What would you prefer: taking a statistics course, or a root canal?

Brian Dennis
Professor
Dept Fish & Wildlife Resources
And
Dept Statistics

(just found out he had to register for a statistics course)

Outline

History

Role of statistics at a university

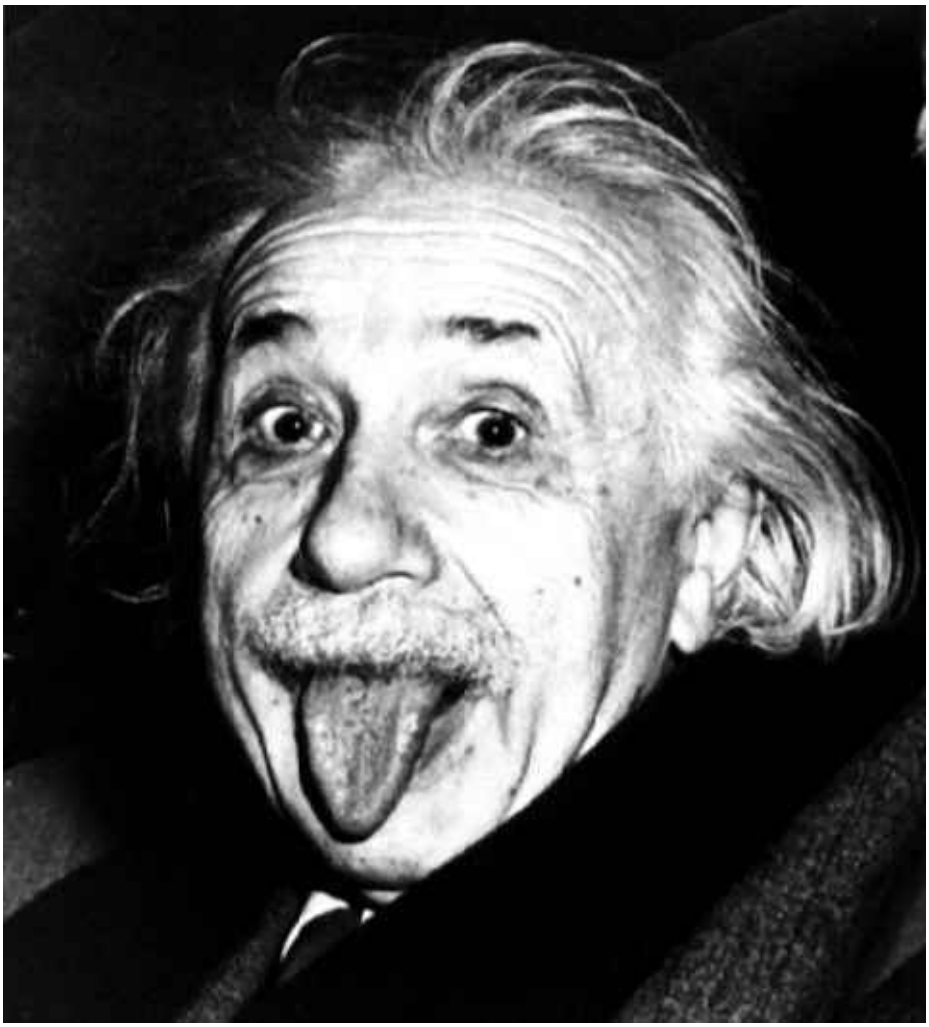
Organization of statistics programs

Statistics as a subject

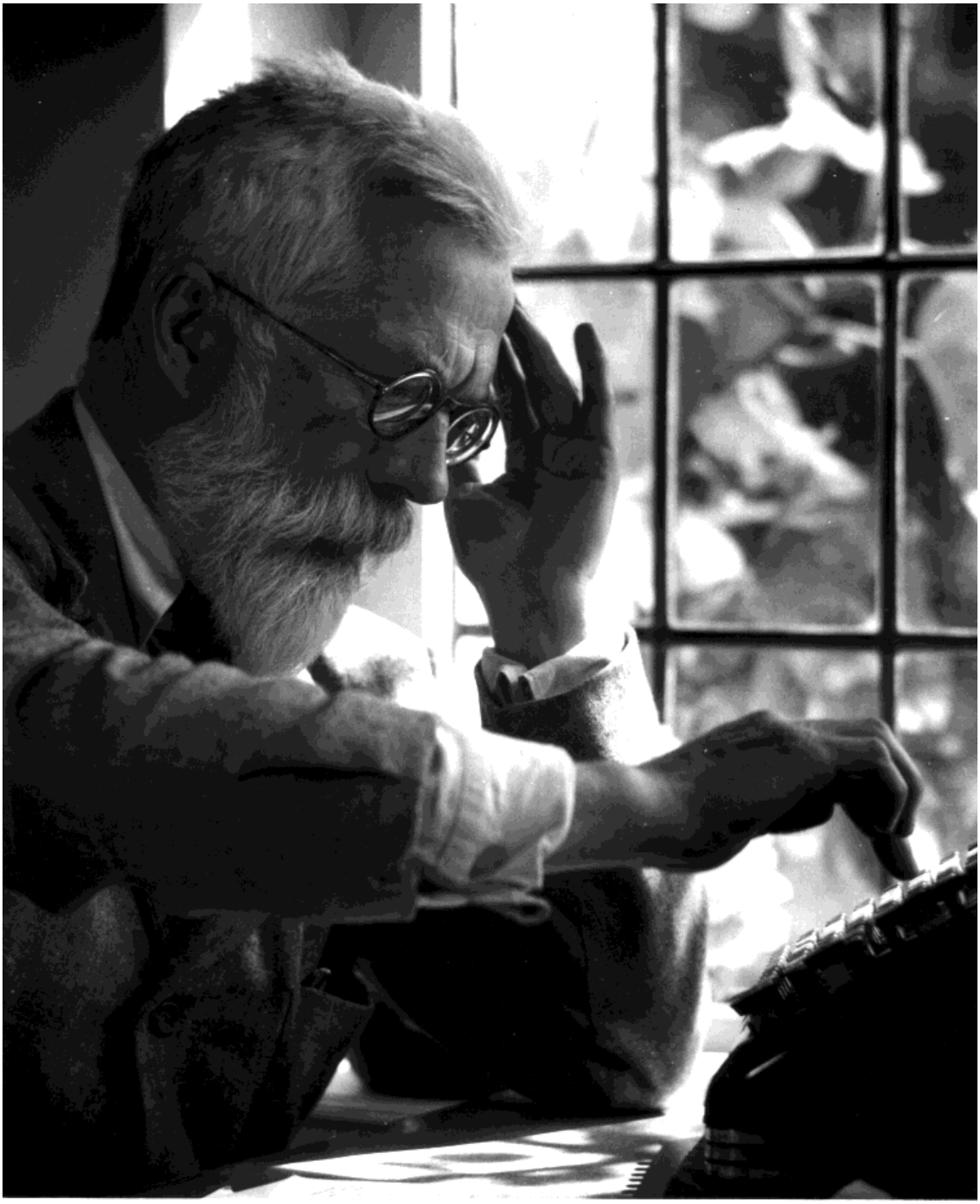
Statistics and citizenship

Why is the subject so hard?

The future of statistics

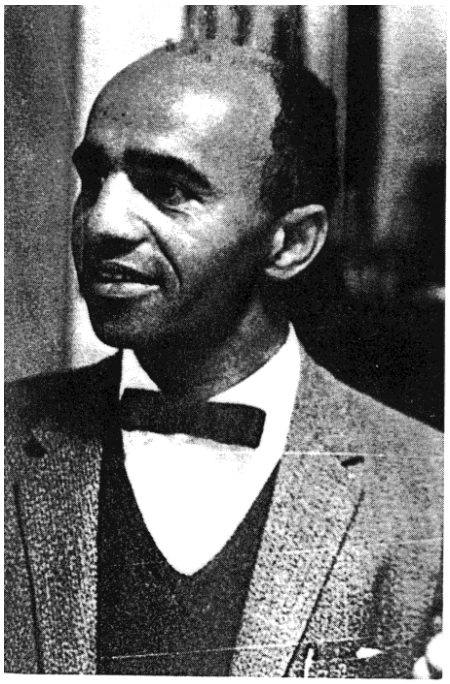


"Man of the Century" according to *Time*. Is there anyone who might have deserved the honor more?



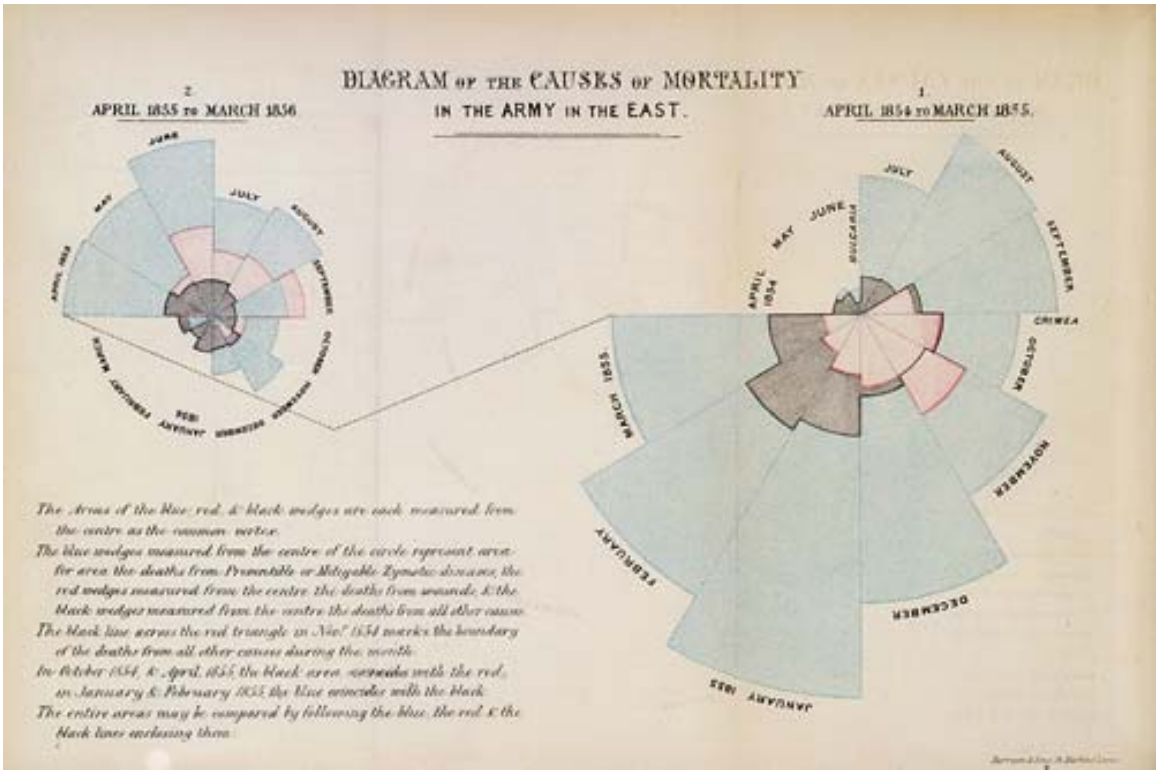
R. A. Fisher

Statistics: a “hard” science that is *diverse*



G M Cox, D Blackwell, C R Rao

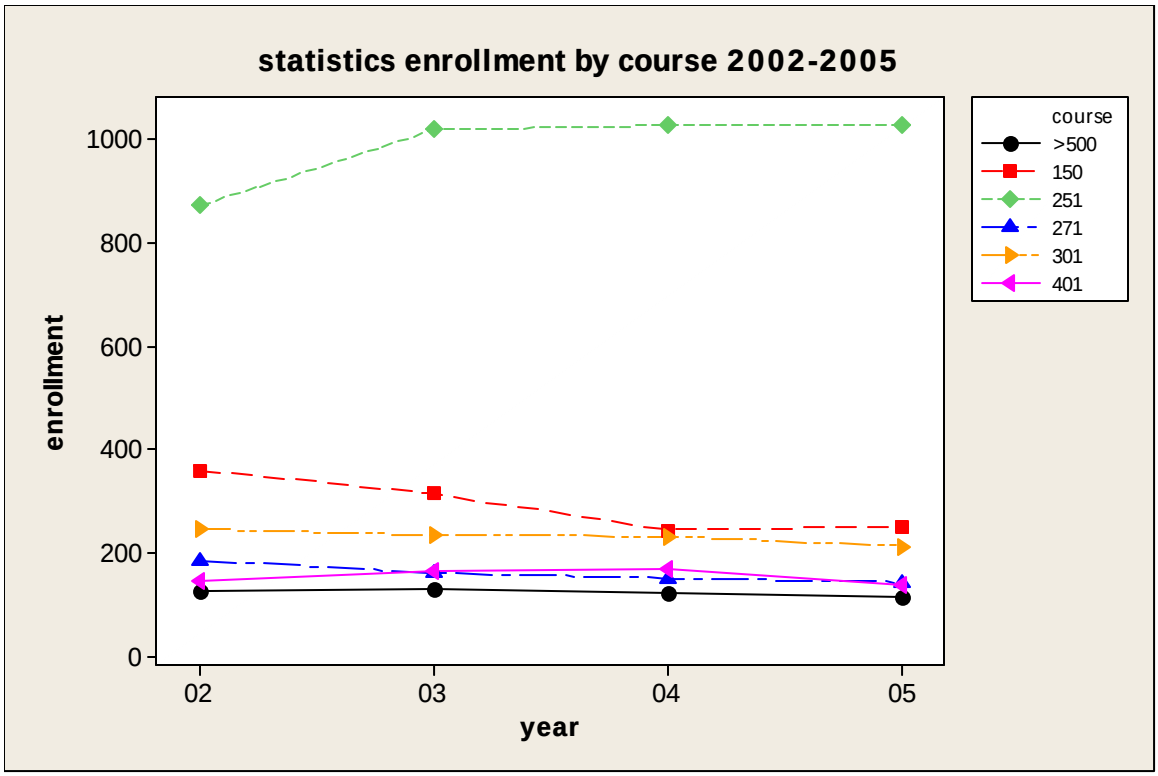
Florence Nightengale, *statistician*



D R Cox (who probably saved your life)

Role of statistics at a research university

- graduate courses for other majors
- undergraduate courses for other majors
- consulting (for univ scholars and for the state)
- graduate statistics degrees (courses and supervision; statistics grad students often dual-enrolled in other programs)
- undergraduate statistics degrees (uncommon)


statistics enrollment by course 2002-2005
enrollment
year
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05
course
>500
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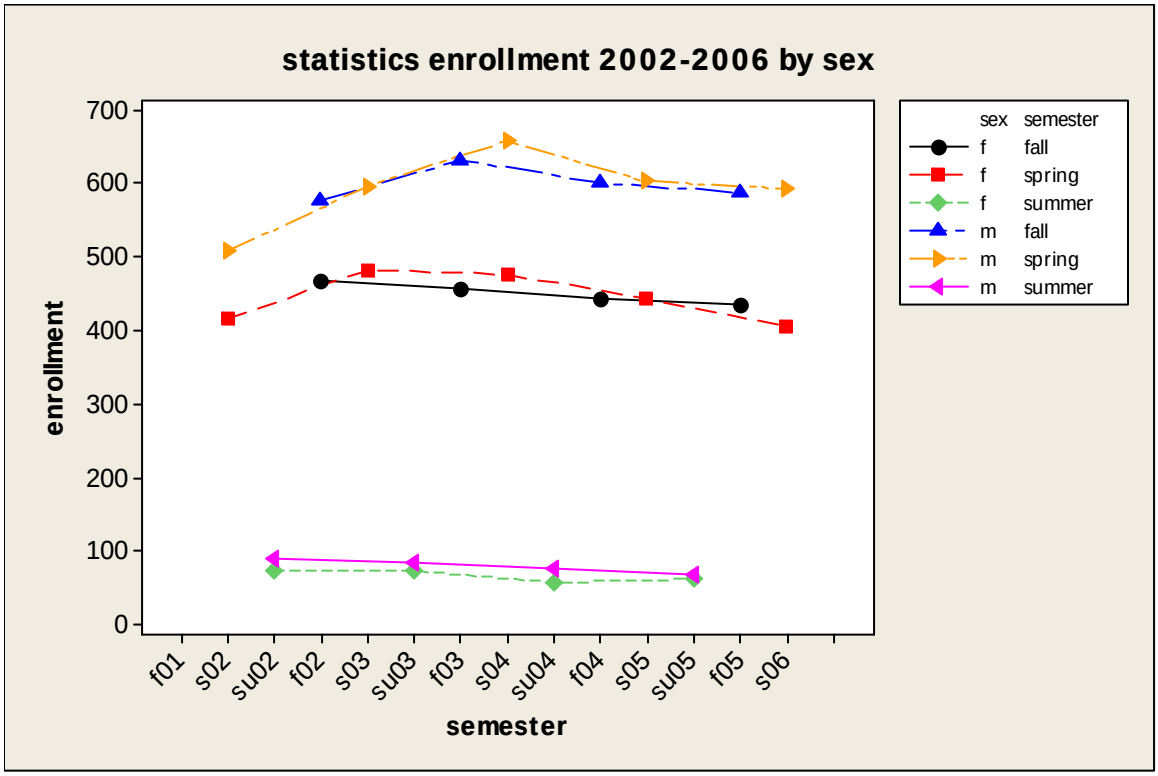
251
271
301
401


statistics enrollment 2002-2006 by sex
enrollment
semester
0
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300
400
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600
700
f01
s02
su02
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su03
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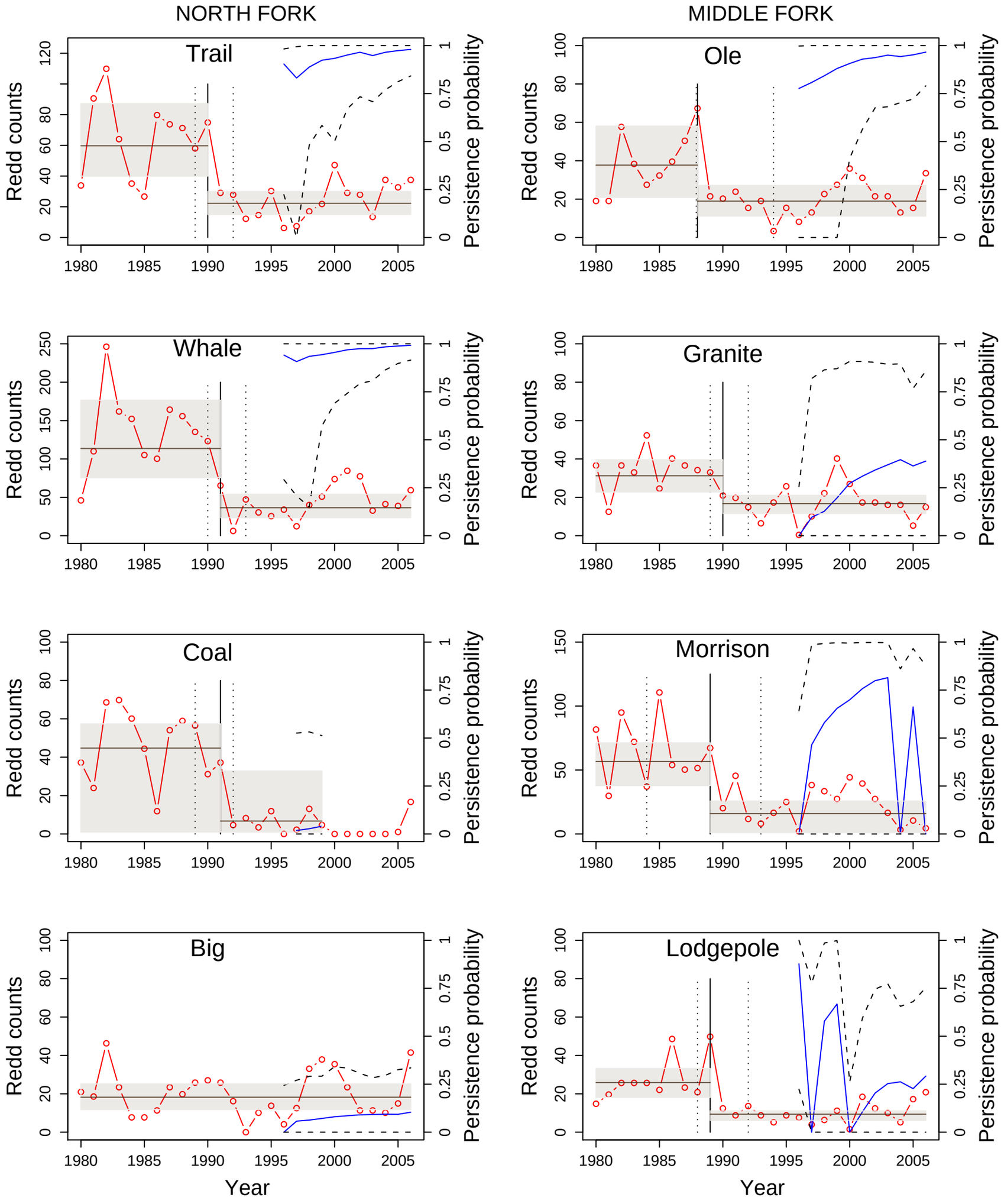
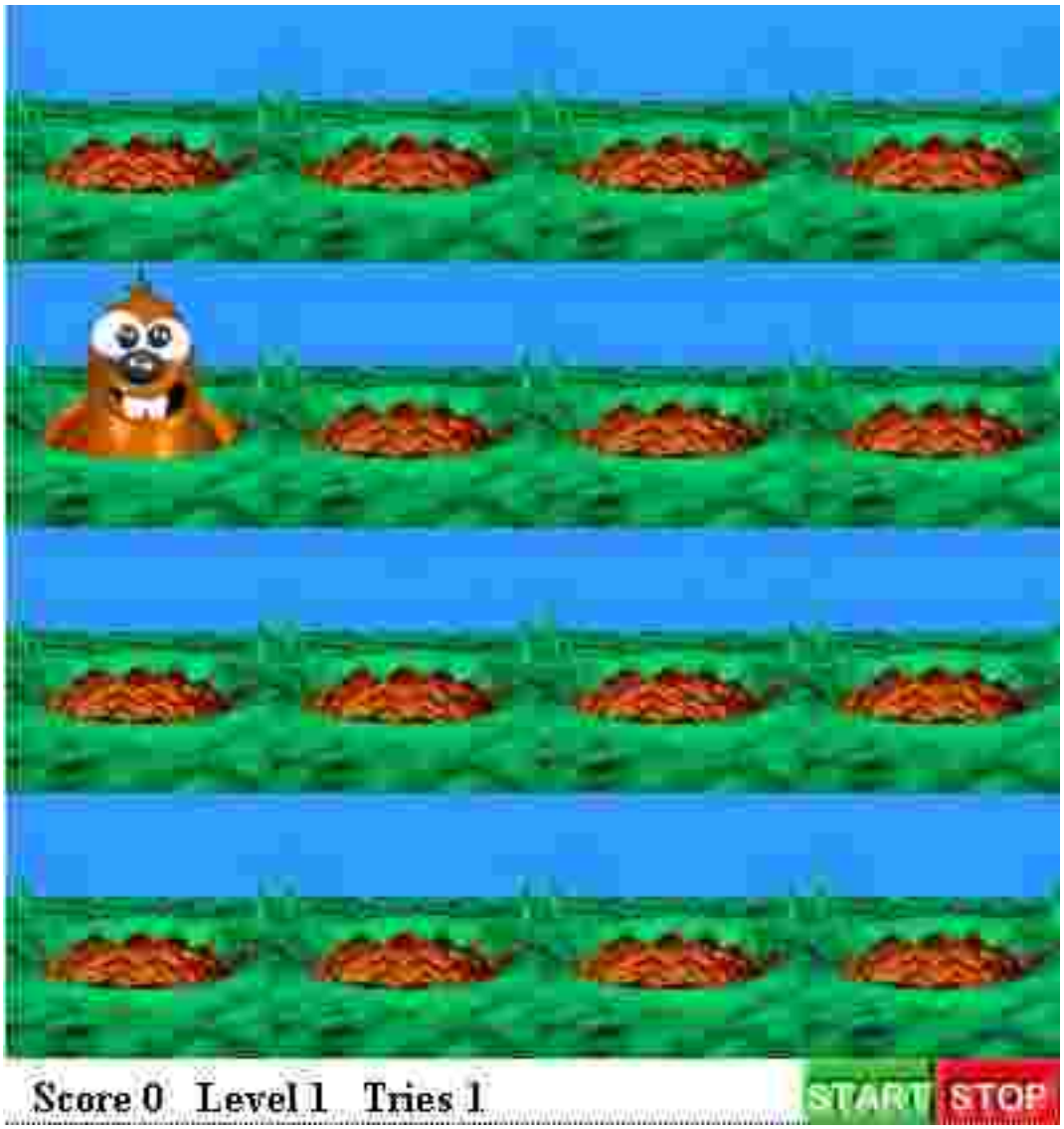
s04
su04
f04
s05
su05
f05
s06
sex semester
f fall
f spring
f summer
m fall
m spring
m summer

Stat 410 Applied Multiple Regression (Stat 401)
Stat 412 Analysis of Variance & Design of Experiments (Stat 401, 507)
Stat 420 Probability (Stat 451)
Stat 424 Mathematical Statistics (Stat 452)
Stat 437 Introduction To Applied Multivariate Analysis (Stat 524)
Stat 438 Graphical Techniques In Data Analysis *
Stat 439 Logistic Regression *
Stat 449 Mixed Model Analysis *
Stat 446 Sampling (Stat 422)
Stat 500 Seminar
Stat 505 Linear Models *
Stat 506 Advanced Regression Analysis *
Stat 510 Statistical Consulting Seminar
Stat 520 Topics in Applied Statistics *
Stat 522 Stochastic processes (Stat 453)
Stat 524 Biostatistics *
Stat 526 Experimental Design *
Stat 528 Statistical Quality Control *
Stat 530 Nonparametric And Resampling Methods
Stat 534 Spatial Data Analysis *
Stat 537 Multivariate Analysis I *
Stat 538 Multivariate Analysis II *
Stat 539 Generalized Linear Models *
Stat 570 Individual Problems
Stat 575 Research or Professional Paper/Project
Stat 578 Response Surface Methodology *
Stat 580 Special Topics

Courses in statistics, 400-level or above, offered at Montana State University, with equivalent UI statistics courses in parentheses. Asterisks denote courses not offered at UI.


NORTH FORK
MIDDLE FORK
Trail
Ole
Whale
Granite
Coal
Morrison
Big
Lodgepole
Redd counts
Persistence probability
Year
1980
1985
1990
1995
2000
2005

Unique activity of statistics faculty:



(watching aghast while stat courses pop up all over in other departments)

“I can see a department of chemistry, I can see a department of biology, but I just can’t see a department of statistics”

— a WSU Vice President, in a statistics program organizational meeting, as quoted by Kirk Steinhorst

Common organization schemes for statistics at research universities

Resident "experts" in departments (1980: almost 20 intro stat courses at UI; only one person on campus with PhD in statistics)

"Program" in statistics

Dept *Something* and Statistics
Math and Stat
Business and Stat

Department of Statistics

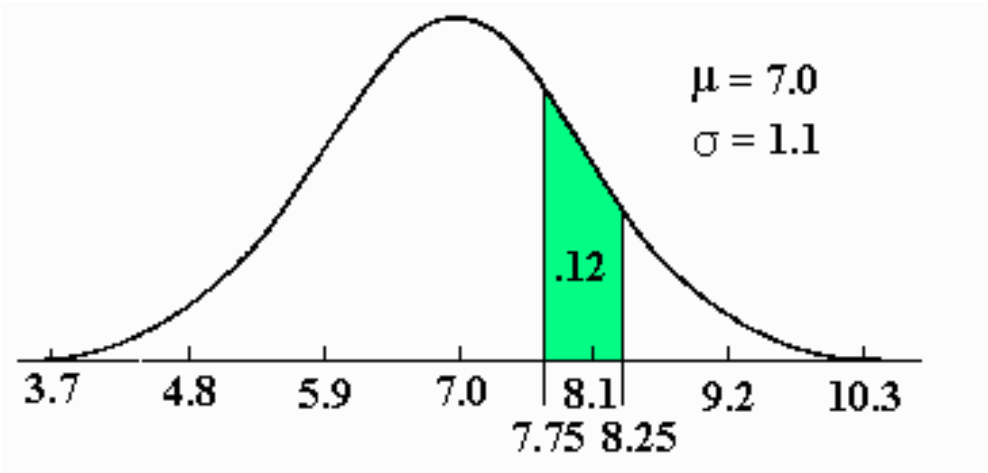
Statistics as a subject

statistics is *not mathematics!!!* (but, like physics, it uses much math)

statistics concepts are *really* difficult (CIs, etc)

statistics is (now) highly computational

statistics is intrinsically post calculus (similar to physics in that regard)



statistics research is highly collaborative and interdisciplinary

statistics graduate degrees highly sought-after by industry, government

Statistics and citizenship!

- evaluating medical, health, lifestyle practices (acupuncture, etc)

- social science claims (is capital punishment racist?)

- understanding opinion polls

- statistics used in many realms of employment (daycare marketing survey, etc)

Why is statistics so... reviled?

1. that standard undergraduate course:

wide heterogeneity of student preparation levels

extremely crowded & hectic syllabus (many clients to satisfy)

pre-calculus

thinking of the subject as "statistical methods"

lack of writing; case histories; learning computing

insufficient mathematical maturity (symbols)

cash cow mentality of university

2. cocooning of stat faculty in response to contemporary university pressures

Statistics of the future

1. first course is a 4 credit lab course (computing & recitation lab)

   probability

   statistical inference concepts

   design of data collection

   graphical & exploratory analysis

   inferential analysis (through 2 sample quantitative & categorical data)

2. second u-grad course picks up some of the "statistical methods" used in client disciplines; emphasizes on contemporary, computer-intensive analyses

3. more disciplines put calculus, finite/discrete math early in their curricula (& before intro statistics)

4. graduate students in all research disciplines have 1 yr calculus

Statistics depts., client depts., & university relationship: ideas?

- better partnership
- guidance committee
- better advising info, to & fro
- university-wide plan/timetable for statistics (no, not a “vision” or a “strategic goal”)

So… which would you rather have?