

GRADUATE STUDIES IN BIOSTATISTICS

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SITTING IN YOUR SHOES

- What to do with undergraduate degrees in Math and Economics?
 - Straight to workforce?
 - Actuarial studies?
 - Graduate school?
- What field in graduate school?
 - Law?
 - Statistics?
- Summer Institute in Biostatistics (SIBS)
 - Many participating universities around the country
 - More info:

<https://www.nhlbi.nih.gov/research/training/summer-institute-biostatistics-t15>

WHAT IS BIOSTATISTICS?

- Application and development of statistical theory for use in biological, medical, and public health research
 - Rich application opportunities
 - Application-driven theoretical research and education
 - Ex. Survival analysis
- Versus statistics?
 - Less theoretical education, 'theory for the sake and interest of theory'
- Versus bioinformatics?
 - More focus on statistical theory in methods development
 - Less focus on straight computational research
- Extensive computer programming
 - R, Python, C+
 - Data visualization, simulation, “Big Data” and algorithm development

WHAT DO BIOSTATISTICIANS DO?

- Lead Statistician (PhD, Master's with many years of experience)
 - Suppose you are scientist or policy maker and you have a question you want to answer with data. What do you do?
 - Design studies, decide how data will be analyzed, work with investigators
 - Employers: Government, research universities, medical device companies, pharma
- Professor/Developing of statistical methods (PhD)
- Programmer (Masters)
 - Carry out the dirty work of carrying out analysis plan, creating presentation of results (tables, graphs, etc.)
- General statistics
 - For strong programs, not limited to bio- fields
 - Ex. At UNC have had PhD grads at Apple, Google, AIG



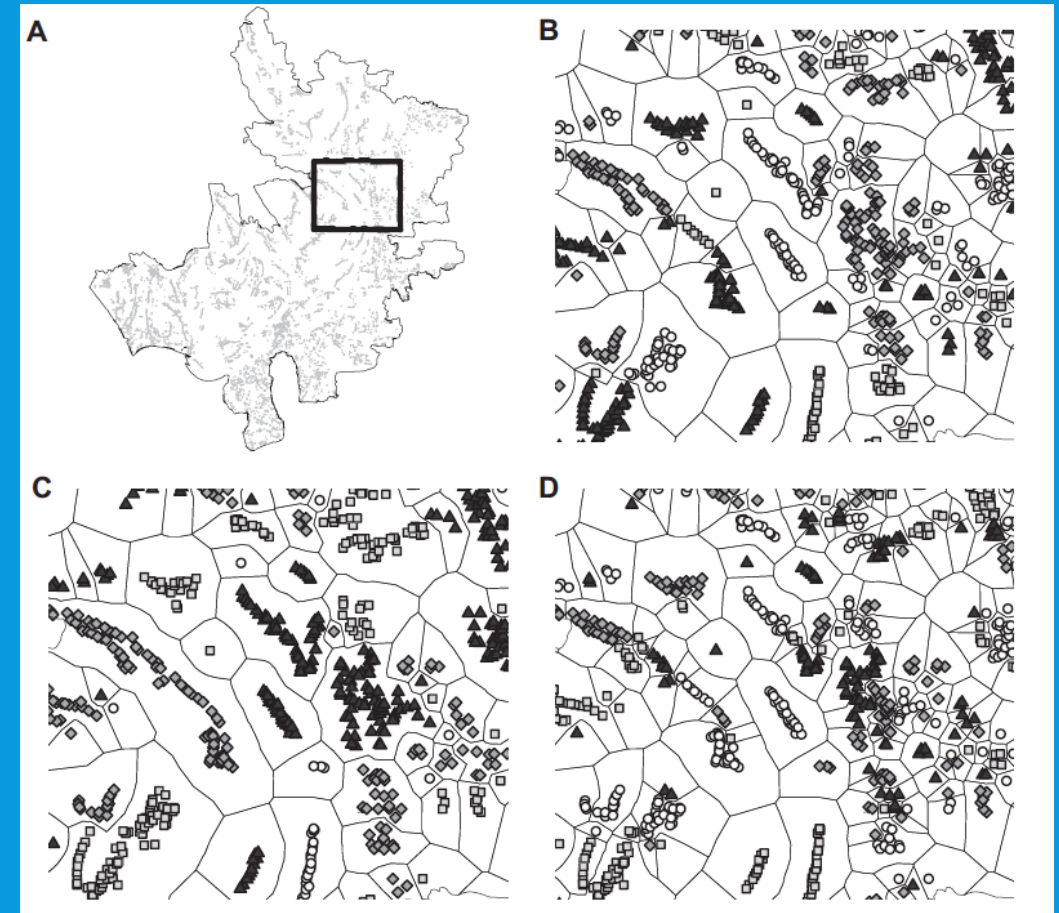
National Institutes
of Health



Medtronic

EXAMPLES OF BIOSTATISTICS

- Subfields
 - Clinical trials
 - Genetics
 - Precision medicine
 - Causal inference
 - Imaging, spatial statistics, time series analysis
- Assessing the effects of Cholera vaccination
 - Want to separate out and quantify effects due to
 - Person being vaccinated
 - People around you being vaccinated
 - Incorporate spatial relationships



EDUCATION IN BIOSTATISTICS

- Different degrees
 - Master's
 - Less theory, focused on learning methods currently used in research
 - General structure: coursework (1 year), comprehensive exam (end of 1st year), thesis and coursework (2nd year)
 - Time duration: 2 years
 - Doctorate
 - More theoretical education (level of theory depends on institution), goal is to train student to lead research studies and develop new statistical methods to address scientific questions
 - Can apply and enter program with undergraduate degree only
 - General structure: Master's coursework (1 year), PhD coursework (1 year), Qualifying exam (end of 2nd year), finish coursework and begin dissertation (3 year), complete dissertation
 - Time duration (usual): 5-6 years

DIFFERENT PROGRAMS

- Programs range in level of theory required for degree (especially PhD)
 - Generally top programs have extensive theoretical preparation
- Different programs generally have different research strengths
 - Clinical trials: UNC-CH, UWash, UMinnesota
 - Genetics: UNC-CH, UMichigan

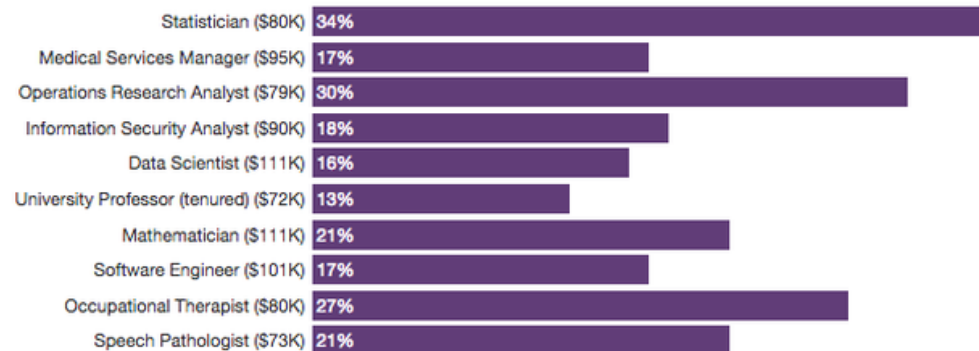


WHY DID I CHOOSE BIOSTATISTICS?

- Allows a continuation in learning mathematical theory while learning how to analyze real data
- Focuses education on questions I find important to society
- Plentiful job opportunities globally, forward thinking employers

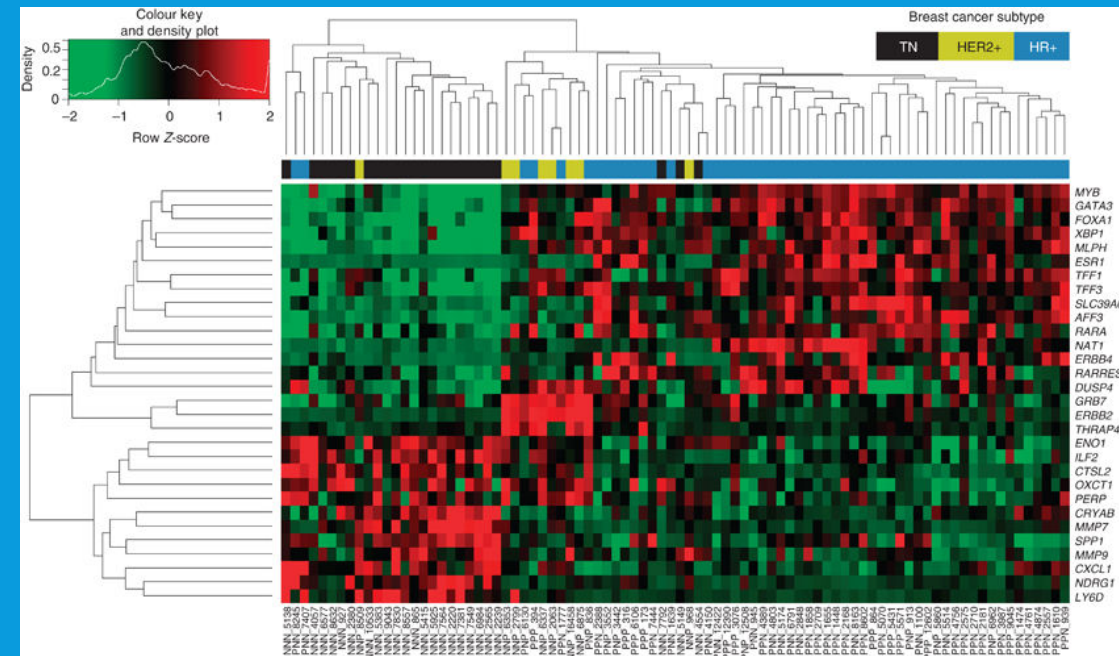
CareerCast's 10 best jobs

Projected growth through 2024



Source: CareerCast; Bureau of Labor Statistics

Created with [Datawrapper](#)



Abramovitz et al. *British Journal of Cancer*. 2011.

PAYING FOR EDUCATION

- Many post-graduate degrees are extremely expensive
 - Many Master's degrees, Law degrees require six figure debt
 - Applied nature of program => funding opportunities for Master's degrees
 - PhD degree => Funding
- Funding duties
 - Research assistant
 - Teaching assistant
- Funding amount
 - Tuition, stipend, health insurance

MY EXPERIENCES AND GENERAL ADVICE

- Tips for choosing a program
 - For Master's, focus on program quality and financial cost
 - Look at time to completion and job placement results
 - If potentially interested in PhD, program rigor and quality is very important
 - For PhD, take all factors into account and don't focus the 'ranking number'
 - You will be living there for 5+ years, your JOB is to be a student and treat it as such
 - Program prestige is important, but only to a certain extent
 - Look at research opportunities, auxiliary departments, and research expertise of professors
- My experience
 - Difficult but very rewarding
 - Unique opportunity to live in a college atmosphere
 - Many people around you of similar age
 - Part of graduate student community

