

RISING RESEARCHERS

Machine Learning for Health Equity Research Intensive Camp

2 COLLEGE CREDITS - PARTNERS WITH
UNIVERSITY OF MASSACHUSETTS AMHERST

UMass
Amherst

WWW.RISINGRESEARCHERS.COM



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Machine Learning for Health Equity Research Intensive Camp
Winter 2023

Dates: January 9 – March 3, 2023

Schedule: Mon/Tues/Wed 7pm - 8:30pm ET/4pm - 5:30pm PT (live lessons), office hours + Q&A on Thursday and Friday evenings & by appointment.

Academic Credit: 2 College Credits + Certification of Completion issued by the University of Massachusetts Amherst (UMass)

Student Profile: Rising 9th – 12th grade. International students are welcome to apply.

Course Prerequisites: This course has no course prerequisites, but requires students to be committed to attend classes, learn, fully participate in the class experiments and discussions, and be respectful to each other.

Format: Online with live (synchronous) sessions + offline (asynchronous) assignments.

Cost: \$4,900.

Payment Details: A 50% deposit is required to secure a student's spot, with the remaining balance due 60 days prior to the program start date. The deposit is non-refundable.

Application Deadline: December 19th 2022, or when all spots have been filled (rolling admissions). Space is limited.

Class materials: E-Textbook, YouTube videos, and research papers



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COURSE OVERVIEW

Welcome to our winter Research Intensives Course where we will explore the use of computing and statistical tools for health equity research. This is an 8-week online winter research class with four learning units organized by themes. The course is designed to provide you with an introduction to statistical and machine learning techniques for understanding, finding, and explaining health equity gaps in electronic health records data. Through lectures, hands-on experiments, public electronic health records databases, basic machine learning algorithms, basic statistical skills and tools, class and small group discussions, and oral presentations, we will delve into the computational world with emphasis on human diseases like cardiovascular disease and health equity issues. The hands-on patient cohort selection and machine learning modeling will emphasize the proper use of the scientific method to answer a research question, develop a hypothesis, carry out computational tasks, make observations, analyze, interpret and communicate results.

LEARNING UNITS/SECTIONS

1. Introduction to the scientific method of research; with emphasis on hypothesis generation and testing, using statistical tests.
2. Introduction to statistical sampling and patient selection criteria.
3. Introduction to social determinants of health (SDoH) and their importance in patient care and health outcomes.
4. Introduction to machine learning modeling tools to detect and “explain” health equity gaps and their association with social determinants of health.



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COURSE GOALS

- Exploration of general machine learning for the healthcare research field and career opportunities in the field.
- Construction of a unique research question and hypothesis related to the health equity gaps in cardiovascular diseases.
- Development of a research strategy including the definition and justification of patient inclusion criteria, as well as study hypotheses.
- Understanding the data processing pipeline for machine learning models including exploration of computing tools and techniques to extract data from large electronic health record databases.
- Explanation of equity gaps in patient care using statistical tests and machine learning algorithms.
- Investigation of existing literature to build reference and resource lists.
- Final research poster presentation.
- Creation of research report for publication submission.



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UPON SUCCESSFUL COMPLETION OF THIS COURSE, STUDENTS SHOULD BE ABLE TO DO THE FOLLOWING:

- Describe and demonstrate the ability to use the scientific method.
- Demonstrate an understanding of research design including; patient selection criteria, generation and justification of hypotheses, and choosing appropriate hypothesis testing tools.
- Develop fundamental knowledge on health equity and machine learning and career opportunities in the area. Furthermore, understand what SDoH are and their influence in patient care and outcomes.
- Develop data preprocessing, extraction and curation skills for application in public health records data.
- Use machine learning tools to model and interpret the association between the SDoH and health outcomes.
- Demonstrate ability to record and interpret data from experiments.
- Demonstrate ability to run multiple experiments to evaluate different hypotheses.
- Demonstrate the ability to communicate research and results.

Course Credit and Grading:

- Each student receives a grade and feedback throughout the course; however, the transcript will say pass/fail.
- Students will receive 2 U.S. College Credits and an official transcript from UMass.

****It is at the discretion of the attending college to accept the college credits. The attending college will determine how the credits will be applied and will have their own requirements. UMass and Rising Researchers cannot guarantee the credits will transfer to every college. Contact your attending college to see if the credits will transfer.**



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Meet the Professor: Purity Mugambi

- PURITY MUGAMBI IS A PH.D. CANDIDATE IN COMPUTER SCIENCE AT THE UNIVERSITY OF MASSACHUSETTS - AMHERST
- HER RESEARCH FOCUSES ON DEVELOPING MACHINE LEARNING TOOLS TO ENHANCE AND IMPROVE HEALTH EQUITY.
- PRIOR TO BEGINNING HER PH.D. PROGRAM AT UMASS, PURITY WORKED AS A RESEARCH SOFTWARE ENGINEER AT IBM RESEARCH AFRICA, NAIROBI'S OFFICE.



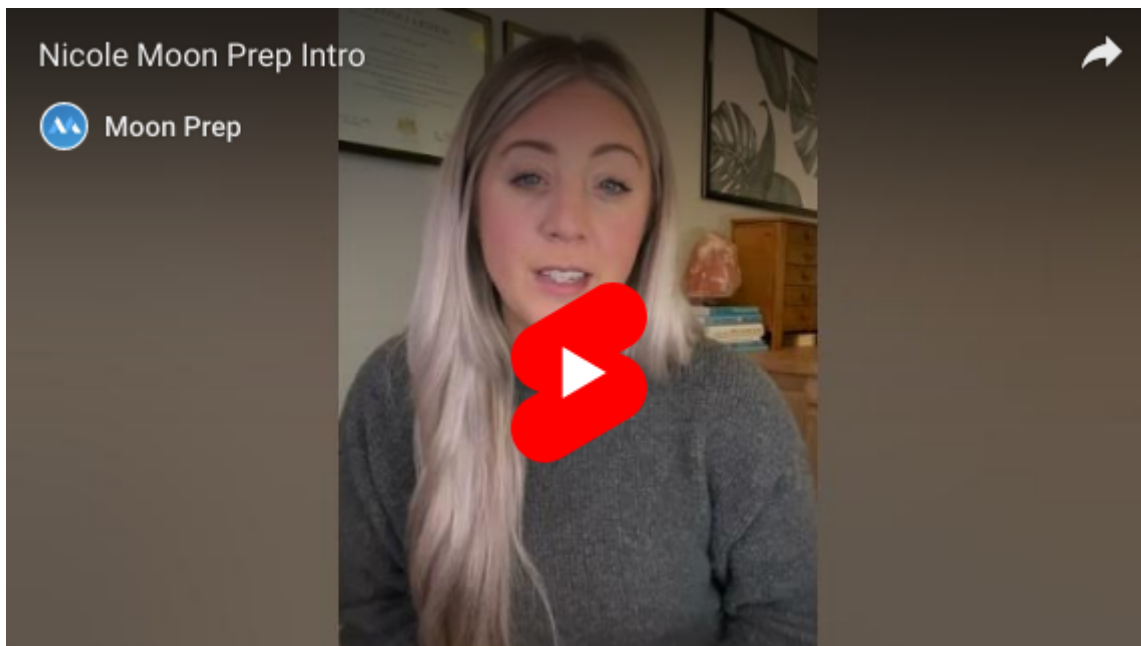
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Meet the Counselor: Nicole Cooksey

- NICOLE IS A LICENSED PROFESSIONAL SCHOOL COUNSELOR WITH A MASTER'S DEGREE IN BOTH SCHOOL COUNSELING AND HIGHER EDUCATION LEADERSHIP AND POLICY STUDIES.
- NICOLE WILL WORK AS A SUPPLEMENTAL COACH DURING THE RISING RESEARCHERS PROGRAM INTRODUCING STUDENTS TO THE COLLEGE ADMISSIONS PROCESS AND ITS NECESSARY PREPARATIONS.
- WORKING WITH NICOLE, STUDENTS WILL LEARN HOW TO LEVERAGE THIS UNIQUE RESEARCH EXPERIENCE TO GIVE THEMSELVES AN EDGE IN THE COLLEGE ADMISSIONS PROCESS.



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