Jupyter infrastructure, Data 8 teaching guides, Data 100, and Data Science Modules and Connectors.
- **Washington DC: 2022 R studio conference.** I was selected and partook in the 2022 National Workshop on R studio. This conference was organized by R-studio and contained an array of coding workshops and presentations pertaining to data science/machine learning algorithms, software improvements and employment opportunities.

Grant Proposals

- **Spring 2022: Undergraduate Research Opportunities Program (UROP)**
Mentor for Abigail Moonan's 2022 Summer UROP pertaining to the application of the Fresnel Water Treatment System (FWTS) to Low-Income Rural Communities. Successfully helped Abigail compose the grant proposal in the amount of \$3,000, which will be used to fund her research.

Notable Projects

- **Burgio Medical Research** *'A New Research Methodology'*
 - As a research associate, I contributed to the company's first clinical research findings on reducing disc Desiccation in young trauma victims. Our work involved the use of an operating system and computerized software for a Quadruple-Blinded Research. We did another pilot study involving Degenerative Disc Disease in the Active Military Special Forces and the financial benefits of early detection using a quadruple blind-study. Both of these studies were published in the Journal of Bioequivalence and Bioavailability (JBB).