Careers in STATISTICS

A WORLD OF OPPORTUNITY
What Is Statistics?

• American Heritage® Dictionary: “The mathematics of the collection, organization, and interpretation of numerical data, especially the analysis of population characteristics by inference from sampling.”

• Statisticians collect and analyze data, then calculate results using a specific design. They draw conclusions and make decisions in the face of uncertainty.
Areas where STATISTICS are used

Business
Economics, Engineering, Marketing, Computer Science

Physical Sciences
Astronomy, Chemistry, Physics

Environment
Agriculture, Ecology, Forestry, Animal Populations

Government
Census, Law, National Defense

Health & Medicine
Genetics, Clinical Trials, Epidemiology, Pharmacology

Business Areas

Physical Sciences Areas

Health & Medicine Areas

Environment Areas

Government Areas
Collecting data on subsets of the population (samples) can give valid information about the whole population.

Knowing what has happened in the past can help answer questions about the present and future.

Knowledge helps plan future tests, determines resource allocation, and improves quality.
What Do Statisticians Do?

- Study the safety of **nuclear power** plants
- Evaluate the environmental impact of **pollution**
- Determine the effectiveness of new **drugs**
- Estimate the U.S. **unemployment** rate
- Analyze **consumer demand** for products
- Plan and analyze **agricultural** experiments
What Can I Do With A Degree in Statistics?
Business and Industry

• Manufacturing
  – Build products and deliver services that satisfy consumers and increase the corporation’s profit margin
Business and Industry

• Marketing
  – Design experiments for new products, conduct focus groups and sample surveys, and perform field experiments in test markets to determine product viability
Business and Industry

• Engineering
  – Make a consistent product, detect problems, minimize waste, and predict product life in electronics, chemicals, aerospace, pollution control, construction, and other industries
Business and Industry

• **Statistical Computing**
  – Work in software design and development, testing, quality assurance, technical support, education, marketing, and sales to develop code that is both user-friendly and sufficiently complex
“I love that statistics is very multidisciplinary. It involves problem solving in a group environment and it involves many skills and talents. I love the ability to be a mathematician, computer scientist, teacher, quizmaster, sleuth, and devil’s advocate all rolled into one.”

Linda Quinn, Private Industrial Consultant
Epidemiology

- Work on calculating cancer incidence rates, monitor disease outbreaks, and monitor changes in health-related behaviors such as smoking and physical activity
Health and Medicine

• Public Health
  – Prevent disease, prolong life, and promote health through organized community efforts, including sanitation, hygiene education, diagnoses, and preventative treatment
Health and Medicine

- **Pharmacology**
  - Work in drug discovery, development, approval, and marketing, to ensure the validity and accuracy of findings at all stages of the process.
Health and Medicine

• **Genetics**
  – Label possible indicators of genetic abnormalities, such as birth defects and early aging, or breed desirable characteristics in plant offspring
Last year when I began applying to medical schools, the fact that I majored in statistics was always a good conversation point in interviews and made me more unique as an applicant.

Amy Elise Derrow, Medical Student
Learning

• Education
  – Teach K-12 through post-graduate students, assess teacher effectiveness, or develop statistical models to represent student learning
Learning

• Science Writing & Journalism
  – Work with mass media, universities, and corporations to produce news briefs, articles, news releases, and other reports
Research

- **Government**
  - Work in regulations for stock trading, pollution, and drug approvals, or testify in court proceedings, congressional hearings, and lobbying arguments
Research

• **Survey Methods**
  
  – Collect data in the social sciences, education, law, forestry, agriculture, biology, medicine, business, and e-commerce, and for the government
"I found that statistics used more reasoning and logic skills than the mathematics courses I had previously taken. The more I did statistics, the more I liked the “alternative” application of mathematics that it provided. I especially liked being able to use a lot of data and a little common sense to figure out problems."

Tiffany T. Sundelin, Quality Control Engineer
Social Statistics

• Law

  – Analyze data in court cases, including DNA evidence, salary discrepancies, discrimination law suits, and disease clusters
Social Statistics

• Consulting
  – Work on a temporary basis on a variety of projects including quality improvement, pharmaceuticals, ecology, and engineering
Natural Resources

- **Agriculture**
  - Study chemical pesticides, hydrogeology, veterinary sciences, genetics, and crop management in order to ensure optimal yield
Natural Resources

• Ecology
  – Address questions about the earth’s natural environment, including animal populations, agricultural protections, and fertilizer and pesticide safety
I became involved with statistics because mathematics did not provide the avenue to cross into other areas of science and continue to learn about topics that interested me. I have stayed in statistics because of the diversity that it offers and because of the rational approach it provides to seek solutions to problems.

Dan Mowrey, Senior Research Scientist
How Do I Become A Statistician?
Education

• **High School**
  – Study statistics, mathematics, science, computer science, and English

• **College**
  – Major in statistics, applied mathematics, or a closely related field (i.e. epidemiology, engineering)

• **Post-Graduate**
  – Many career fields require a Master’s degree or PhD in a specialized statistical field
Skills

• Quantitative Skills
  – Statistics, Mathematics, Science

• Problem Solving Skills
  – Analysis, Teamwork

• Communication Skills
  – Verbal, Written

• Computer Programming Languages

• Foundation in Field of Application
Opportunities

• **Diversity**
  – Pure Research
  – Interdisciplinary Teams

• **Advancement**
  – Experience, education, and communication skills lead to professional advancement

• **Versatility**
  – Challenging and Exciting Fields of Application
And Always Remember

THERE IS STRENGTH IN NUMBERS