PHP 2510 Principles of Biostatistics & Data Analysis

Week 1: Intros & Motivation

Today's Plan

1

Introductions

Professor Lipman

TAs

2

Course Expectations

Shopping

Syllabus Review

R/RStudio

3

Class Activity

Data Generation

4

Biostatistics in Practice

Article Highlights

Professor

Peter J Lipman, PhD

peter_lipman@brown.edu

121 S Main St; Room 725

After a career in industry, I'm excited to get back in the classroom in a teaching-focused role. I look forward to helping diverse students and working professionals understand statistical concepts and appropriately analyze biomedical data.

Area of expertise
Survey Design & Analysis; Experimental Design; Causal Inference

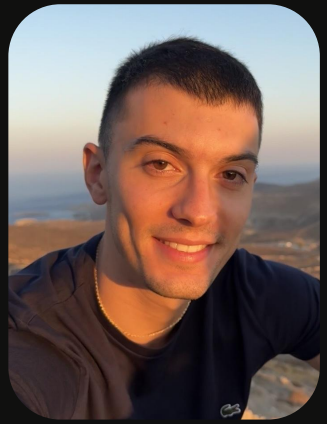
Academic background
PhD Biostatistics; BA Mathematics

Previous roles

- 11 years at Google as a **Data Scientist** (Ads + Play Store)
- 2 years at Takeda as a **Clinical Trial Statistician** (Oncology)

Office Hours
Th@2-3pm, in-person

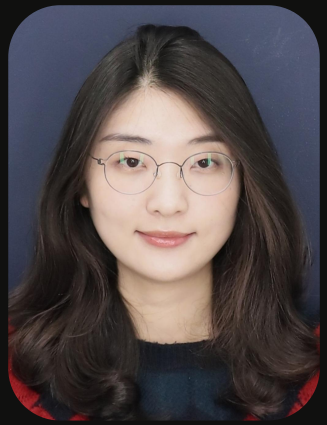
Teaching Assistants



Aristofanis Rontogiannis

This is my second year as a PhD student in the department of Biostatistics. I am from Greece, and I completed my undergraduate studies at Athens University of Economics and Business, at the department of Statistics (I do not hold a Masters degree). Currently, I am working with Dr. Youjin Lee, focusing mainly on causally interpretable meta-analysis. I am glad to be one of your TAs for this semester!

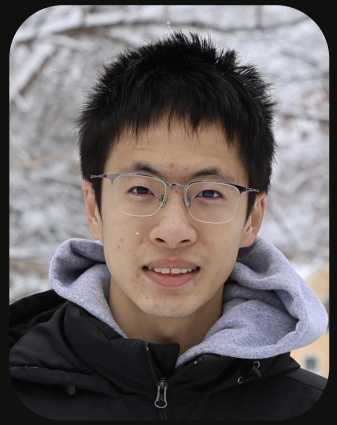
aristofanis_rontogiannis@brown.edu



Jina Yang

I am a third-year Ph.D. student in Biostatistics with an undergraduate degree in Statistics. My research interest is in leveraging mediation analysis to address challenges related to informative observation in electronic health record (EHR) data. Outside of my academic work, I enjoy watching musicals, and my favorite productions include *Frankenstein* and *Rebecca*

jina_yang@brown.edu



Mo Zhou

I'm a second-year master student in Biostatistics department of School of Public Health. Beside taking classes, I'm involved with some statistical methodology research in causal inference. I hold a BS in quantitative science and a BA in Spanish from Emory University, and I play tennis competitively.

mo_zhou1@brown.edu

Weijing Yin

I'm a second-year Master's student in Biostatistics. I hold a BS in Mathematics and Physics, and my interests focus on applying statistical models and computational techniques to pharmaceutical statistics. Outside of academics, I enjoy listening to pop music, reading and writing novels, and playing video and card games.

weijing_yin@brown.edu

Program Staff

Keviner Asigi

Keviner Asigi is a Quantitative Academic Support Specialist at the Brown University School of Public Health and an alumna of the Master of Science in Biostatistics program. She supports students in developing a strong foundation in statistical software and data analysis. Her approach emphasizes a supportive, collaborative learning environment that helps students build both confidence and technical proficiency. You can schedule an appointment with Keviner here!

keviner_asigi@brown.edu

Part 2

Course Capacity

I will implement a 60-person class maximum

Priority for overrides in the following order:

1. Graduate students at SPH
2. Undergrad - Stats or Public Health concentrators
3. Graduate Students → Seniors → Juniors → Sophomores → Freshman

If you fall into (1) or (2), you *will* get in

Undergrads: consider PHP1501
Grads: consider PHP2507 (pre-test will help you decide)

SHAMELESS PLUG

[UNDERGRADS] If you love this course and want to continue your academic career in public health and/or biostatistics, consider SPH's:

- 5th year MPH (link) ← 2510 satisfies a degree requirement
- 5th year AM, Biostatistics (link) ← talk to Stavroula Chrysanthopoulou or Alice Paul

Part 2

Course Expectations

R & RStudio

Labs (starting 9/12)

Mon 3–4 pm, 121 S Main St, Rm 251
Fri 9–10 am, 121 S Main St, Rm 251
Fri 10–11 am, 121 S Main St, Rm 251

Syllabus Details

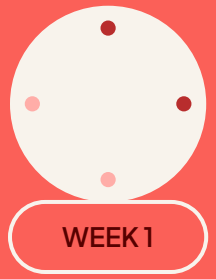
Learning Objectives
Assessments & Grading
AI Policy

Week	Dates	Topic	Assessments
1	9/4	Introductions & Motivation	
2	9/9; 9/11	Intro to R & Basic Probability	
3	9/16; 9/18	Random Variables	
4	9/23; 9/25	Manipulating Data with R	
5	9/30; 10/2	Exploratory Data Analysis	Assignment #1 Due
6	10/7; 10/9	Sampling Distributions	
7	10/14; 10/16	Hypothesis Testing	Exam #1 Administered
8	10/21; 10/23	Confidence Intervals	
9	10/28; 10/30	Confidence Intervals & Hypothesis Testing (cont.)	
10	11/4; 11/6	Non-Parametric Testing	Assignment #2 Due
11	11/11; 11/13	Categorical Data Comparisons	
12	11/18; 11/20	Simple Linear Regression	Exam #2 Administered
13-14	11/25; 12/2; 12/4	Multiple Linear Regression	
15	12/9; 12/11	Retrospective / Spillover	Assignment #3 Due
16	12/12-12/20	Finals Period	FINAL: 12/13 @ 9am EG5

OUTCOMES

After today's class, along with the required readings (CHIHARA Chapter 1), you should be able to:

- Distinguish between descriptive and inferential statistics
- Classify variables into different types
- Distinguish between a population and a sample
- Recognize importance of course content thru real world examples



Data Collection & Variation

Take a note card
Write down a number 1–5

Data Collection & Variation

1

3

5

2

4

Data Collection & Variation

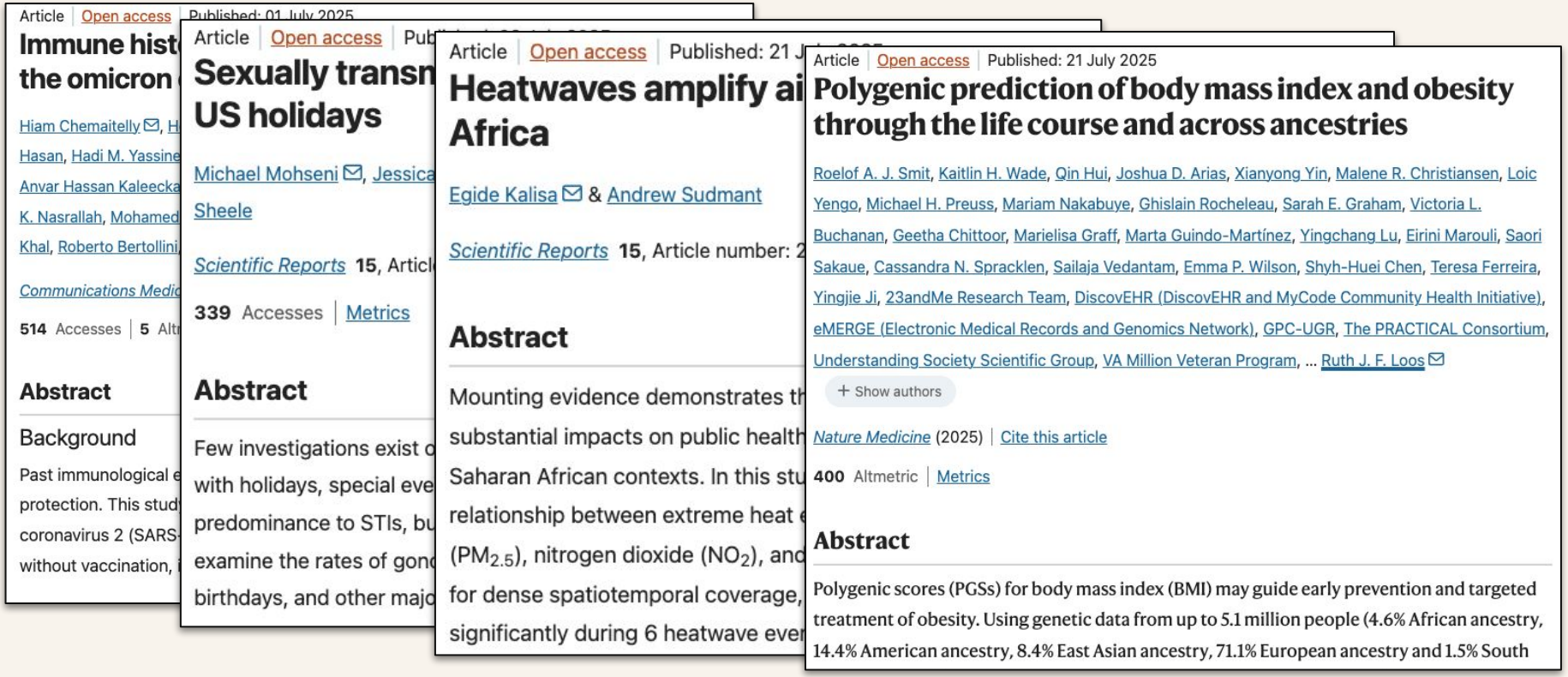
Picture 1			Picture 2			Picture 3			Picture 4			Picture 5		
Guess	Truth	Error	Guess	Truth	Error	Guess	Truth	Error	Guess	Truth	Error	Guess	Truth	Error

Data Collection & Variation

	Truth	Number of Guesses	Avg Guess	Min Error	Max Error	Avg Abs Error
Picture 1						
Picture 2						
Picture 3						
Picture 4						
Picture 5						

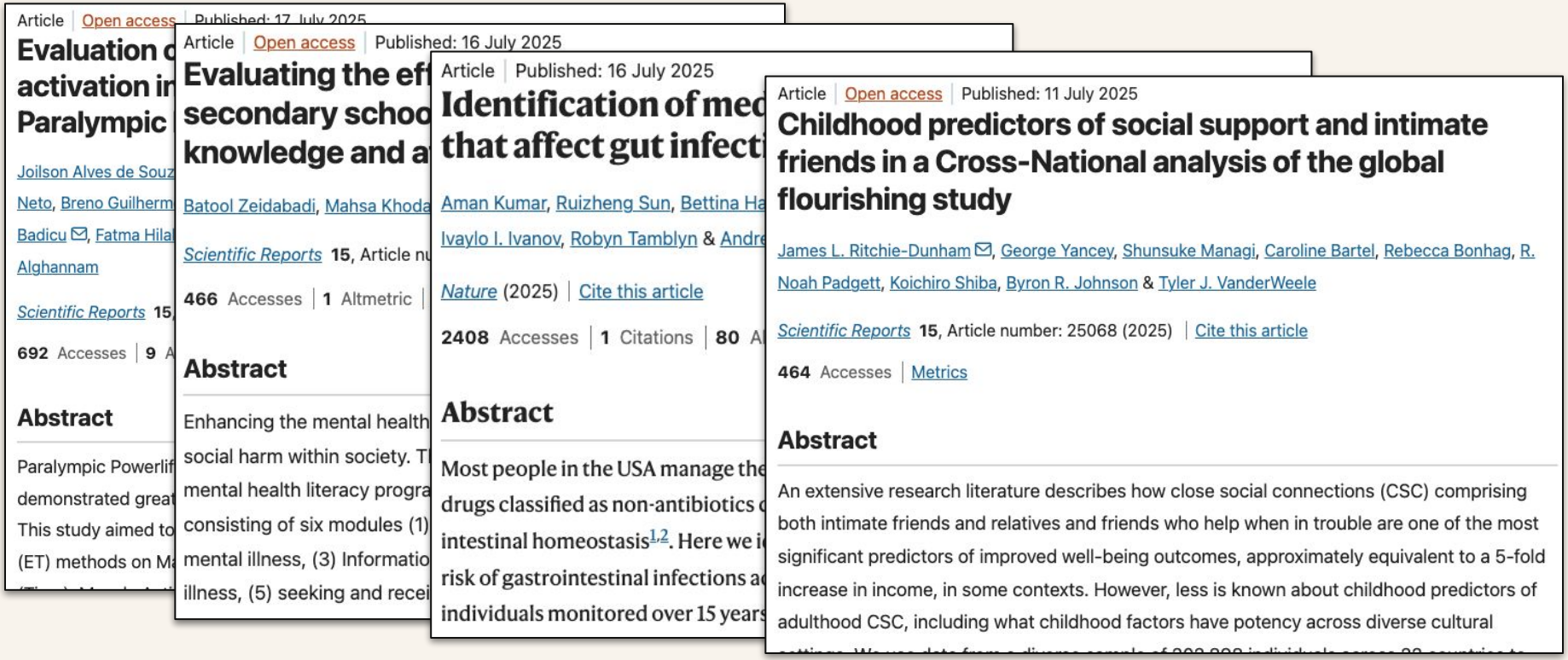
Part 4

Biostatistics in Practice



Part 4

Biostatistics in Practice



Part 4

Topics & Applications

- Policy Evaluation
- Drug Safety & Effectiveness
- Medical Devices
- Disease Progression
- Big Data Analytics
- Climate Change
- Mental Health
- Nutrition
- Clean Water; Air Quality
- Product Safety Testing
- Health Disparities

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Next Week

Intro to R & Probability