



Department of Mathematics

Fall 2022

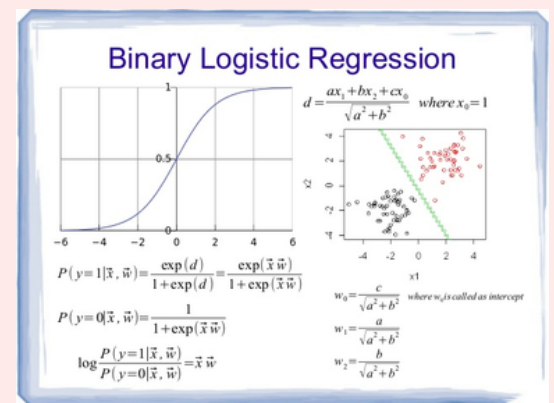
Colloquium Series

# Binary Logistic Regression and the Maximum Likelihood Estimator

With Dr. Joseph Carroll, PhD and MD

Several generalized linear regression models (GLMs), including (binary) logistic regression, are “solved” by finding a unique maximum likelihood estimator (MLE). The applied statistician usually assumes that the MLE exists and plugs the data from their study into a computer program which locates it by successive approximations, and that usually works. However, the question of its existence and uniqueness lies not in the realm of statistics, but in that of the calculus of several real variables. We shall prove a necessary and sufficient condition for the existence of a unique MLE for logistic regression and, if there is time, show its equivalence to a more common criterion, a separation of the data.

Some knowledge of statistics will be helpful, but not necessary. Knowledge of basic vector calculus and linear algebra over  $\mathbb{R}$ , including inner products, will be necessary for a full understanding of the content.



Thursday, October 6

4 pm

BSS 166

FOR MORE INFO GO TO  
[HTTPS://MATH.HUMBOLDT.EDU/GET-INVOLVED/MATHEMATICS-COLLOQUIUM](https://math.humboldt.edu/get-involved/mathematics-colloquium)

WE CORDIALLY INVITE YOU TO THE PRE-COLLOQUIUM TEA ON THE THIRD FLOOR

OF BSS AT 3:30 PM