

# FIELD EXPERIMENTS SUMMER SCHOOL SYLLABUS 2019

July 8, 2018 - July 12, 2019 > European University Institute

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**Objectives:** Randomized field experiments are deployed across the social sciences to answer well-posed theoretical questions and to generate new information from which to build new theories of social interaction and behavior. Experiments are attractive because they enable the researcher to (mostly) ground statistical and causal inferences in features of the research design rather than assumptions about the world.

This five-day course will cover the design and analysis of many experimental designs, using the textbook by Gerber and Green (2012) as our main guide. Strong emphasis will be placed on developing practical skills for real research scenarios. Given resources, how should subjects be assigned to conditions? How many treatment arms should we include? How do we plan to analyze the resulting data?

Each day will be broken up into three to four sessions that will provide a mix of statistical theory, practical tips for implementing field experiments, and computer practice. Each evening, students will complete short problem sets that will reinforce the day's material. The last day will be focused on workshopping students' own field experimental designs.

**Prerequisites:** The only pre-requisite is any course covering (at any level of detail) linear regression. We will build the statistical foundations for randomized experiments from the ground up, so there is relatively little assumed knowledge. If you have conducted a hypothesis test of any kind, you probably have the requisite skills. For those with a deeper statistical background, there will be opportunities for exploration of more advanced topics as well.

**Course Pages:** Our course site is set up at <https://github.com/acoppock/EFESS2019>. Data, code, and problem sets will be distributed via the github. Readings will be distributed by email.

**Required Textbook:** Gerber, Alan and Donald P. Green *Field Experiments: Design, Analysis, and Interpretation*, W.W. Norton, 2012. If possible, please obtain a copy before arriving in Florence.

## **Recommended Texts on Field Experiments:**

Glennerster, Rachel and Kudzai Takavarasha. *Running Randomized Evaluations: A Practical Guide*, Princeton University Press. 2013.

John, Peter. *Field Experiments in Political Science and Public Policy: Practical Lessons in Design and Delivery*, Routledge, 2017.

**Software:** Students will have a choice between using STATA or R. If you are unfamiliar with both languages, we would suggest using R, as it is free and open source. All analyses that we will consider are easily done in either language.

## Monday, July 8th

Readings in Gerber and Green: Chapters 1 through 3.

### Session 1: 10:00 - 11:30 (Led by Florian, Eline and Alex)

- Welcome and introductions

### Session 2: 11:30 - 12:30 (Led by Eline)

- Motivating examples of field experiments
- Paper discussions (tbc)

### Lunch: 12:30 - 13:30

### Session 3: 13:30 - 15:00 (Led by Florian)

- Potential Outcomes Framework
- Three core assumptions
- Difference-in-means estimator of the ATE
- Sampling distribution of the difference-in-means estimator
- Sharp null hypothesis
- Intro to randomization inference

### Coffee Break: 15:00 - 15:30

### Session 3 (continued): 15:30 - 16:30

### Session 4: 16:30 - 17:30 (R session led by Alex, STATA section led by Eline)

- Load in a simulated dataset that includes  $Y(0)$  and  $Y(1)$ .
- Simulate a random assignment
- Generate a sampling distribution

### University Reception 17:30 - 19:00

### Short Practice

- Please turn in Short Practice 1 to alex.coppock@yale.edu by 9am.

## Tuesday, July 9th

Readings in Gerber and Green: Chapter 4.

### Session 1: 9:00 - 10:30 Led by Alex

- General framework: Hypothesis testing via randomization inference

### Coffee Break: 10:30 - 11:00

### Session 2: 11:00 - 12:30 Led by Eline

- Experimental Partnerships
  - Who is responsible for what
  - Scientific goals / Policy goals
  - Preanalysis plans can help
- Failures in the field
  - Breaking symmetry
  - Overpromising and underdelivering
  - Bells and whistles
  - Insignificant results  $\neq$  failure

### Lunch: 12:30 - 13:30

### Session 3: 13:30 - 15:00 Led by Alex

- Use of covariates in an experimental design
  - Blocks
  - Clusters
- Use of covariates in an experimental analysis
  - Adjusting for pre-treatment covariates
  - Avoiding post-treatment bias

### Coffee Break: 15:00 - 15:30

### Session 4: 15:30 - 17:30 (R session led by Florian, STATA section led by Eline)

- Learn to obtain a p-value via randomization inference
- Learn how blocking can tighten a sampling distribution
- Learn how covariate adjustment can tighten a sampling distribution

### Short Practice

- Please turn in Short Practice 2 to alex.coppock@yale.edu by 9am.

## Wednesday, July 10th

- Readings in Gerber and Green: Chapter 9.
- Karpowitz, Monson, and Preece (2017)
- Blair, Cooper, Coppock, and Humphreys (2018)

### Session 1: 9:00 - 10:30 Led by Alex

- Treatment effect heterogeneity
- Treatment-by-covariate interactions
- Treatment-by-treatment interactions
- Dangers of multiple comparisons

### Coffee Break: 10:30 - 11:00

### Session 2: 11:00 - 12:30 Led by Eline

- Replication and Discussion of Karpowitz, Monson and Preece (2017)

### Lunch: 12:30 - 13:30

### Session 3: 13:30 - 15:00 Design Diagnosis (Led by Alex)

### Coffee Break: 15:00 - 15:30

### Session 4: 15:30 - 17:30 (R session led by Florian, STATA section led by Eline)

- How to specify an interaction model

### Short Practice

- Please turn in Short Practice 3 to alex.coppock@yale.edu by 9am.

## Thursday, July 11th

Readings in Gerber and Green: Chapters 5 and 6, skim chapters 7 and 8.

### Session 1: 9:00 - 10:30 Led by Florian

- One- and two-sided non-compliance
- Subject types: Compliers, Always-Takers, Never-Takers, Defiers
- The  $ITT_Y$  and  $ITT_D$
- The CACE

### Coffee Break: 10:30 - 11:00

### Session 2: 11:00 - 12:30 Led by Alex

- Post-Treatment Bias
- Condition on reply (audit experiments)
- Condition on response (attrition)
- Condition on compliance
- Condition on manipulation check

### Lunch: 12:30 - 13:30

### Session 3: 13:30 - 15:00 lead by Eline

- Spillover
- Households and neighbourhoods (Sinclair, McConnell, and Green, 2012)
- Schools (Paluck, Shepherd, and Aronow, 2015)

### Coffee Break: 15:00 - 15:30

### Session 4: 15:30 - 17:00 (R session led by Alex, STATA section led by Eline)

- How to estimate the CACE

### Design Diagnosis

- Please turn in your preliminary Design Diagnosis to alex.coppock@yale.edu by 9am

## **Friday, July 12th**

### **Session 1: 10:00 - 12:30 Led by Eline, Florian and Alex**

- Feedback on experimental designs in small groups

### **Lunch: 12:30 - 13:30**

### **Session 2: 13:30 - 15:00 Led by Alex**

- Power analysis and simulation of designs

### **Coffee Break: 15:00 - 15:30**

### **Session 3: 15:30 - 17:00**

- Each group presents on a few designs what was learned from simulations.