GVPT 729A **Professor William Reed (wlr@umd)**
Fall 2018 **Office Hours: By appointment**
Location: LEF 0229 **TA: Sebastian Vallejo(svallej1@umd)**

Special Topics in Quantitative Political Analysis; Advanced Maximum Likelihood Estimation

Introduction
This seminar is a general introduction to Maximum Likelihood. Students learn to estimate choice, count, and duration models. Emphasis will be placed in understanding the relationship between political processes, theories, and statistical models.

Class Format
The lectures will be split into three parts. We will begin with theory. Next we discuss implementation in the R statistical package. Finally, each lecture will conclude with applications (Students will lead the discussion of applications; more on this when we meet.). Students should read all materials before class and active participation is required. Students will have regular exercises to be completed at home (These exercises may be completed alone or in groups; more on this when we meet). These homework assignments are due on Thursday at the beginning of class. There are two in class exams and a research report that will be presented on the last day of class. The research report should be a replication study (More on this when we meet).

Software
Most assignments will require you to use R and R-Stuido (Google "R statistics" and "Rstudio"). These are free and can be downloaded and installed on your personal computer. These programs are also installed on the lab computers.

Learning Outcomes:
• Student will master basic Maximum Likelihood concepts.
• Students will write their own maximization functions, estimate advance ML models, and produce a final research report.
• Students will be able to understand different advanced ML models should be used to explain different political phenomena.

Campus Policies
It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences

- Grades and appeals
- Copyright and intellectual property

Please visit www.ugst.umd.edu/courserelatedpolicies.html for the Office of Undergraduate Studies' full list of campus-wide policies and follow up with me if you have questions.

Grading
10% Participation
20% Exam I
20% Exam II
10% Student Led Discussion
10% Weekly Exercises
30% Final Paper

Books
Each week we will read discussion some articles that apply the methods under discussion. For general reference I recommend (not require) students to buy:

- Long J. Scott. 2006. Regression Models for Categorical Dependent Variables Using Stata. Second Edition. Stata Press.
- King, Gary. 1998. *Unifying Political Methodology.* University of Michigan Press.

Suggested R readings:

- Monogan, James E: Political Analysis using R, 1st Edition (2015)
- basic introduction to R (ebook)

http://www.r-tutor.com/r-introduction
Other resources :

- Quick R: reference manual for basic R commands
  - http://www.statmethods.net/index.html
- R-bloggers: Regular blog posts with code and write-ups of new packages and methods
  - https://www.r-bloggers.com/
- Companion site for Hadley Wickham's advanced R textbook.
  - http://adv-r.had.co.nz/

Schedule

September 6: *Introduction: Basic Math, Estimators, R*

- A (very) short introduction to R
  - https://cran.r-project.org/doc/contrib/Torfs+Brauer-Short-R-Intro.pdf

- R Studio Tutorial
    - http://web.cs.ucla.edu/~gulzar/rstudio/basic-tutorial.html

Normal Distribution. OLS. Mu and Sigma. Gauss-Marcov assumptions. Normality violations. Using R and R-Stuido.

September 13: *The Method of Maximum Likelihood*

Types of distributions. Bernoulli, Binomial, Poisson, and Normal distributions. Finding the MLE, visualizing your parameters, dependent and independent variables.

September 20: *Probit, Logit, Cloglog, Scobit*

- Scobit: An Alternative Estimator to Logit and Probit Jonathan Nagler *American Journal of Political Science* Vol. 38, No. 1 (Feb., 1994), pp. 230-255

September 27: Quantities of Interest

- King, Gary; Michael Tomz; and Jason Wittenberg. Making the Most of Statistical Analyses: Improving Interpretation and Presentation, *American Journal of Political Science*, Vol. 44, No. 2 (April, 2000): 341-355.
- Hanmer, Michael J., and Kerem Ozan Kalkan. "Behind the curve: Clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models." *American Journal of Political Science* 57.1 (2013): 263-277.

October 4: Exam I

October 11: *Models for Ordered Dependent Variables*

- Slantchev, Branislav L. "How initiators end their wars: The duration of warfare and the terms of peace." *American Journal of Political Science* 48.4 (2004): 813-829.

October 18: Models for Self-Selection and Decomposition

- Reed, William. "A unified statistical model of conflict onset and escalation." *American Journal of Political Science* (2000): 84-93.

October 25: *Models for Nominal Dependent Variables*

- Clark, David H. "Trading butter for guns: Domestic imperatives for foreign policy substitution." *Journal of Conflict Resolution*45.5 (2001): 636-660.

November 1: Poisson and Poisson models with extra variation.

- Gary King and Curtis S Signorino. 1996. "The Generalization in the Generalized Event Count Model, With Comments on Achen, Amato, and Londregan." Political Analysis, 6: 225–252.

November 8: Exam II

November 15: Class will be taught by Prof. Mike Hanmer (Thank you, Mike!).

- Hanmer, Michael J, and Kerem Ozan Kalkan. 2013. "Behind the curve: Clarifying the best approach to calculating predicted probabilities and marginal effects from limited dependent variable models." American Journal of Political Science no. 57 (1):263-277.
- Herron, Michael C. 2000. "Postestimation Uncertainty in Limited Dependent Variable Models." Political Analysis, 8:83-98.
- Ai, Chunrong, and Edward C. Norton. 2003. "Interaction Terms in Logit and Probit Models." Economics Letters, 80:123-129.

November 29: Hazard Models and other approaches to Time-Series data.

- Beck, Nathaniel, Jonathan N. Katz, and Richard Tucker. "Taking time seriously: Time-series-cross-section analysis with a binary dependent variable." *American Journal of Political Science* 42.4 (1998): 1260-1288.

December 6: Student Presentations