Save Our Stats

Erin E. Blankenship, PhD
and
Christopher R. Bilder, PhD
University of Nebraska–Lincoln
Department of Statistics

- Erin Blankenship
  - Started at UNL in 1999
  - Fellow of the American Statistical Association
  - John E. Weaver Professor of Statistics
  - Outstanding Teaching and Instructional Creativity Award
  - Mu Sigma Rho Statistical Education Award
- Chris Bilder
  - Started at UNL in 2003
  - Fellow of the American Statistical Association
  - American Statistical Association's Outstanding Statistical Application Award (twice)
  - Consortium for the Advancement of Undergraduate Statistics Education Web Resource Award
  - PI for two NSF and three R01 NIH statistical research grants
  - Nebraska native: Omaha, Millard South, UNO Regents Scholarship

- September 11 meeting with IANR Senior Leadership Team (SLT)

I don't know how you are a comprehensive R1 land-grant institution without having a presence in statistics.

Tiffany Heng-Moss, IANR Interim Vice Chancellor

I struggle. As Tiffany said, [with respect to] teaching and learning how a land-grant R1 university can then be a comprehensive university and succeed in its mission without statistical expertise.

Derek McLean, Dean/Director of Agricultural Research Division

- Key point: Statistics is very important!
- What about Association of American Universities (AAU) membership?
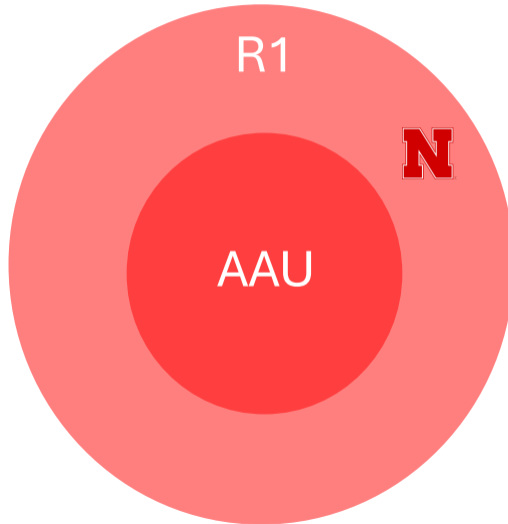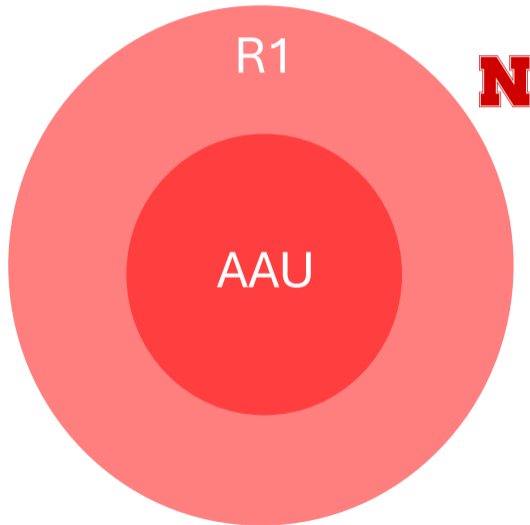
- Big 10
    - All universities are in the AAU, except UNL
    - 15 of 18 universities have Departments of Statistics
    - Maryland
        - Land-grant university
        - Statistics Program in Department of Mathematics
        - Many other Departments of Statistics in nearby universities
    - Oregon and USC
        - Not land-grant universities
        - Many other Departments of Statistics in nearby universities
        - USC: Statistics Program in Department of Mathematics
        - Oregon: Rapidly building a Department of Data Science; job posting minimum requirements: "PhD in discipline related to data science (ex: statistics, computer science, applied mathematics, ..."

- September 12 e-mail from IANR SLT: The "distributed model" for statistics

  The proposed plan would eliminate a standalone Department of Statistics offering BS, MS, and PhD degrees and moves the university toward a distributed model that leverages expertise embedded across IANR, UNL and the NU system. The plan proposes to strategically deploy a portion of state-appropriated funds to continue to offer:
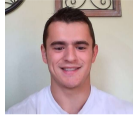
  - *Critical student competencies. Undergraduate and graduate students would continue to gain essential skills in statistics and data analytics for their future careers. We anticipate course offerings would include STAT 218, STAT 380, STAT 801, STAT 802, STAT 870, complemented by additional coursework in R programming, bioinformatics, computational biology, quantitative genetics/genomics, and data analysis interpretation and visualization offered through other units.*
  - *Coordinated statistical consulting. Through the Statistical Cross-Disciplinary Collaboration and Consultation Lab (SC3L) Help Desk, services would be available to support laboratory, greenhouse, and field research conducted by IANR faculty, staff, post-docs, and students, as well as other units.*

- 17 faculty and staff will lose their jobs

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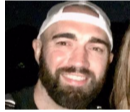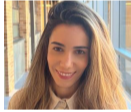- 17 faculty and staff will lose their jobs
- 80+ students will lose their major

Introduction
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Importance
○○○○○○○○○○○○○

Metrics
○○○○○○○

Distributed model
○○

Paths forward
○○

Conclusion
○○○

+ 13 more!

- Purpose
    - Importance of statistics at UNL, in Nebraska, and in the world
    - The metrics: We are PhD statisticians, this is what we do
    - Distributed model: UNL has tried the distributed model before, and, it failed...
    - Paths forward for Department of Statistics and UNL

- What is statistics?
    - The science of data – Collect, analyze, predict, and interpret data; make inferences with a level of accuracy
    - The core of data science
- What is data science?

Introduction
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- What is statistics?
    - The science of data – Collect, analyze, predict, and interpret data; make inferences with a level of accuracy
    - The core of data science
- What is data science?

Data Science

Statistics

Computer Science

Math
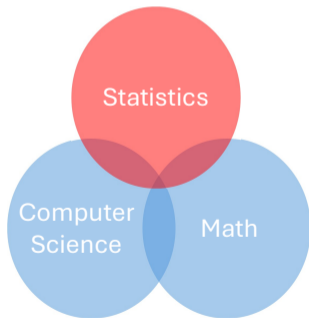
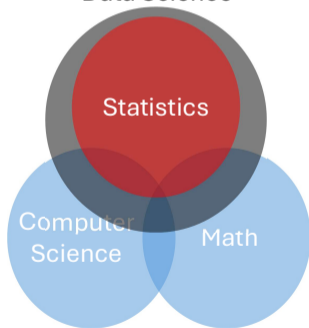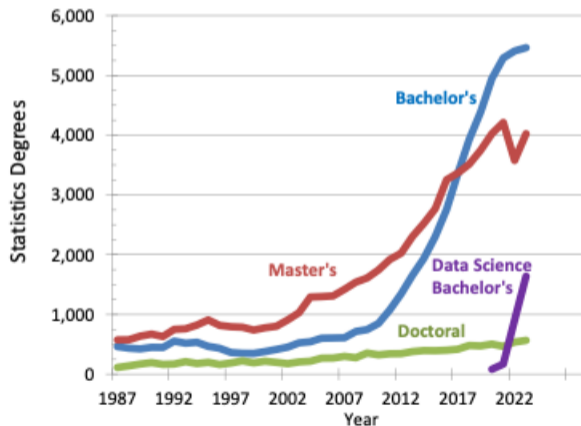- There is no data science without statistics

The sexy job in the next ten years will be statisticians.

Hal Varian, Chief Economist at Google, 2009

Plot from *Amstat News*

Introduction
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Importance
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Metrics
○○○○○○○

Distributed model
○○

Paths forward
○○

Conclusion
○○○

- Statistics and Data Analytics BS program began in 2022
  - Our first undergraduate program! Innovative! Unique! Extraordinary teaching and learning
  - 2021 Academic Program Review (APR)
    - External team members: Departments of Statistics at Illinois, Ohio State, and Penn State, Department of Biostatistics at UCLA
    - External review report, p. 7

The undergraduate program plan is an outstanding one–we are impressed by the vision and effort that has gone into this already. We think this is very important for UNL and the State of Nebraska, given the enormous demand for people who are highly trained in statistics. Based on what has been observed nationwide, we expect this program to grow very quickly–potentially to hundreds of majors in the near future.

- 51 credit hours taught by Department of Statistics faculty
  - 24 new courses: 13 required, 7 electives, 4 capstones
  - Much more than any other statistics undergraduate program
- Rayne Aurit, BS in 2027?
  - Omaha (Elkhorn), NE
  - Sister Lizzie is an Earth and Atmospheric Sciences major; mother Sarah is a UNL Statistics PhD alum (2025)

- Data Science BS program began in 2023, a cross-college effort
  - Uses Statistics and Data Analytics program courses in the core: STAT 101, STAT 102, STAT 218, STAT 318
  - Includes Statistical Modeling focus area open to all Data Science students: 16 potential STAT courses
  - What happens without a Department of Statistics?
- What effect does the elimination of the Department of Statistics have on other undergraduate programs? Examples:
  - Actuarial Science major: STAT 462, STAT 463
  - Digital Agriculture minor: STAT 151, STAT 218, STAT 251, STAT 351
  - Mathematics, Statistics and Data Science major: STAT 380, two at 300-400 level
  - Petronela Radu, Chair of the Department of Mathematics
- MS and PhD in Statistics program since 2003 (year department was formed)
  - Focus on communication and collaboration in addition to the technical skills
  - ALL of our students get jobs

- Where do our MS/PhD graduates go to work? A few examples…
  - **Industry**: Alpha Statistical Consulting, American Board of Pediatrics, Alpine testing Solutions, Bank of America, The Boba Bar, Bryan Health, Celerion, Cytel, Deluxe Marketing Solutions, Detroit Pistons, Duluth Trading Company, Eli Lilly, Experian, First Citizens Bank, Firstat Indonesia, FICO, First American Home Warranty, First National Bank of Omaha (2), IBM, Incredible Health, JMP, Lutz, Marketing Measurement, Merck, National Board of Examiners in Optometry, Northrop Grumman, Novartis, Optum Life Sciences, Pig Improvement Company, Pratt & Whitney, Spreetail, Roblox, Sandhills Global, Univision Communications, US Bank, Wells Fargo, WyoVision Associates, Zoetis, ZyBooks (2)
  - **Government**: National Agricultural Statistical Service, National Cancer Institute, Nebraska Department of Health and Human Services, Sandia National Laboratories, South Carolina Department of Social Services
  - **Academics**: Air Force Academy (2), California Polytechnic State, Chadron State, CUNY, Clemson, Creighton (2), Iowa State, Kansas State, Kentucky, Michigan State (2), McCook Community College, Metropolitan Community College, North Carolina State University, UNLV, Northern Kentucky, Omaha Data Science Academy, Pennsylvania, Portland State, UNL-Athletics, UNMC (4), Virginia, Wake Forest (2), Washington-Tacoma, Winona State (3), Wisconsin-Platteville

Red = Nebraska company or Nebraskan working remotely for company

- Thomas Spoehr, PhD in 2029?
    - Bennington, NE
    - UNO Mathematics MS graduate
    - Brain drain
- "Nebraska's 'brain drain' deepens, loss of college grads now among nation's worst," *Omaha World-Herald*, December 31, 2023

Nebraska's 'brain drain' deepens

Net loss of people with bachelor's degree or more

2010 2012 2014 2016 2018 2020 2022
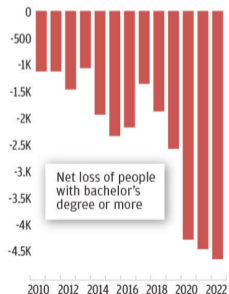
Source: UNO Center for Public Affairs Research

- Graduate students outside of statistics majors take our courses!
  - STAT 801, 802, 870 - Kept in the distributed model
  - Many other courses not in the distributed model (2012-2025)!

Courses Completed by ABSE, ACCT, ACTS and 136 more Graduate or Professional Students
Courses completed with a "C" or greater (as recorded shortly after the conclusion of the semester) by students who graduated between Fall 2012 and Summer 2025

Course	Title
STAT 802	Dsgn&analys Resh Std
STAT 801	Stat Methods In Rsh
STAT 801A	Stat Mthds Rsh:non Calc
STAT 892	Topics: Stat&problty
STAT 882	Math Stat I Dstb Thr
STAT 873	Appld Multivar Stat
STAT 870	Multiple Regression
STAT 811T	STATS MID-LEVEL TCHRS
STAT 883	Math Sta Ii Stat Inf
STAT 812T	Stat For H.s.teachers
STAT 880	Intro Math Stat
STAT 875	Categorcl Data Anlys
STAT 902	Adv Experimentl Dsgn
STAT 850	COMPTNG TOOLS FOR ST..
STAT 843	Sequenc&system Biol
STAT 831	Spatial Statistics
STAT 804	Survey Sampling

Number of Students

- Example: STAT 875, Categorical Data Analysis
  - Last 6 offerings had 22 different non-statistics majors

Major	Count	Major	Count
Accounting	3	Early Childhood Ed	1
Actuarial Science	2	Ecology	3
Ag Econ	3	Educational Pyschology	7
Agronomy	2	Entomology	1
Animal Science	5	Environmental Engineering	1
Atmospheric Science	1	Finance	1
Biosystems Engineering	3	Food Science	5
Biology	1	Natural Resources	1
Civil Engineering	10	SRAM	1
Communication Studies	1	Textiles	1
Construction Engineering	3		

Texts in Statistical Science

Analysis of Categorical Data with R

Second Edition

Christopher R. Bilder
Thomas M. Loughin

A Chapman & Hall Book · CRC Press

  - Metrics: Both editions of my book were not included as a research contribution
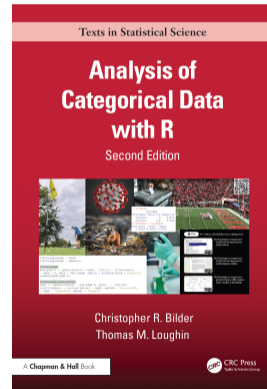
- What research does a faculty member in a Department of Statistics do?
  - Consulting
    - Work with subject-matter specialists
    - Apply known statistical methods
    - Publish in non-statistical journals
    - Consultant on grants
  - Team science
    - Same areas as consulting
    - Maybe develop new statistical methods and publish in statistics journals
    - Can be a Co-I on grants
  - Statistical
    - Develop new statistical methods
    - Publish in statistics journals
    - PI on grants: R01 NIH, NSF (CAREER, DMS, SES), Dept. of Education, USDA
- Faculty may focus on one, two, or all three of the research areas
- Effect on metrics
  - Many faculty are not PIs on grants
  - Many faculty are not first authors on papers
- Martha Mamo, Chair of the Department of Agronomy and Horticulture

- Extraordinary research: Group (pooled) testing example, March 2020
    - Chris Bilder, Professor at UNL Department of Statistics
    - Brianna Hitt, PhD student at UNL in 2020; now professor at Air Force Academy
    - R01 AI121351 NIH grant
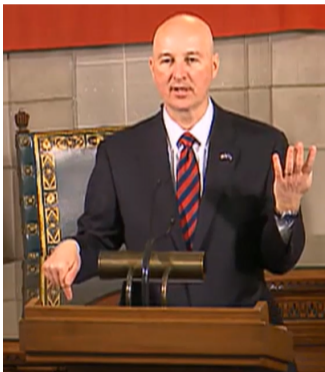
- Extraordinary research: Group (pooled) testing example, April-October 2020
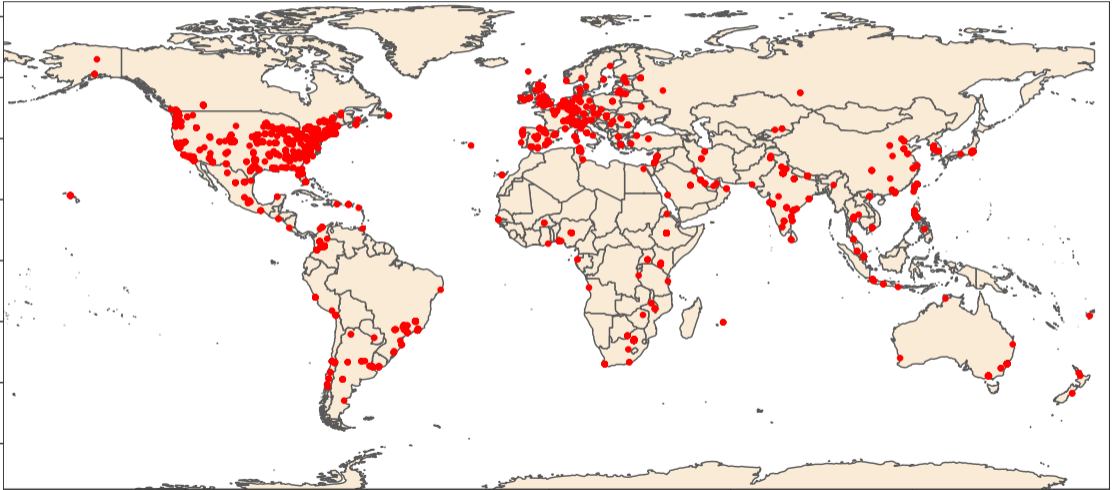
- **Extraordinary research**: Group (pooled) testing example, July 2020

The New York Times

How to Test More People for Coronavirus Without Actually Needing More Tests

By Quoctrung Bui, Sarah Kliff and Margot Sanger-Katz   July 27, 2020

Pooled Testing Could Expand Testing Capacity Across States
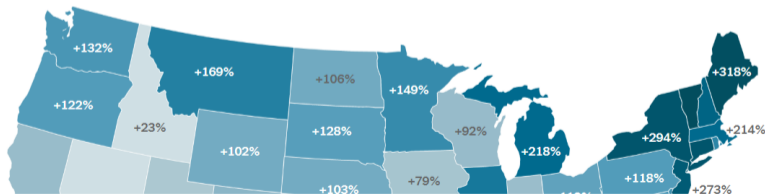
- Metrics: My app and the software were not included as a research contribution

- Using stats to eliminate a stat department
    - Faulty data, faulty analyses, faulty conclusions
    - See our report at www.SaveOurStats.com
- Need an external review by individuals with a PhD in Statistics
- Scholarly Research Index (SRI)
    - Measurement of research productivity for a department
    - Academic Analytics says SRI values are comparable ONLY within discipline (the higher, the better)
    - Chancellor's team used SRI values to compare across UNL disciplines/departments
    - Need to calculate the percentile within discipline AND then compare UNL departments
    - Apples vs. ~~oranges~~ pumpkins
    - Dramatic changes to departmental rankings when analyzed correctly

Units at UNL
ranked by their standing compared to peers

Communication Studies
Sociology
Architectural Engineering
Agronomy and Horticulture
Computing
Community and Regional Planning
Food Science and Technology
Modern Languages and Literatures
Accountancy
English
Biological Sciences
Educational Administration

Physics and Astronomy
Mathematics
Landscape Architecture Program
History
Statistics
Advertising
Biochemistry
Teaching, Learning and Teacher Education
Chemistry
Special Education and Communication Disorders
Natural Resources

Agricultural Leadership, Education and Communication
Mechanical and Materials Engineering
Political Science
Civil and Environmental Engineering
Child, Youth and Family Studies
Management
Architecture
Supply Chain Management and Analytics
News and Editorial
Art, Art History and Design
Psychology

Classics and Religious Studies
Educational Psychology
Economics
Interior Design
Philosophy
Animal Science
Marketing
Music
Broadcasting
Global Integrative Studies
Nutrition and Health Sciences

Electrical and Computer Engineering
Biological Systems Engineering
Finance
Agricultural Economics
Veterinary Medicine and Biomedical Sciences
Earth and Atmospheric Sciences
Textiles, Merchandising, and Fashion Design
Plant Pathology
Theatre and Film, Johnny Carson School of
Chemical and Biomolecular Engineering
Entomology

Proposed
● Eliminate
● Merger1
● Merger2
● Not Mentioned

SRI Percentile

Statistics has
3rd best
SRI out of 15
IANR units!

Proposed
- Eliminate
- Merger1
- Merger2
- Not Mentioned

Communication Studies
Sociology
Architectural Engr
Agronomy and Horticulture
Computing
Community and Regional Planning
Food Science and Technology
Modern Languages and Literatures
Accountancy
English
Biological Sciences
Educational Administration

Physics and Astronomy
Mathematics
Landscape Architecture
History
Statistics
Advertising
Biochemistry
Teaching, Learning and Teacher Education
Chemistry
Special Education and Communication Disorders
Natural Resources

Agricultural Leadership, Education and Communication
Mechanical and Materials Engr

Finance
Agricultural Economics
Veterinary Medicine and Biomedical Sciences
Earth and Atmospheric Sciences
Textiles, Merchandising, and Fashion Design
Plant Pathology
Theatre and Film
Chemical and Biomolecular Engr
Entomology

SRI Percentile

Statistics is a top 20 unit at UNL!

- How did the start of the new undergraduate programs affect the Department of Statistics?
  - 2021 APR, external review report, p. 9

  The [undergraduate] major requires the development of a considerable number of new courses. To develop these courses with only the existing faculty would require major sacrifices to faculty research programs and to their ability to collaborate with IANR and other faculty at UNL.

  - Number of faculty by year, undergraduate program began in 2022

 | Year | Number of faculty |
    |------|-------------------|
    | 2021 | 13.4 |
    | 2022 | 11.4 |
    | 2023 | 12.4 |
    | 2024 | 13.4 |
    | 2025 | 13.4 |

  - We were repeatedly told by IANR SLT
    - Don't indicate in proposal that you need more faculty to implement the major
    - We've got your back
    - Resources will come
  - End result: Research growth stunted, reduction in graduate courses offered, effect on metrics

- Fellows of the American Statistical Association

Department of Statistics	College/school of university	# of faculty	Percentage
Washington	Arts and Sciences	24	33%
UNL	IANR	13.4	30%
Rutgers	Arts and Sciences	35	29%
Iowa	Liberal Arts and Sciences	19	26%
Penn State	Science	48	21%
Wisconsin	Computer, Data, & Information Sciences	49	20%
Northwestern	Arts and Sciences	22	18%
Ohio State	Arts and Sciences	34	18%
Michigan	Literature, Science, and the Arts	46	17%
Purdue	Science	42	17%
UCLA	Physical Sciences	47	15%
Minnesota	Liberal Arts	21	14%
Michigan State	College of Natural Science	40	10%
Illinois	Liberal Arts and Sciences	41	5%
Indiana	Arts and Sciences	17	0%

- SRI by AAU and R1 for Departments of Statistics

December 2025: David Jackson (Interim Executive VP and Provost of the U of Nebraska system) has requested particular identifiers on the AAU+R1 panel be removed. We removed names and changed colors so that they do not coincide with universities from an athletic conference that UNL may be a member. The original panel is available on UNL's APC website.
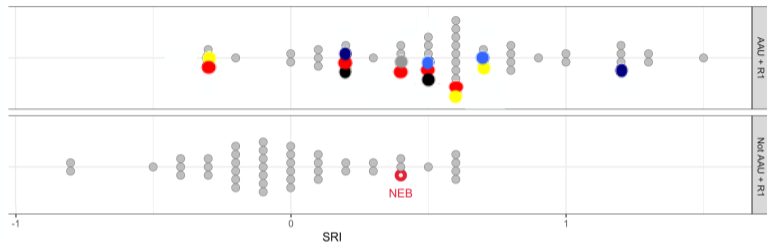
- The Department of Statistics is ready for the AAU. Is the rest of UNL?
- Public universities: Department of Statistics ranked 27 out of 123

- SC3L (consulting center) 2020-2024
  - 691 subject-matter researcher interactions with 58 units across NU system and Nebraska public service
  - Current staff per year: 1 director, 5 RAs @ 20 hours per week, students from consulting courses, faculty help
  - Proposed distributed model: 1 FTE (Full Time Equivalent faculty member)?

- Majors

Year	Number of faculty	Number of students
2021-2	13.4	38
2025-6	13.4	82

116% increase!

- Statistical no brainer: Keep the Department of Statistics

- Chancellor's recommendation: All faculty lose their jobs (13.4 FTE); others across the system can replace them
- Alternative distributed model
  - Why not the Department of English? $3.6 million in savings
  - Why not the Department of Mathematics? $4.6 million in savings
  - Ridiculous!
- Distributed model was used in the 1980s and 1990s at UNL. It did not work.
  - History lesson

    The Chancellor's proposal for statistics is a reversion to what existed at UNL in the 1980s. ... By 2001 it was clear that something needed to be done. Richard Hoffmann arrived from Iowa State to become Dean of Arts and Sciences. His first comment when we were introduced was, 'Why does UNL, a Land Grant, AAU, R1 research university, not have a statistics department?'
    Walt Stroup, founding chair of the Department of Statistics, UNL professor 1979-2020

 - Department of Statistics created in 2003

- 2021 APR exit report, p. 4; comment regarding the future

The big winners will be those universities which see the resources, current and future, generated by Statistics/Data Science and which direct them to invest in the development of statistical methodology, to grow the interdisciplinary connections between the field of Statistics and the nascent Data Science community; the losers will be those which poach this revenue stream to patch other holes in their budgets.

- Letter from Nancy Reid
  - Department of Statistical Sciences at U. of Toronto
  - National Academy of Sciences member
  - Describes what the harsh truth at UNL would be like without a Department of Statistics

- Efficiency
  - STAT 218 teach with less sections (implemented; $200k savings)
  - Reduce number of courses in Statistics & Data Analytics BS program; no longer extraordinary?
- Revenue
  - Recruit AP Statistics students! 252K students took the exam in 2024!
  - 4+1 program to obtain BS and MS in Statistics (paused)
  - UNL and Vellore Institute of Technology joint MS degree program; projected tuition in 2026-7 is $100K (paused)
  - Online MS in Data Science developed by Statistics, Mathematics, and Computing (paused)
    - Projected tuition in 2026-7 is $407K and in 2027-28 is $877K
    - The Department of Statistics is a one-third contributor to this program
  - Differentiated tuition for courses: IANR SLT suggests $300K
- Savings: Transition faculty from 12-month to 9-month appointments, $176K
- Investment: Professors of Practice
  - Department of Statistics at University of South Carolina
  - Similar size but also with Professors of Practice-like positions
  - Tuition: $13.5 million; expenses: $4 million (per year; best among A&S STEM departments)

- 2021 APR exit report: Certificates, online graduate majors, ... after undergraduate program is mature
- Change from a "distributed model" for statistics to a "central-focus model" for data science
    - Create a School of Data Science

Data Science

Statistics

Computer Science   Math
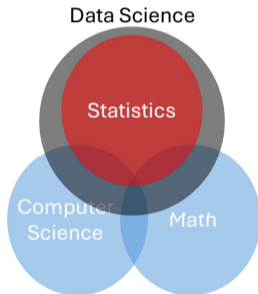
- Emulate other schools like Wisconsin, Cal-Irvine, and Cornell
- This truly "leverages expertise embedded across IANR, UNL, and the NU system" that will eliminate any redundancies that may exist
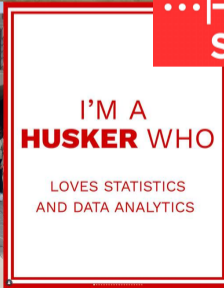
When I was a student, I was fortunate to work with faculty doing both research in statistics and extensive consulting across the Institute of Agriculture and Natural Resources. That balance of theory and application was incredibly valuable. It was also one of the reasons I was hired at Winona State ...

Since then, Winona State has hired two more UNL statisticians, and we've sent several of our graduates to UNL's graduate program in statistics, as well ... They've gone on to land highly competitive positions in academia and industry. This is proof that the department doesn't just serve its own students; it raises the bar for research and teaching far beyond its walls.

Tisha Hooks '06, first PhD graduate

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