

**BIOS 101:
Principles of Biostatistics and Data Science for Cancer Researchers
University of New Mexico Comprehensive Cancer Center**

Fall 2016

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Background

Understanding biostatistics is paramount for cancer research. BIOS 101: Principles of Biostatistics and Data Science for Cancer Researchers at UNM Comprehensive Cancer Center (UNMCCC) is a diverse program presented in 9 lecture series. The lectures introduce the basic principles of biostatistics and quantitative data science and are intended for those who are in the process of learning biostatistical applications or for those who desire a refresher course. Types of data, descriptive statistics, estimation, hypothesis testing, correlation/regression, survival analysis, sample size calculation, and guidelines for statistical genomic data analysis will be taught in this course series. Some classes will introduce of basic theory and application of computing as a tool, or free software.

Course Description	This course covers basic statistical methods.
Course Goal	The goal of this class is to introduce the basic statistical concepts and methods for cancer research.
Course Outlines	See the syllabus below
Course Prerequisites	None
Course Format	The course will consist of both lecture and hands-on instruction. The lecture materials (slides) will be posted before the class.
Registration Policy	There is <i>no fee</i> for this lecture series. However, students should be registered before October 3rd via email to the administrative assistant. *Note that some students may want to take only selective lectures, and this will be acceptable as long as registered.
Who will take this course?	Clinicians, Fellows, Cancer Researchers, and Cancer Biology Students. Note that only UNM health science employees are eligible, and exceptional cases should be discussed with the Coordinator prior to the registration deadline.
Where	UNMCCC Boardroom and 1048
Time	October 6, 2016 – Dec 8, 2016: Every Thursday 4:00 – 5:00 pm;
Credit policy	No credit for this course.
Home work	Every week there will be a homework assignment (5 questions), and this will be considered as a test that engages if the student understood the material.
Grade	50% Homework, 50% Attendance → Pass (Certification will be provided) or Fail
Certification	The class certification will be given to students who completed and passed the course (7 of 9 lectures is required as the minimum attendance).
Course evaluation	At the end of each class, students are recommended to fill <u>an evaluation</u> form for the lecture.

Faculty Profile for PBDS

<http://cancer.unm.edu/research/shared-resources/biostatistics-shared-resource/>

Name	Academic Rank	Education	Research Focus
Dr. J.-H. Lee	Professor	DrPH. University of North Carolina at Chapel Hill	Correlated data analysis, Group randomized trials, Generalized linear mixed models
Dr. H Kang	Associate Professor	PhD. University of New Mexico	Statistical genomics, Biomarker data analysis, Agreements
Dr. L Luo	Assistant Professor	PhD. The University of Texas School of Public Health	Epidemiological studies, Statistical genomics and genetic epidemiology
Dr. R Du	Research Scientist	PhD. LSU Health Science Center	Statistical analysis/design in clinical trials, Statistical metagenomics
Ms. T Boyce	Research Scientist	MS, MPH. Tufts University	Data management, Epidemiology and Nutritional data analysis
Mr. Y Shi	Research Scientist	PhD Candidate, University of Michigan	Statistical genomics, Generalized linear mixed models
Ms. Z Galochkina	Research Scientist	MS. University of New Mexico	SEER data management and data analysis

Syllabus for BIOS 101:
Principles of Biostatistics and Data Science for Cancer Researchers
University of New Mexico Comprehensive Cancer Center

# Sequence	Date Room 4-5 PM Thursday	Contents	Goals
1.	Oct 6 UNMCCC 1048	Introduction	<ul style="list-style-type: none"> • Understand definition of statistics/statistical inferences • Data types • Descriptive statistics • Distributions (Normal, Binomial, Poisson)
2.	Oct 13 UNMCCC Boardroom	Estimation/ Hypothesis Testing and Statistical Inferences	<ul style="list-style-type: none"> • Understand how to lay out scientific questions with hypotheses • Understand basic statistical inference: p-value, confidence interval, Type I error, & power.
3.	Oct 20 UNMCCC Boardroom	Introduction to Clinical Trials	<ul style="list-style-type: none"> • Concepts of Phase I, II, III, and IV • Primary and secondary endpoints • Translational study→ Confirmation study • New Trends for Phase I/II
4.	Oct 27 UNMCCC Boardroom	Common Statistical Tests I	<ul style="list-style-type: none"> • Association/Group Comparisons • Basic assumptions required for common statistical tests including the t-, paired t-tests, Chi-Square, Fisher's exact test, and the corresponding non-parametric tests.
5.	Nov 3 UNMCCC 1048	Common Statistical Tests II	<ul style="list-style-type: none"> • Linear Regression • ANOVA • 2 x 2 Contingency Tables • Logistic Regression
6.	Nov 10 UNMCCC Boardroom	Survival Analysis	<ul style="list-style-type: none"> • Kaplan-Meier Curve with Log Rank Test • Cox Regression Model
7.	Nov 17 UNMCCC Boardroom	Genomic Data Analysis I	<ul style="list-style-type: none"> • Principles and Challenges for High Throughput Data analysis • Gene Expression Data
8.	Dec 1 UNMCCC Boardroom	Genomic Data Analysis II	<ul style="list-style-type: none"> • Genome-Wide Association Studies (GWAS) • High throughput DNA sequencing • Statistical design and analysis of genetic association
9.	Dec 8 UNMCCC Boardroom	Sample Size Calculation	<ul style="list-style-type: none"> • Understand the role of sample size, effect size, variability, and power in study design. • For cell culture experiments what is your sample size?

Lecture Evaluation Form

This evaluation is anonymous.

DO NOT PUT YOUR NAME ON THIS SHEET.

COURSE: BIOS 101 at UNMCCC, Fall 2016

COURSE SEQUENCE: Check ONLY one box.

Sequence	1	2	3	4	5	6	7	8
Check Box								

Please Score 1 (Lowest) – 2 – 3 – 4 – 5 (Highest) for Each Box of Three Below

Lecture Content	Organization & Presentation	Overall Rating

COMMENTS:

1.

2.

3.

4.

5.