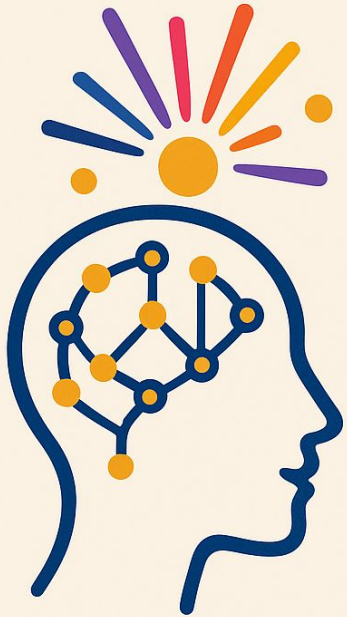
Electronic Conference on Teaching Statistics (eCOTS) 2026

Closing Session

Nick Horton (Amherst College)



Sparking Joy and Discovery

In a World of AI

eCOTS 2026

Connect. Share. Educate

CAUSE

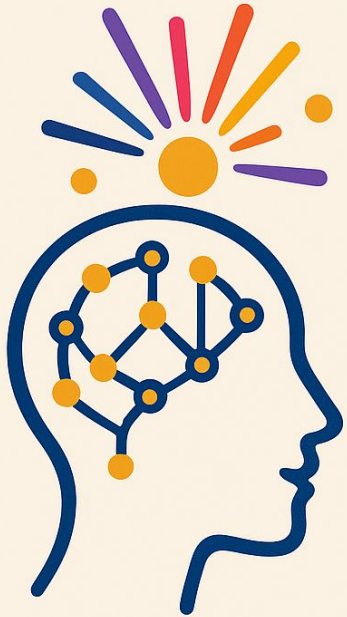
Consortium for the Advancement of Undergraduate Statistics Education

Congratulations to the R Core Team!

https://rousseeuwprize.org/2026

So Long, and Thanks for All the Fish!

https://en.wikipedia.org/wiki/So_Long,_and_Thanks_for_All_the_Fish



Sparking Joy and Discovery In a World of AI

eCOTS 2026

Sponsors


jmp
STATISTICAL
DISCOVERY


WILEY


posit


PennState
Eberly College of Science

Sponsors

Ross Metusalem: Multivariate Analysis with JMP

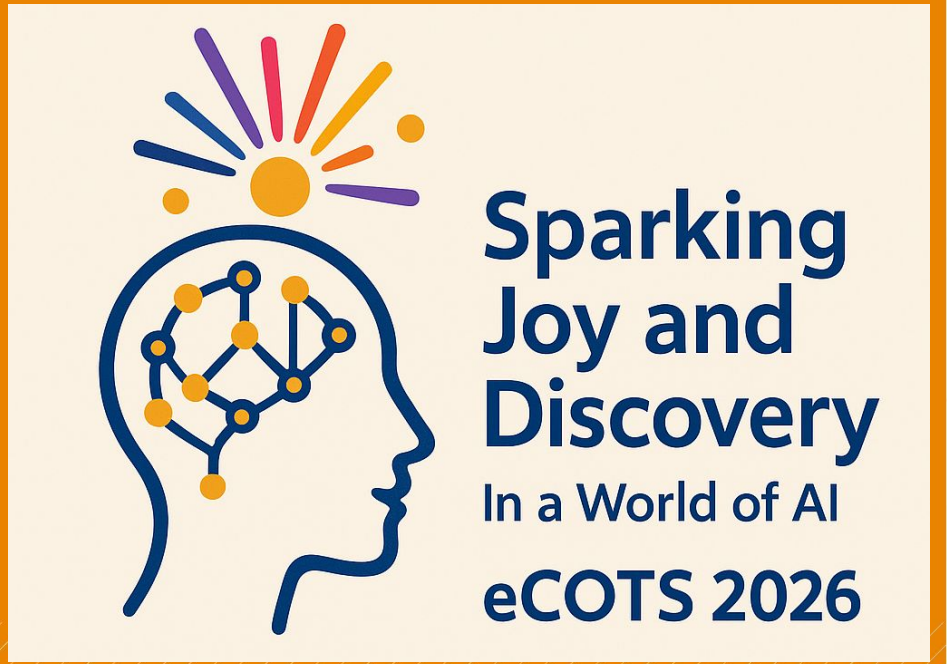
Patti Frazer Lock: Teaching Statistics using the GAISE College Report

Julia Silge: Teaching with Positron

CAUSE + Andrew + Terra + Matt + Lydia!

CAUSE Research

Laura Le (University of Minnesota) and **Jenny Green** (Michigan State University)



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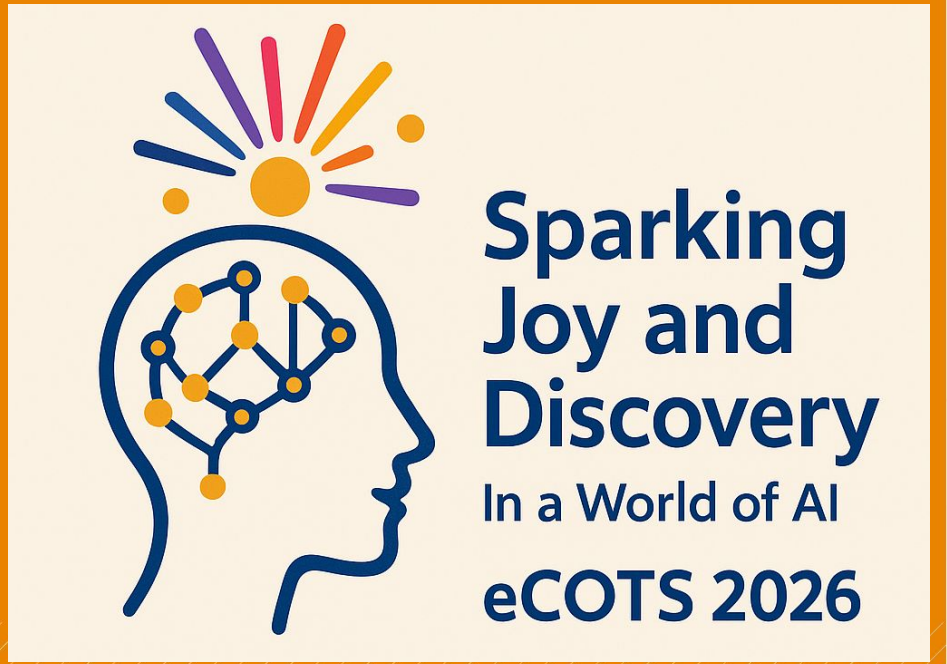
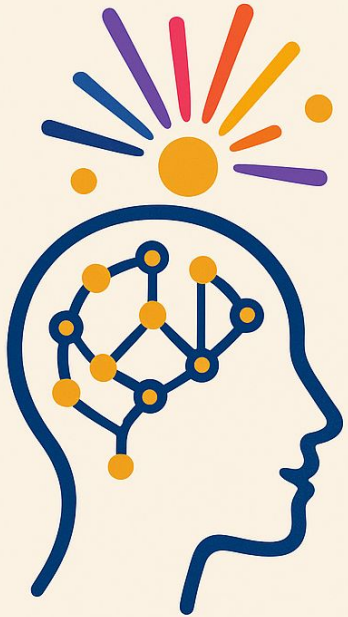
USPROC/USCLAP/USRESP

- **Ciaran Evans** (Wake Forest University)
- **Ranjini Grove** (University of Washington)
- **Shaoyang Ning** (Swarthmore College)
- **Annie Tang** (Colby College)
- **Victoria Woodard** (Notre Dame University)



Speed Mentoring

Tyler George
(Cornell College) and
Catalina Medina
(CSU Channel Islands)



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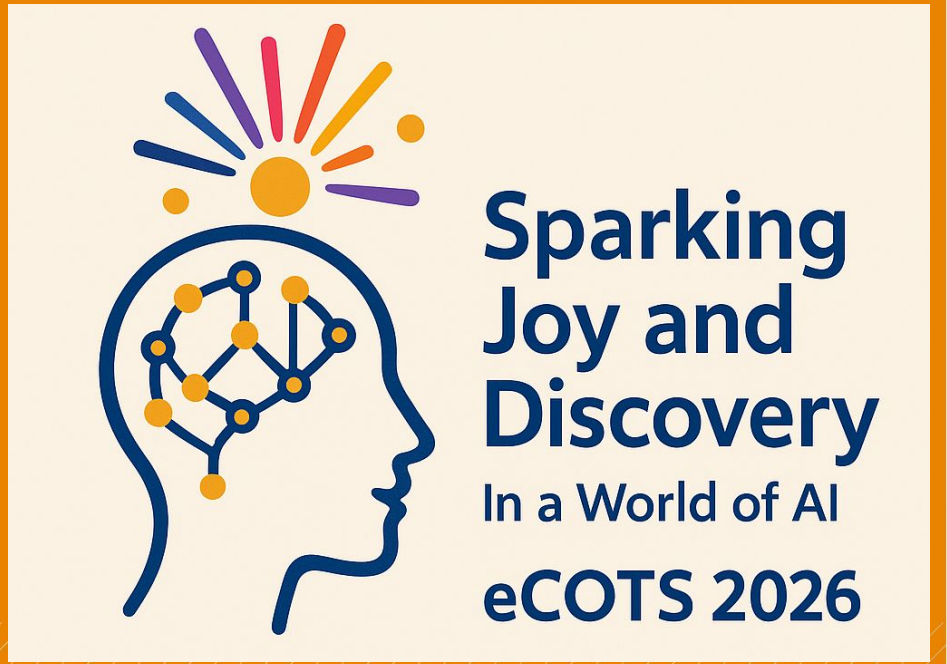
eCOTS 2026

Speed Mentoring

Kudos to our mentors!

Tori Ellison
Camille Fairbourn
Jennifer Green
Jennifer Kaplan
Tyler Maley
Ariadni Papana
Uma Ravat
Joel Sanqui
Derek Sollberger
Travis Weiland
Bethany White

Behind the Scenes Award



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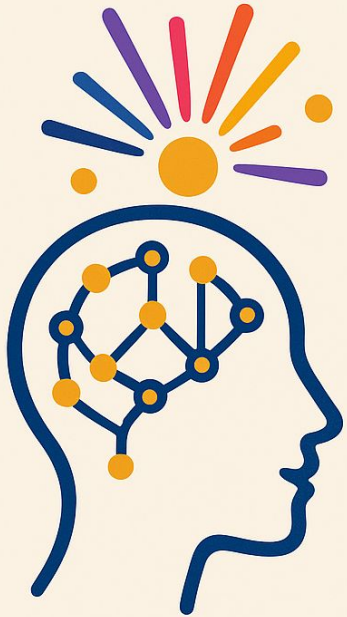
Behind the Scenes Award

Andrew Ferguson
(Penn State University)



Sparking Joy and Discovery
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2026 Program Committee

- Heather Cook (poster co-chair), University of Southern Indiana
- Andrew Ferguson, Penn State University
- Tyler George, Cornell College
- Juan Gomez, Carmel High School, CA
- Jacqueline Herman (poster co-chair), Northern Kentucky University
- Nicholas Horton (chair), Amherst College
- Vimal Rao, University of Illinois
- Kelly Spoon, San Diego Mesa College
- Sara Stoudt, Bucknell University
- Maria Tackett, Duke University
- Allison Theobold, Cal Poly, San Luis Obispo
- Jennifer Ward, Clark College
- Jonathan Wells, Grinnell College
- Beverly L. Wood, Embry-Riddle Aeronautical University

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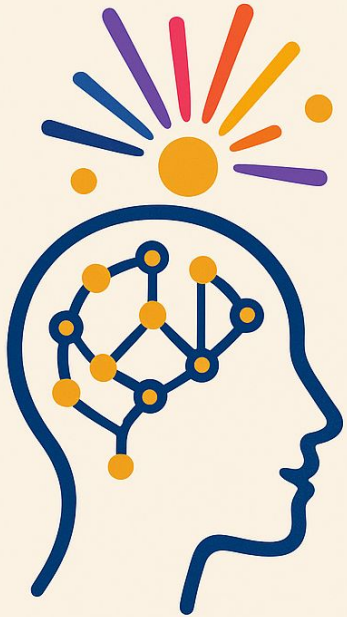
- Jennifer Ward, Clark College
- Jonathan Wells, Grinnell College
- Beverly L. Wood, Embry-Riddle Aeronautical University

Plus the leadership of CAUSE Director Matt Beckman!

What have we learned?
Where do we go from here?



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In a World of AI
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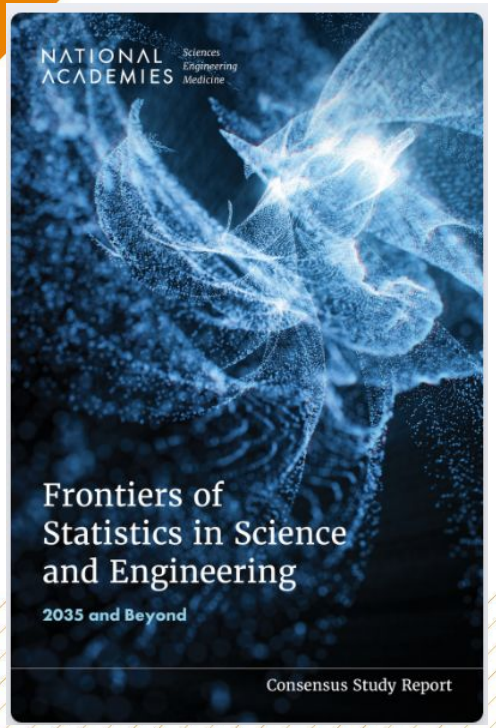
What would Dennis Pearl Say?

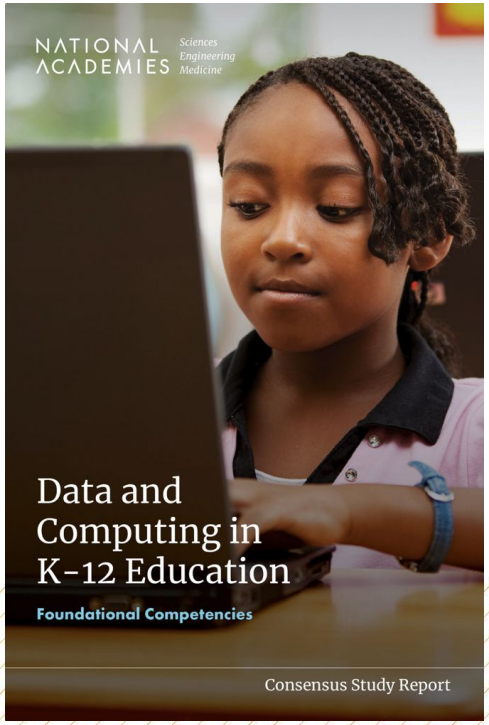
What can we learn from the world of chess?

What would Dennis Pearl Say?

Congrats again to Dennis for the 2026 George Cobb Lifetime Achievement Award!

Liz Stuart (Johns Hopkins) and Lance Waller (Emory University) keynote





Both reports freely downloadable (with free NASEM account)

Modernizing Mathematics Education for Grades 9-14 consensus report

Information Gathering Open Session to be held June 23
Noon-4pm ET (Virtual)

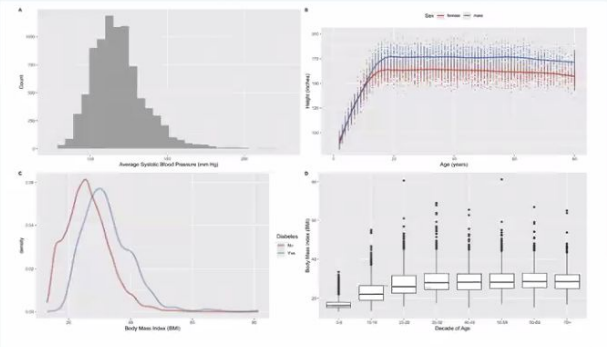
https://www.nationalacademies.org/projects/DEPS-MSEB-25-01

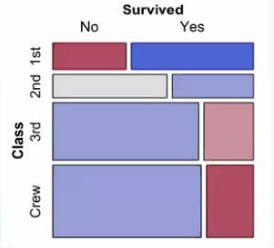
Liz Stuart (Johns Hopkins) and Lance Waller (Emory University) keynote

COMPETENCY 2

Producing & Working with Data

Measure, organize, explore, visualize





COMPONENTS

- Produce data: measurement & data provenance
- Organize data: case/attribute structure & data moves
- Exploration & data visualization

KEY INSIGHTS

- Data is actively "produced," not simply collected — every measurement involves decisions about what and how
- Data provenance matters: who collected it, when, where, why, and who was left out?
- Organizing data through wrangling, filtering, and aggregation is essential before meaningful analysis

Takeaways from this talk

Barbara Means keynote

- Students are using gen AI extensively and in many different ways.
- While gen AI is influencing student course behaviors, the basic principles of how people learn remain applicable and have implications for effective instruction.
- Digital Promise research shows that use of learning sciences-based teaching practices in statistics course matters for affective engagement, conceptual learning, and grade outcomes.
- As gen AI use continues to grow and proliferate, uses that complement or enable active learning and metacognition are likely to improve learning while those that support efficiency at getting right answers may undermine meaningful learning.
- Course assessment and grading practices need to change in light of the availability of AI.
- We should be assessing reasoning and inquiry processes rather than number of correct answers.
- In the near future, gen AI tools may support more efficient assessment of student reasoning on an ongoing basis.

The 10 Recommendations in the 2025 GAISE College Report embody many of these strategies

Strategy	*Definition*
Active Learning	Practices that ask the learner to construct and/or apply knowledge
Collaborative Active Learning	Practices that call on students to construct/apply knowledge collaboratively with peers
Building on Prior Knowledge	Cues that activate students' background knowledge and experiences with relevance to course content
Formative Assessment	Opportunities to practice skills and receive timely targeted feedback
Supporting Metacognition	Practices that help students take control of the learning process and learn how to be a better learner
Transparency	Providing students with a clear description of course content, learning objectives, and criteria to be used in assessing their work
Fostering Belonging & Inclusion	Practices that enable all students to feel that they and their unique background are welcomed in the course
Data-informed instruction	Use of near real-time student learning data to inform teaching

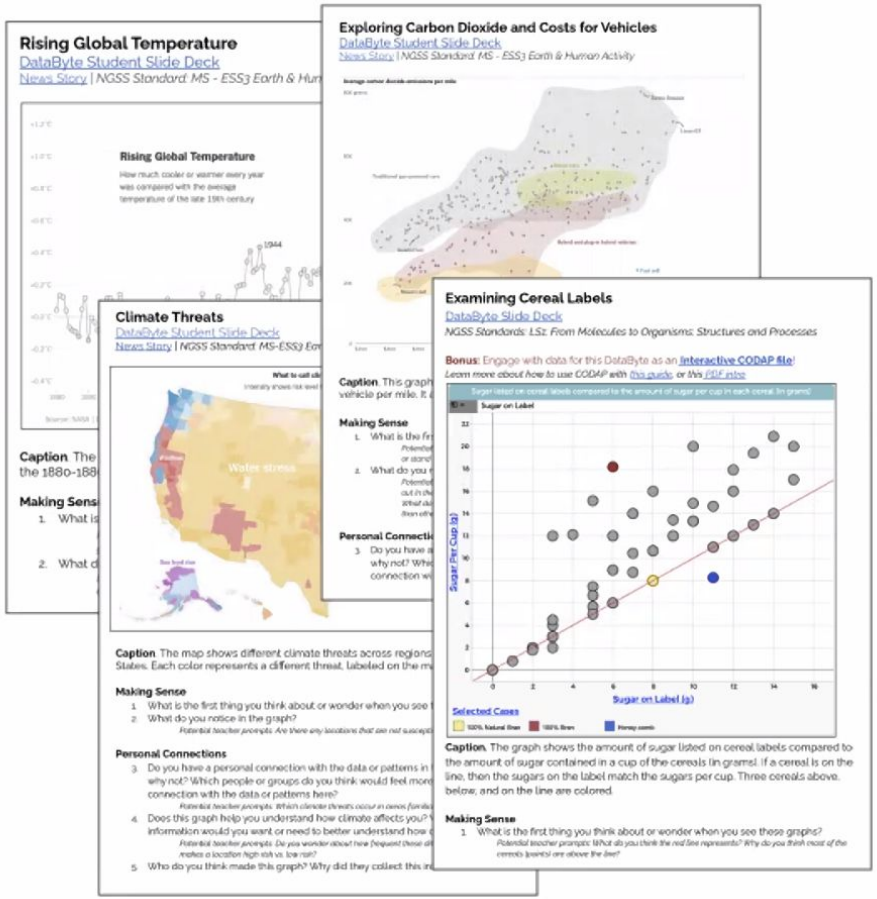
See https://amstat.quarto.pub/college-gaise/

What has changed?

In the age of AI

Rohan Alexander keynote

1. The importance of teaching skepticism.
   - Evals rule everything around me.
2. The importance of teaching editing and understanding code
   - “Learning Opportunities: A Claude Code and Codex Skill for Deliberate Skill Development” by Cat Hicks: https://github.com/DrCatHicks/learning-opportunities.
3. The importance of teaching students to push back.
   - AI helps most where the user knows least (Mythos model card, p. 27)!



Michelle Wilkerson keynote

Making sense of the data.

Building personal connections to the data.

Reflecting on the context and history of the data.

Envisioning future uses of the data.

Data Science AI Slop

Tori Ellison (UIUC)

AI + Data Science *Concepts/Interpretations*

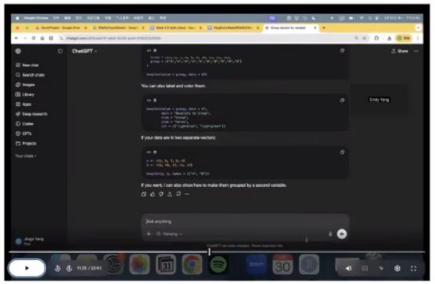
AI tools like ChatGPT make ***A LOT of incorrect claims/interpretations about data science concepts.***

Common *Conceptual* Data Science AI Slop

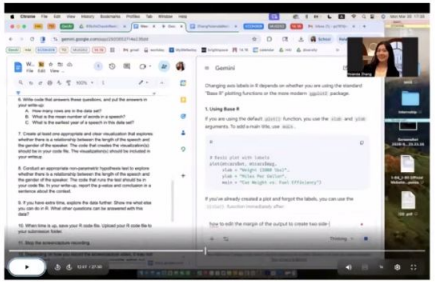
Type	Professional Penalty	Course Penalty
"ChatGPT linguistic style" (ANY content written in this style) *Ex: Too many emdashes.* **What counts as "ChatGPT linguistic style"?** (Just like in your future career, it is incumbent upon *you* to know and keep up to date with what people think "looks" like "ChatGPT linguistic style" if you plan to use it.) 	• Even if characteristic "ChatGPT linguistic style" is used for non-technical content, reader **loses *some* trust** that you actually understood and/or looked over the technical work. • Potentially not the appropriate **tone/audience** for the analysis. • Overhyped tone can be **misleading.**	• **-1.5 points** additionally deducted from assignment.
"Provable" Unchecked AI Content Generation • *Ex: Leaving the AI prompt/response/instructions in a copy-paste "Sure, here is a k-means elbow plot below".* • *Ex: A hallucinated written response that is completely unrelated/misaligned with what other code/elements of your assignment says.* 	• Reader **loses *pretty much all* trust** that you actually understood and/or looked over the technical work. The work could be full of errors, for all they know. Reading and **using the insights** from this work becomes very **risky for the reader**, if they do not wish to have a flawed understanding of the topic.	• **0 on the assignment** ("drop the 2 lowest" doesn't count). • The assignment counts as a **"AI Slop Warning"** (see tier system) • ***Repeated*** "Provable" Unchecked AI Content Generation of this nature is subject to an **academic integrity violation.**

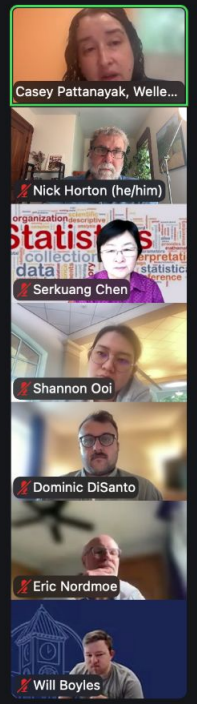
Revisions to course policies and structures

- AI allowed for coding on homework
- Screencapture videos of timed coding tasks, with AI allowed
- Individual feedback on process



- Analysis of video collection and student self-reflection in progress





The University of Texas at Austin
Charles A. Dana Center

Week 2: Using AI to Assist with Time Management

This is the actual lesson as students experience it — embedded in a course support structure, taking approximately **10 minutes of class time**. Here's how it unfolds:

1	Reflect on Successes & Challenges	Students briefly inventory what's working and what isn't from the previous week
2	Describe Their Weekly Schedule	Students articulate their full reality: classes, work, family, commute, and personal obligations
3	Engage the AI Tool	Students input a structured prompt describing their schedule and asking for a realistic study plan
4	Evaluate AI Recommendations	Students critically assess what the AI suggests — what's realistic, what isn't, and why
5	Select Strategies	Students choose which suggestions they'll actually implement based on their own judgment
6	Reflect on Implementation	Students write a brief reflection on what they tried and what they'd adjust going forward

Kadron Johnson (The Dana Center and The University of Texas at Austin) and Edith Aguirre (El Paso Community College)


Allison Davidson (Muhlenberg College)
What brings you Joy?
Photo Credit: Upsplash Joe Caione

Lightning talks: Community members were asked to share something that you are excited about that connects to the program

- Beth Chance (Cal Poly San Luis Obispo)
- Jessie Oehrlein (Fitchburg State University)
- Lisa Chan (The School District of Springfield Township, Pennsylvania)
- Michal Dvir (University of Haifa)
- Zachary del Rosario (Olin College)

Lightning Talk: Beth Chance (Cal Poly San Luis Obispo)

Choose Joy

Example 1: *ISCAM*

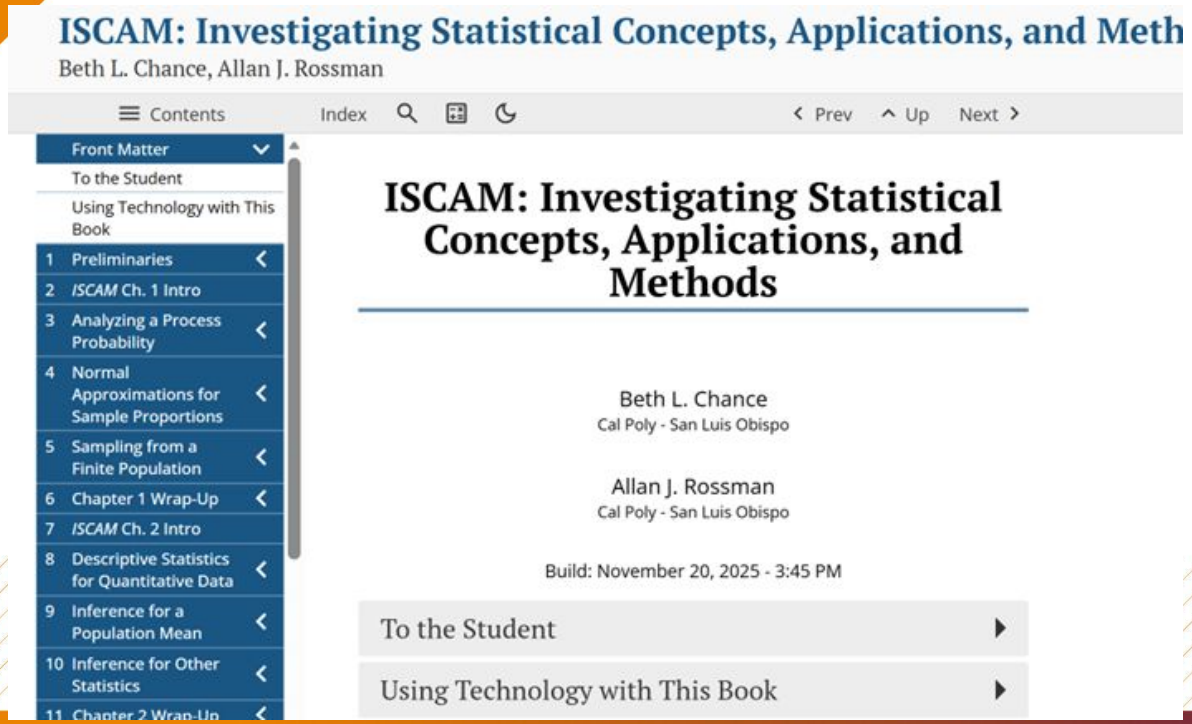
Investigating Statistical Concepts, Applications, and Methods (4th edition, JMP/R, pdf)

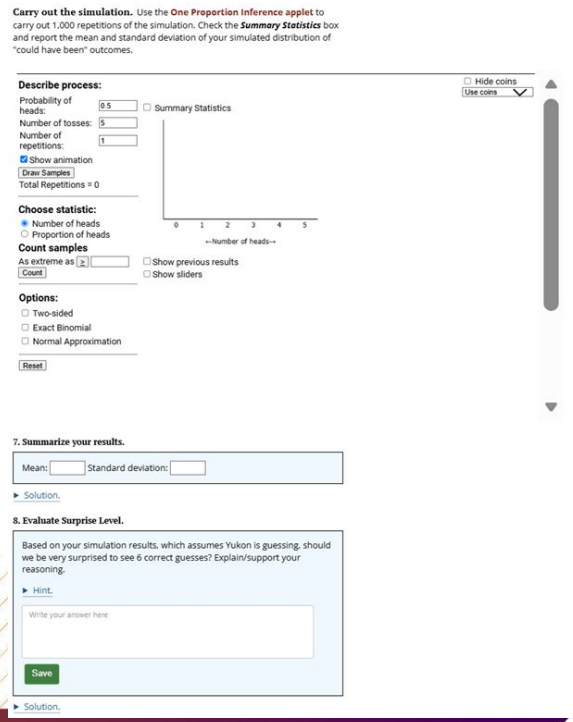
$ 5.00

Investigating Statistical Concepts, Applications, and Methods (4th edition, JMP/R, print)

$ 20.00

Runestone

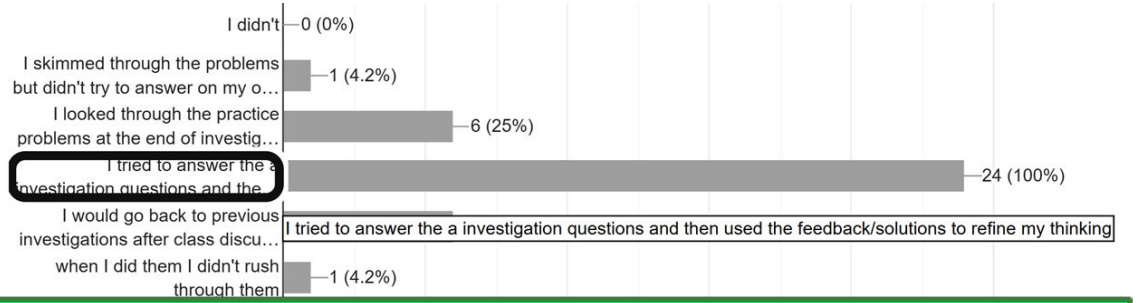

ISCAM: Investigating Statistical Concepts, Applications, and Meth
Beth L. Chance, Allan J. Rossman
Contents
Index
Prev
Up
Next
Front Matter
To the Student
Using Technology with This Book
1 Preliminaries
2 ISCAM Ch. 1 Intro
3 Analyzing a Process Probability
4 Normal Approximations for Sample Proportions
5 Sampling from a Finite Population
6 Chapter 1 Wrap-Up
7 ISCAM Ch. 2 Intro
8 Descriptive Statistics for Quantitative Data
9 Inference for a Population Mean
10 Inference for Other Statistics
11 Chapter 2 Wrap-Up
ISCAM: Investigating Statistical Concepts, Applications, and Methods
Beth L. Chance
Cal Poly - San Luis Obispo
Allan J. Rossman
Cal Poly - San Luis Obispo
Build: November 20, 2025 - 3:45 PM
To the Student
Using Technology with This Book


Carry out the simulation. Use the One Proportion Inference applet to carry out 1,000 repetitions of the simulation. Check the Summary Statistics box and report the mean and standard deviation of your simulated distribution of "could have been" outcomes.
Describe process:
Probability of heads:
Number of tosses:
Number of repetitions:
Show animation
Draw Samples
Total Repetitions = 0
Summary Statistics
Hide coins
Use coins
Choose statistic:
Number of heads
Proportion of heads
Count samples
As extreme as
Count
Show previous results
Show sliders
Options:
Two-sided
Exact Binomial
Normal Approximation
Reset
←Number of heads→
7. Summarize your results.
Mean:
Standard deviation:
Solution.
8. Evaluate Surprise Level.
Based on your simulation results, which assumes Yukon is guessing, should we be very surprised to see 6 correct guesses? Explain/support your reasoning.
Hint.
Write your answer here
Save
Solution.

Changed how I taught the course

Wednesday/Thursday - Factors that impact p-value (Day 4 ppt)

- Inclass: Recap 1.4 and 1.5
- Activity 4 (solutions)
- Submit I Wonder question for Day 4
- To Do before next class
  - Investigation 1.6 in Runestone

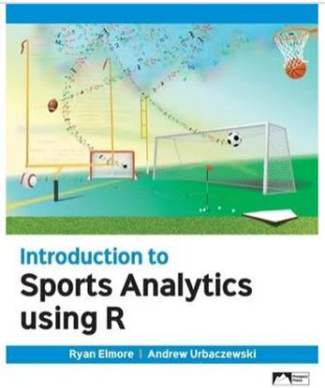


"Favorite: Built in applets + context for each investigations. Least: lack of "demonstrations" prior to questions, forces you to "guess" and learn from the answer key."

Example 2: Sports Analytics Course

SCORE Network

https://scorenetwork.org



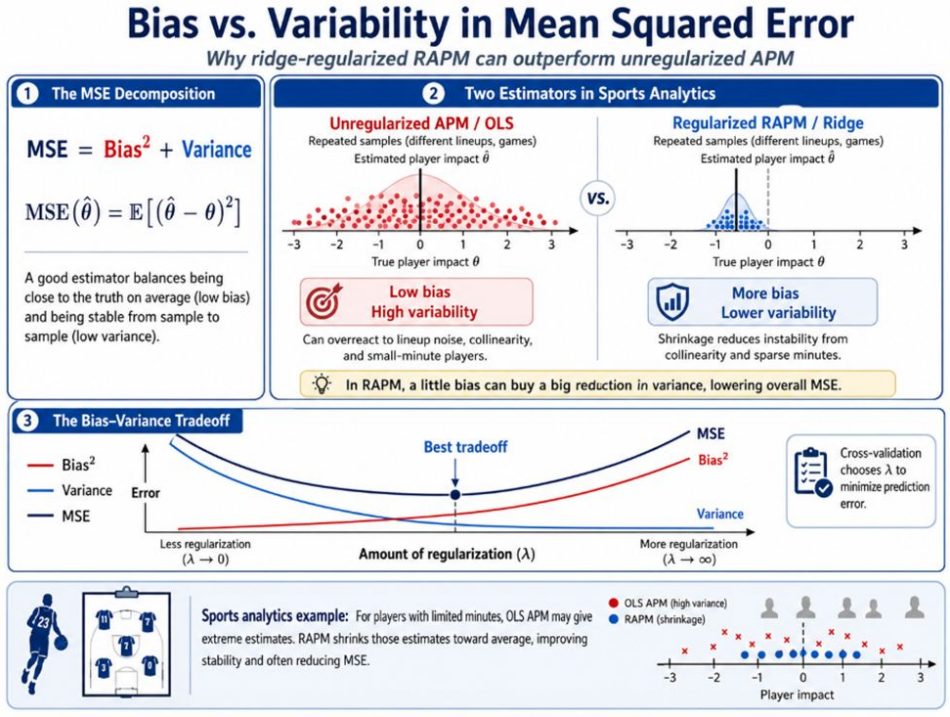
Amanda Glazer,
UT Austin

ASA Statistics in Sports Section

What I needed/got

- Brainstorming
- New examples, contexts
- Programming best practices
- Pedagogical advice
- Better assessment questions
  - Example question: how are regularized adjusted plus minus (RAPM) and shrinkage estimation related, different?

Understanding the big ideas



New times, new skills

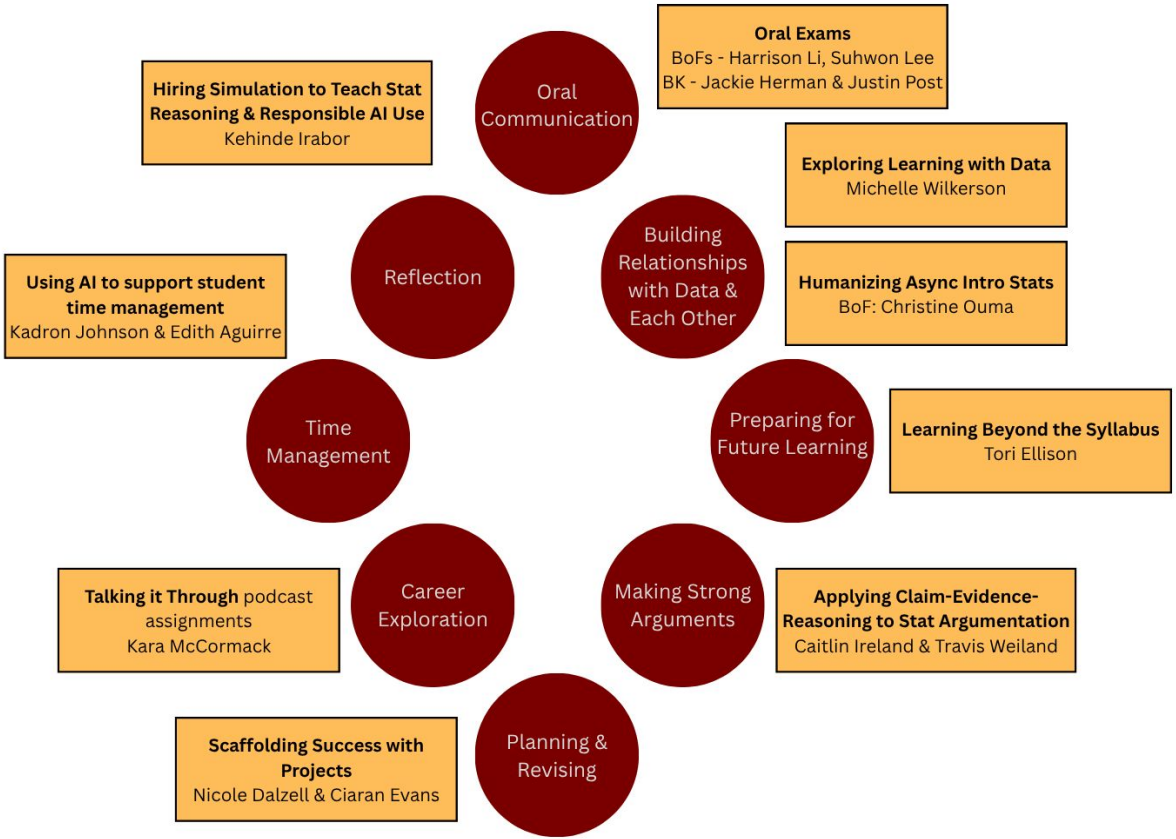
- Modelling effective use, iteration, refinement
- Asking better questions
- Statistical thinking
- Critical thinking
- Project management

Let's work together!

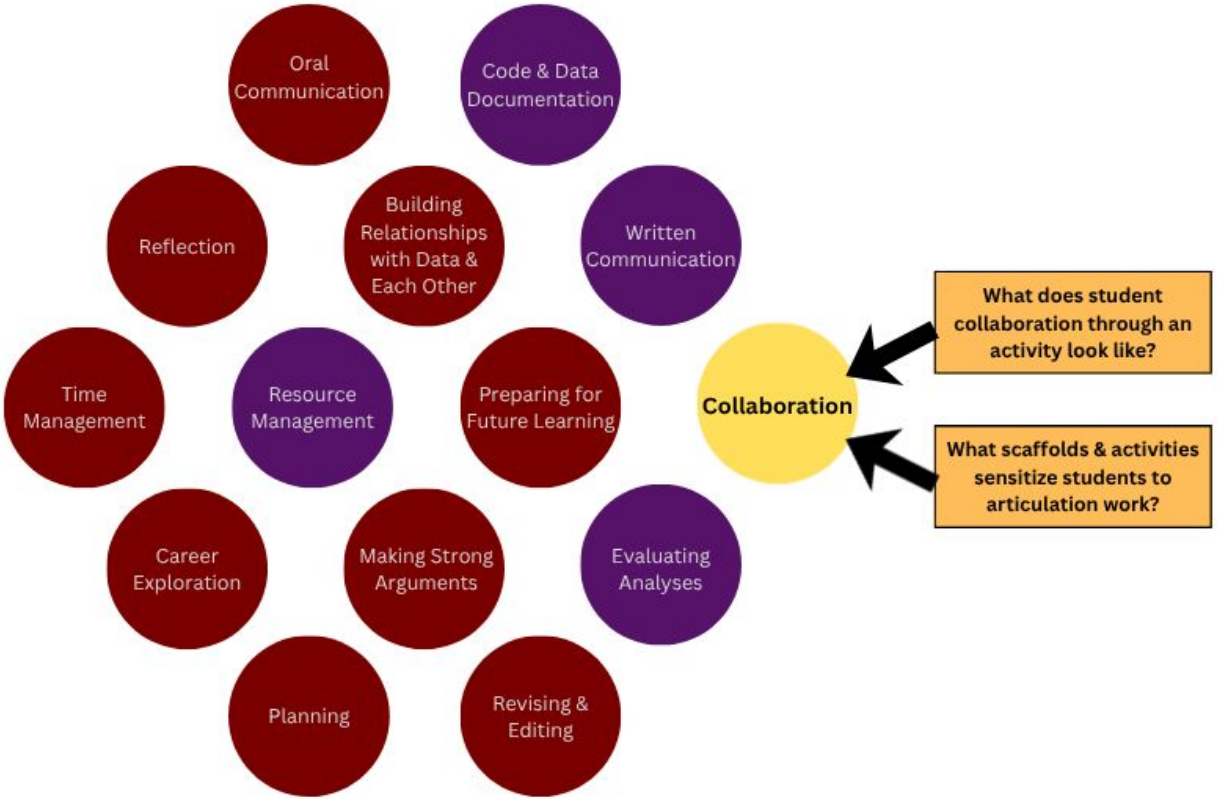
Lightning Talk: Jessie Oehrlein (Fitchburg State University)

Discovering the Process Along the Way

All the Process Along the Way



So many process skills to study & support!



Lisa Chan (The School District of Springfield Township, Pennsylvania)

Statistics Education

- Many statistics education resources including STEW
  - Lesson plans, activities and worksheets for various grade levels
- Data analysis vs. probability in statistics courses

Lightning Talk: Michal Dvir (University of Haifa)

Transformative bridges: Connecting Student Joy with the Dynamic Data Science Culture

Two different foci

Rohan Alexander

Telling Stories with Data in the AI Age

Disciplinary culture

Elizabeth Stuart & Lance Waller

The Future of Statistics and Data Science Education

Two different foci

Michelle Wilkerson
Exploring Learning with Data Across the Curriculum and Beyond

Students' culture

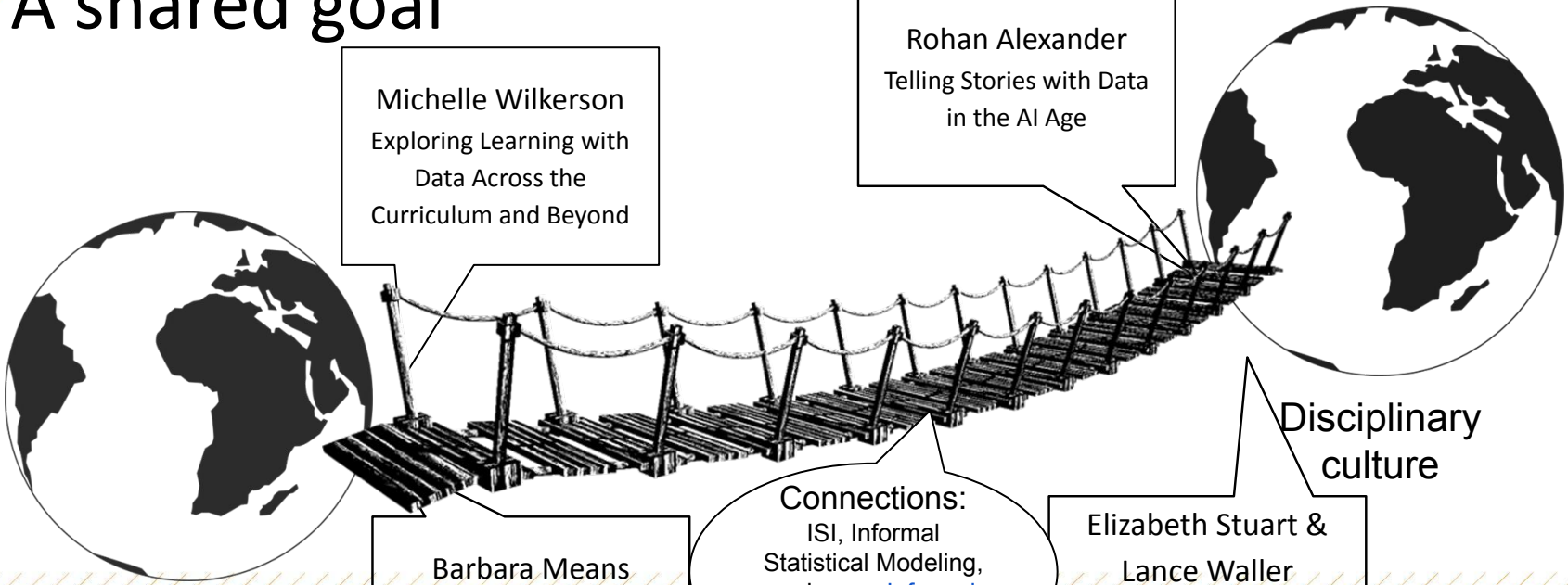
Barbara Means
Building Human Intelligence in a World of AI

Rohan Alexander
Telling Stories with Data in the AI Age

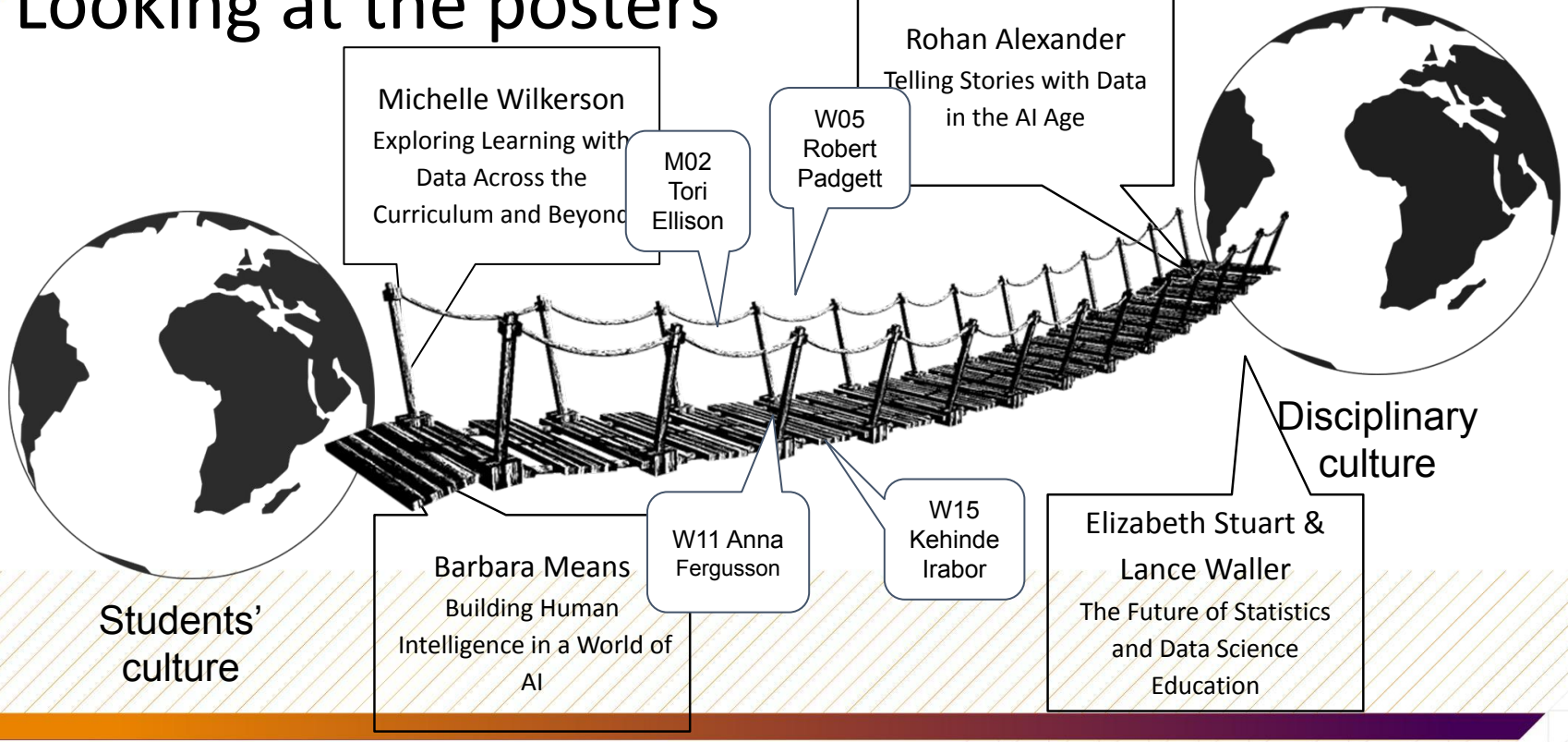
Disciplinary culture

Elizabeth Stuart & Lance Waller
The Future of Statistics and Data Science Education

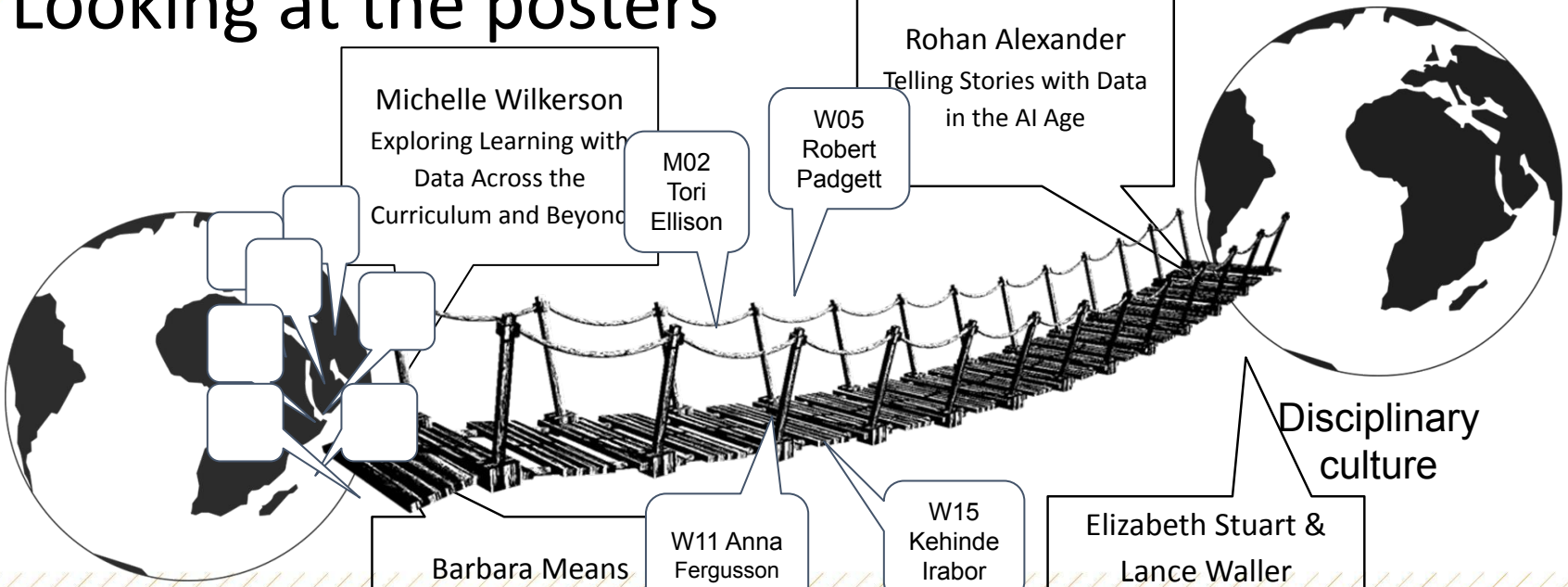
A shared goal



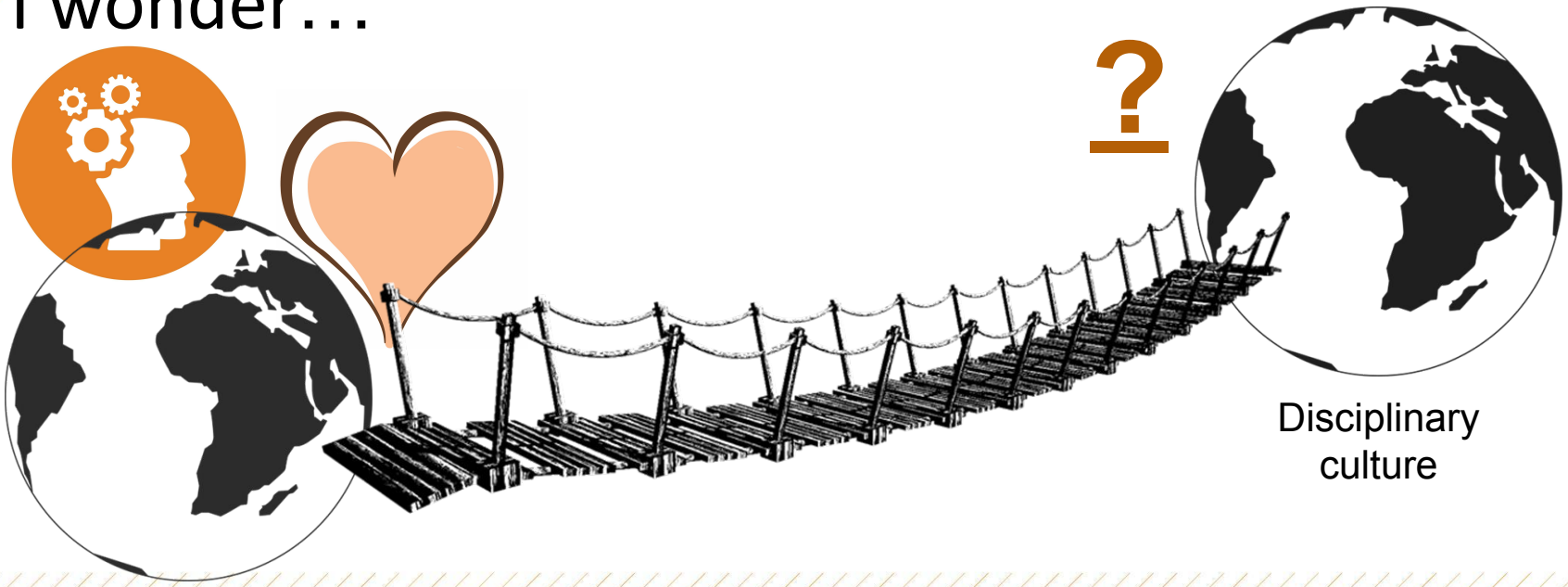
Looking at the posters



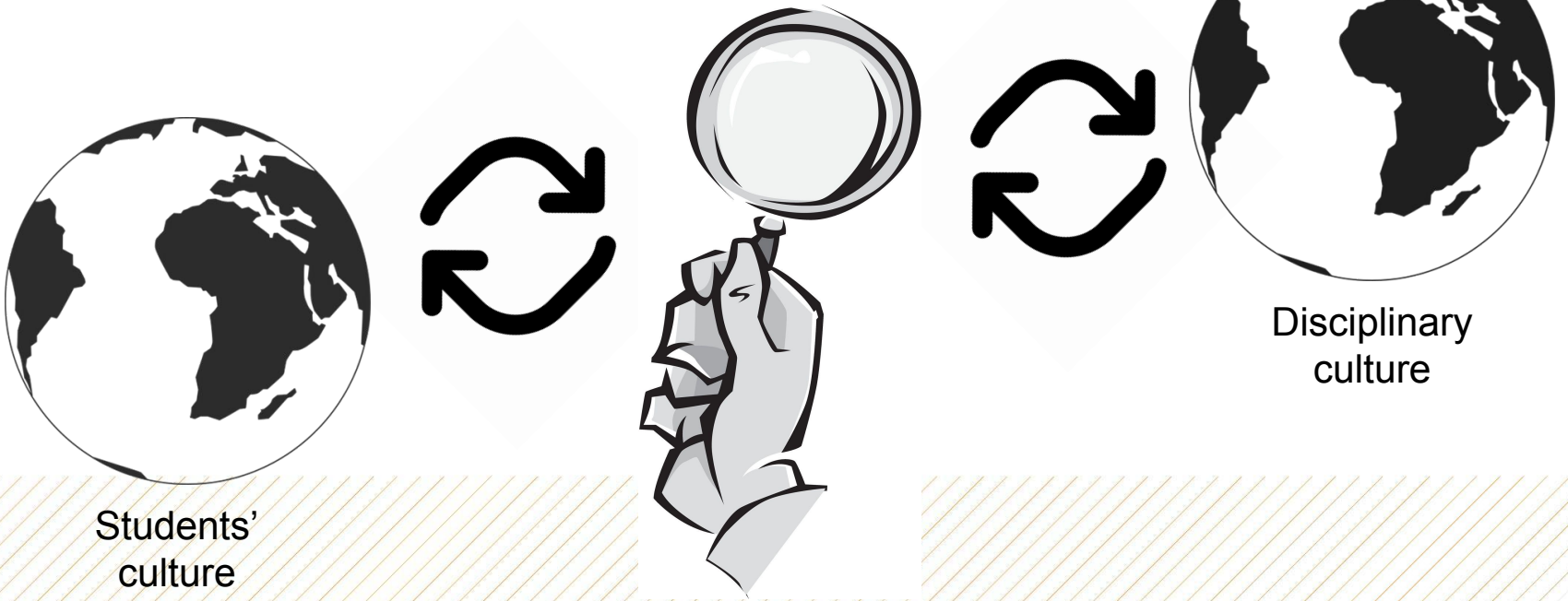
Looking at the posters



I wonder…



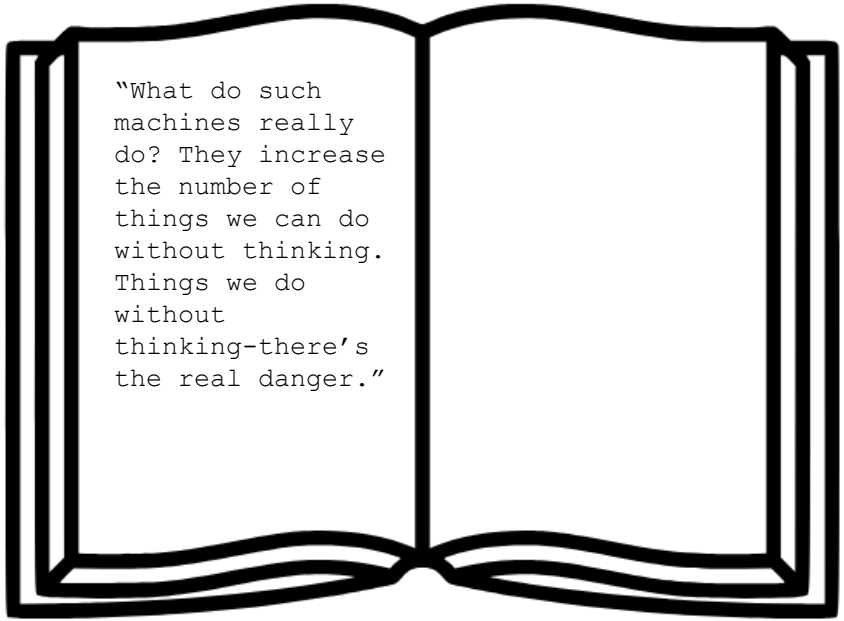
Transformative bridges: Connecting Student Joy with the Dynamic Data Science Culture



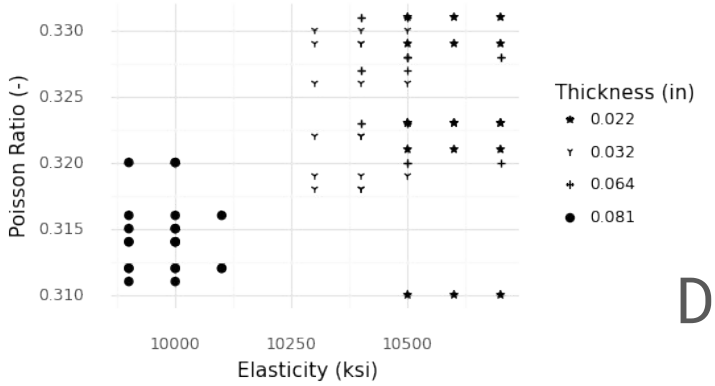
Lightning Talk: Zachary del Rosario (Olin College)

“What do such machines really do? They increase the number of things we can do without thinking. Things we do without thinking-there’s the real danger.”

— Frank Herbert



Created by At Her Cozy Corner
from Noun Project



DATA

+ Human Understanding → MEANING

CONTEXT

U. S. Department of Commerce
National Bureau of Standards

Research Paper RP1742
Volume 37, October 1946

Part of the Journal of Research of the National Bureau of Standards

Poisson's Ratio of Some Structural Alloys for Large Strains

By Ambrose H. Stang, Martin Greenspan, and Sanford B. Newman

Values of Poisson's ratio, as well as ordinary stress-strain properties, for tensile strains as high as 18 percent, were determined on sheets of aluminum alloys 24ST and 24SRT, chrome-molybdenum steel plate, and structural and fully killed low-carbon steel plate.

I. Introdu

1. General

In 1943 the Bureau decided to undertake an investigation on the elastic, and especially the plastic, properties of various materials under simple tension, with particular reference to the variation of Poisson's ratio with axial strain for large strains. Shortly thereafter the Army Air Forces Matériel Command expressed interest in the project, and the work was carried on as a cooperative enterprise. The pressure of other activities made it necessary to restrict the investigation mainly to the materials in which the Matériel Command was immediately interested; these were aluminum alloys 24ST and 24SRT sheet in several thicknesses and chrome-molybdenum steel plate 1/4 in. thick. Some additional results, obtained on structural steel angles and plates and on a fully killed low-carbon steel in connection with other investigations, are included in this paper.

Very few values of Poisson's ratio in the plastic range for structural materials have been published. Lessells and MacGregor [1] report results for one specimen of nickel-chrome-molybdenum steel and Plank [2] for one specimen of mild steel.

* Figures in brackets indicate the literature references at the end of this paper.

Poisson's Ratio for Large Strains

III. Methods of Test

1. Loading

Except as noted below, all of the sheet and plate specimens were loaded in either of two Baldwin-Southwark hydraulic testing machines (capacities 20 kips and 60 kips) equipped with Tate-Emery weighing systems. In the case of the 0.032-in. sheet of 24ST from which specimens were taken in seven directions, the loading in the elastic range was accomplished by means of a single dead weight of 923.0 lb, corresponding to a stress of about 17 kips/in^2.

The sheet and plate specimens were in all cases held in 2-in.-wide Templin grips, capacity 20 kips.

The round steel specimens were held in threaded adapters and loaded in an Amsler horizontal hydraulic testing machine, capacity 100 kips.

Except in the case of six of the fully killed carbon steel specimens, all tests were performed at room temperature. The steel specimens were tested in connection with another investigation and the tests were performed at a temperature of about −44° C. Preliminary tests had indicated that this fully killed steel was as ductile at −44°C as many ordinary ship steels are at room temperature, and the tensile tests confirmed this conclusion. The low temperature was maintained by solid CO_2 in an insulated box surrounding the specimens, and was measured by means of two copper-constantan thermocouples attached one near each end of the reduced portion of the specimen.

Most of the specimens were strained, in the plastic range, at a rate of about 0.8 percent per minute. Of the aluminum alloy 24ST, four specimens, two at 0 and two at 90 degrees, from each of two sheets (0.032 in. and 0.064 in.) were strained at a rate of about 3.2 percent per minute. This 4 to 1 variation in speed had no appreciable effect on the values of Poisson's ratio obtained, and therefore, speed over the range of low speeds used in these tests was not considered a significant variable.

2. Strain Measurements

(a) Elastic Strains

Method a-1.—In most cases these were determined by means of Tuckerman optical strain gages, 1-in. gage length. There were two gages parallel to the axis of the specimen, opposite each other at midwidth; these had 0.5-in. lozenges. Two gages having 0.2-in. lozenges were similarly disposed at right angles to the axis of the specimen. The load was applied slowly and then held constant while the strain gages were read.

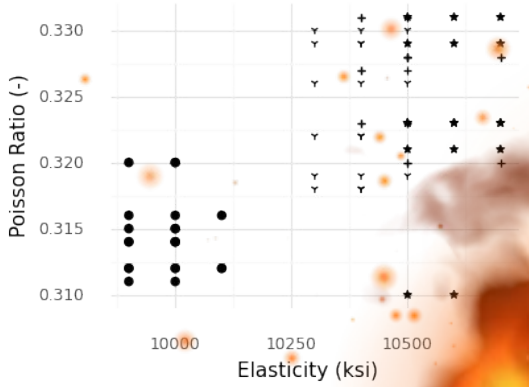
Method a-2.—In the case of the 0.081-in. 24ST sheet and the fully killed carbon steel, the elastic strains were determined by means of SR-4 electric-strain gages of various types. [4-1, 7-8, 7-9, 7-10] used in conjunction with SR-4 portable strain indicators. The disposition of the gages was the same as of the Tuckerman gages of method. a-1.

(b) Small Plastic Strains

Method b-1.—Wherever method a-1 had been used for the elastic strains, the same Tuckerman gages were used in the intermediate range. Each

Poisson's Ratio for Large Strains 213

https://tinyurl.com/stang03



U. S. Department of Commerce
National Bureau of Standards

Research Paper RP1742
Volume 37, October 1946

Part of the Journal of Research of the National Bureau of Standards

Poisson's Ratio of Some Structural Alloys for Large Strains

By Ambrose H. Stang, Martin Greenspan, and Sanford B. Newman

Values of Poisson's ratio, as well as ordinary stress-strain properties, for tensile strains as high as 18 percent, were determined on sheets of aluminum alloys 24ST and 24SRT, chrome-molybdenum steel plate, and structural and fully killed low-carbon steel plate.

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Created by Darwin Mulya
from Noun Project

MEANING??

https://tinyurl.com/stang03

Self Actualization

OR

OR

JOB PREPARATION

Civic Engagement

Created by Oleksandr Panasovskyi
from Noun Project

Cognitive

Created by Arafat Uddin
from Noun Project

OR

Social

Created by IMG visuals icons
from Noun Project

OR

Liberatory

Created by Saeful Muslim
from Noun Project

This "or" perspective limits from

being bold

Here's my perspective:

Hi! I'm Zach del Rosario

Associate Professor of

Engineering and Applied Statistics

…

… but what are you *really*?


Asian / Pacific Islander


White


Engineer


Statistician

... why only one?

Cognitive

Created by Arafat Uddin
from Noun Project

AND

Social

Created by IMG visuals icons
from Noun Project

AND

Liberatory

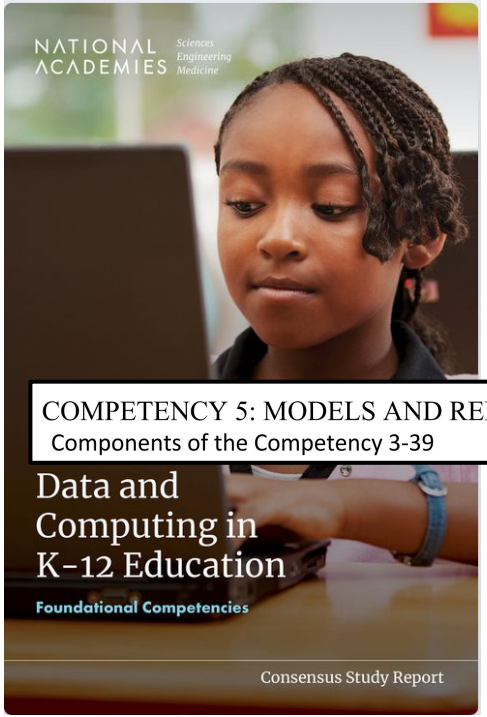
Created by Saeful Muslim
from Noun Project

... how can we put these together?

… can I tell you about my dream?

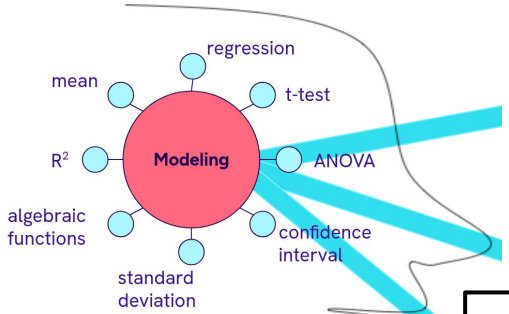
It starts with a *movement*…

Modeling is a movement



COMPETENCY 5: MODELS AND REPRESENTATIONS 3-35
Components of the Competency 3-39

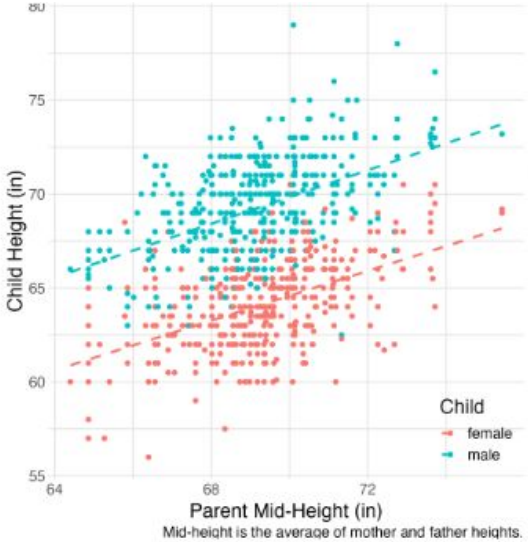
Principles:
7. Modeling authentic applications

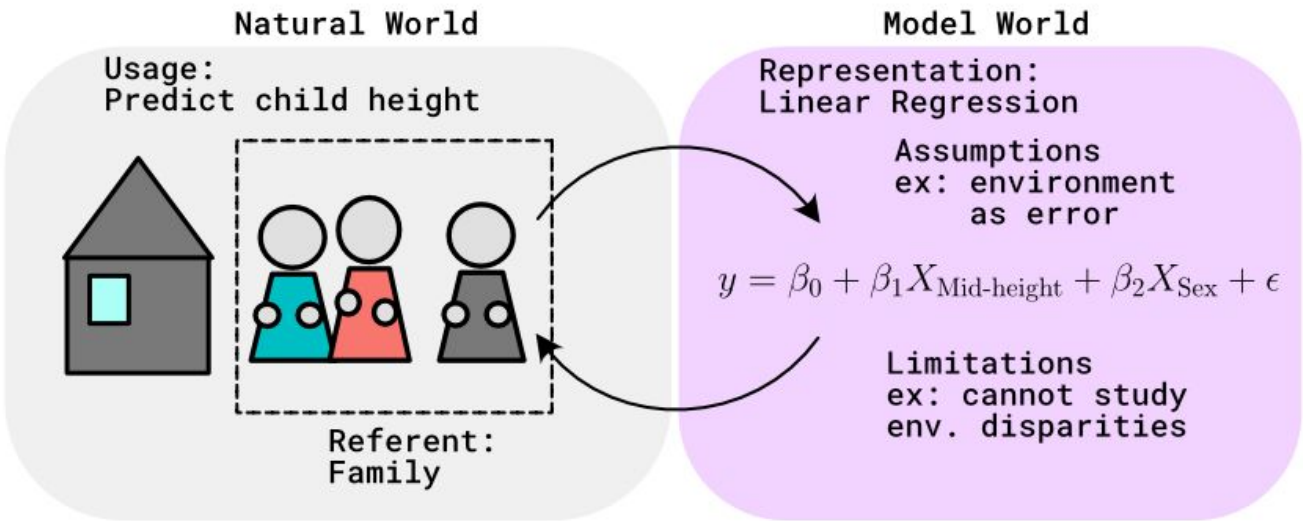


Models as practicing connections

CourseKata

My goal with modeling:
combine cognitive and humanist outcomes

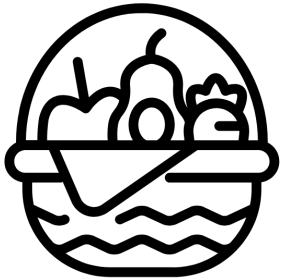




So *multi*disciplinary, right?

Boyd et al. (2026) TENCHI DIAGRAMS: A TECHNIQUE TO MAKE VISIBLE STUDENTS' THINKING ABOUT MODELS, ICOTS-12

Multi-disciplinary



Created by Sentya Irma
from Noun Project

Inter-disciplinary

Created by Arthur Shlain
from Noun Project

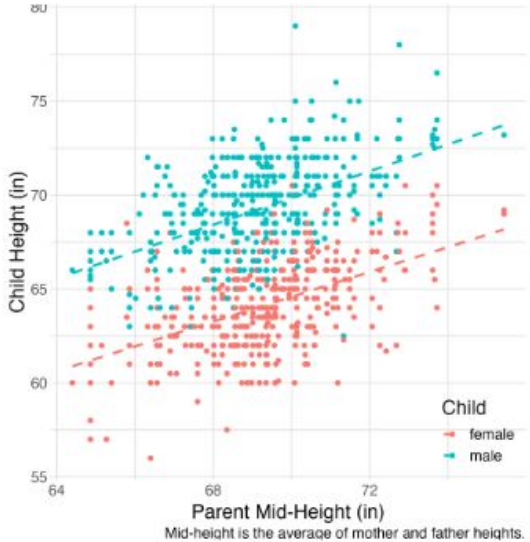
Trans-disciplinary

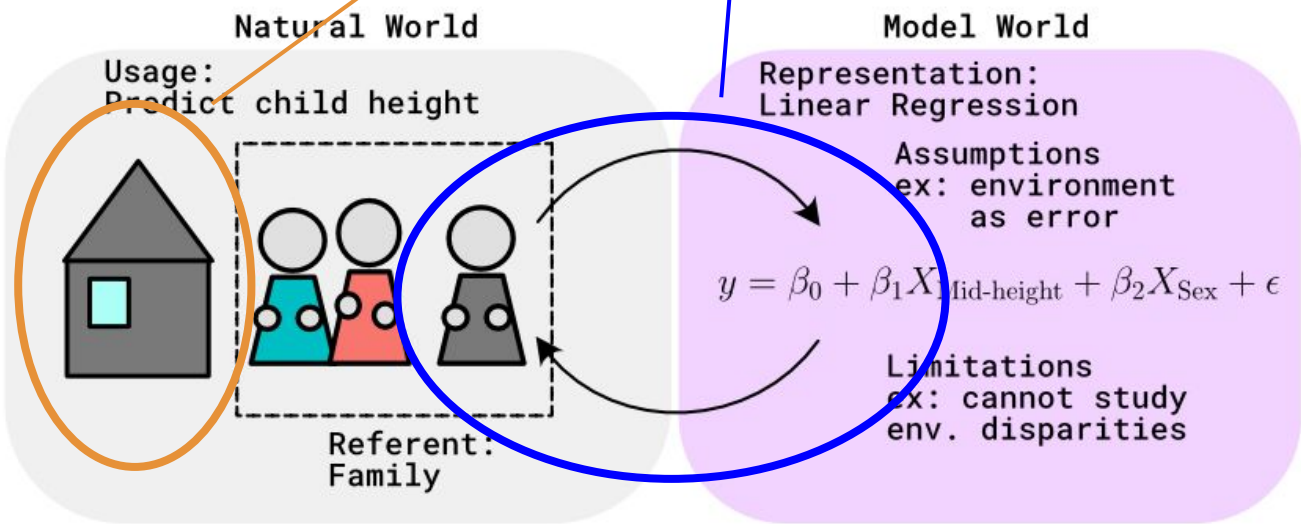
Created by Febrian Hidayat
from Noun Project

See also: https://ian.umces.edu/blog/got-complex-problems-have-a-transdisciplinary-smoothie/

Transdisciplinary teaching
(Tear down boundaries)

Make it obvious the cognitive belongs with the humanist





Boyd et al. (2026) TENCHI DIAGRAMS: A TECHNIQUE TO MAKE VISIBLE STUDENTS' THINKING ABOUT MODELS, ICOTS-12

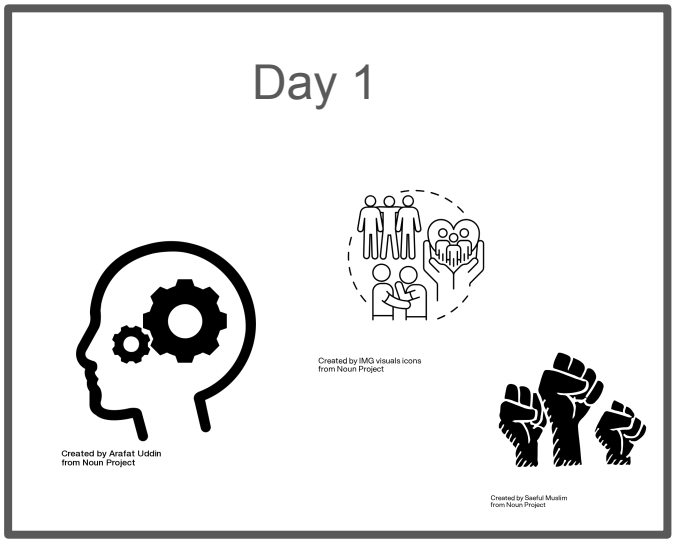
The way we teach can reinforce boundaries

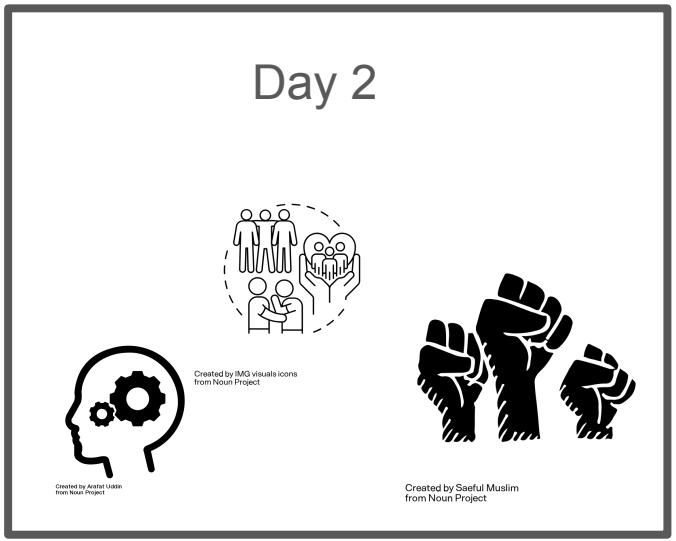
Day 1 Math	Day 2 Math	Day 3 Math	Day 4 Ethics	Day 6 Math	Day 7 Math	Day 8 Math	...

"I guess this is a math class."

"Wait, what was that?!"

My invitation:
What ideas would you want to *tie* together?
And *how* could you do that?





...

"We're going to learn some cool technical stuff!"

"How could you ever do the analysis without the context?"

Why Now in a World of AI?

- Make new meaning(s) no AI could produce
- Resist techno-solutionism
- Show the joy of statistics in *every* backyard

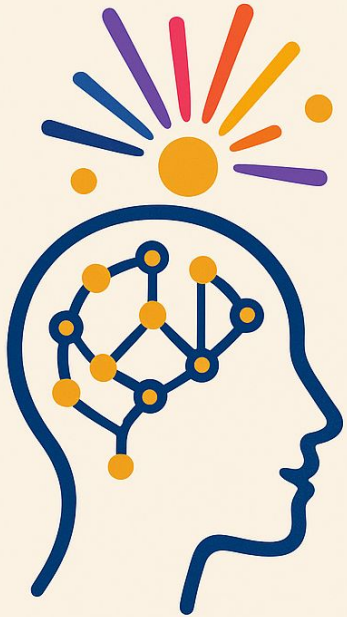
Next steps from here

JSM Birds of a Feather Sessions (virtual ones do not require JSM registration):

Sign Up for Updates: https://bit.ly/JSM26BOF

Journals + Publication

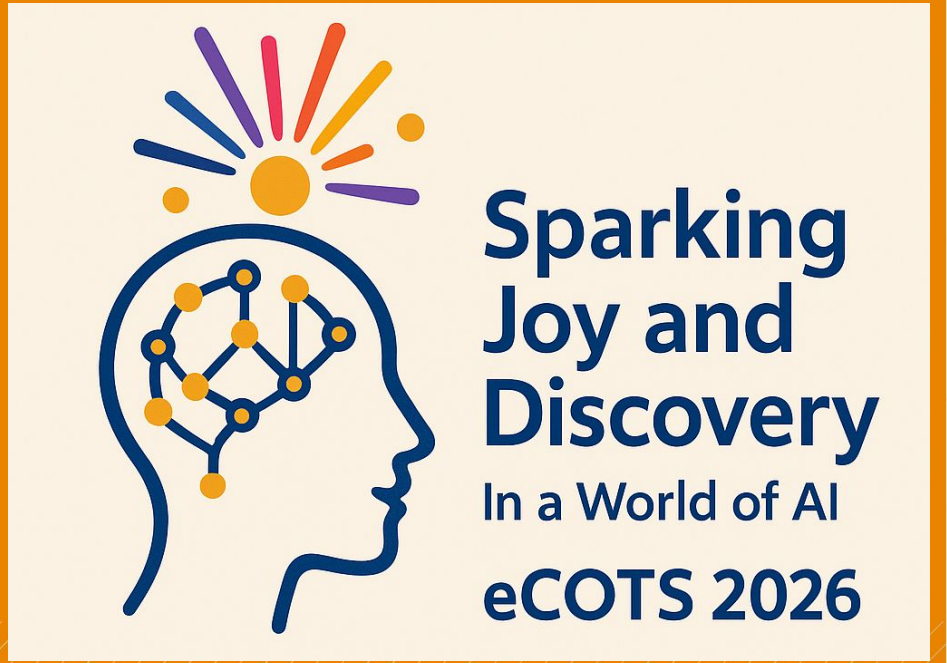
- Journal of Statistics and Data Science Education
- Teaching Statistics
- Harvard Data Science Review
- Statistics Education Research Journal
- Technology Innovations in Statistics Education



Sparking Joy and Discovery
In a World of AI
eCOTS 2026

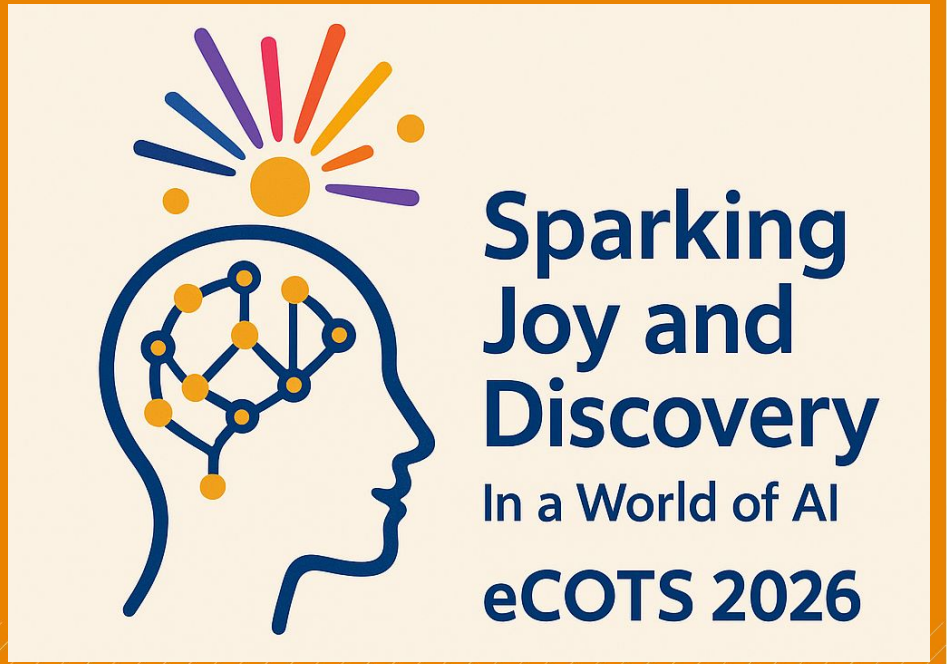
Next steps from here

CAUSE Slack Workspace (posts expire after some time but a chance to interact)



Closing Thoughts

Matt Beckman (CAUSE Director)



USCOTS 2027: June 22nd - 26th

- **Timing**
  - **Main conference:** Lunch on Thursday June 24th through lunch on Saturday June 26th
  - **Workshops:** Tuesday, June 22nd through morning of Thursday June 24th
  - **Research Satellite:** Evening of Wednesday June 23rd through morning of Thursday June 24th
- **Location:** The Penn Stater, State College, PA
- And, the **theme** will be…

USCOTS 2027 Theme: Constancy and Disruption

In an age of disruption, what **guiding principles** do you aim to hold constant amid the disruption?

On the flipside, how do you embrace the disruption to **transform** your teaching and education research?

Want to get involved in planning USCOTS 2027?
Reach out to Kelly McConville (k.mcconville@bucknell.edu), Allan Rossman (arossman@calpoly.edu), or Matt Beckman (mdb268@psu.edu).

“Ask Good Questions” Symposium on July 14 - 15, 2027 at Cal Poly - San Luis Obispo, CA

- Program:
  - Wed, July 14th: Dinner banquet
  - Thu, July 15th: Talks
- Hosted in honor of Allan Rossman
- Organized by the Statistics Department of Cal Poly - San Luis Obispo, CA
- Contact Beth Chance (bchance@calpoly.edu) for more information
- Hope to see you there!

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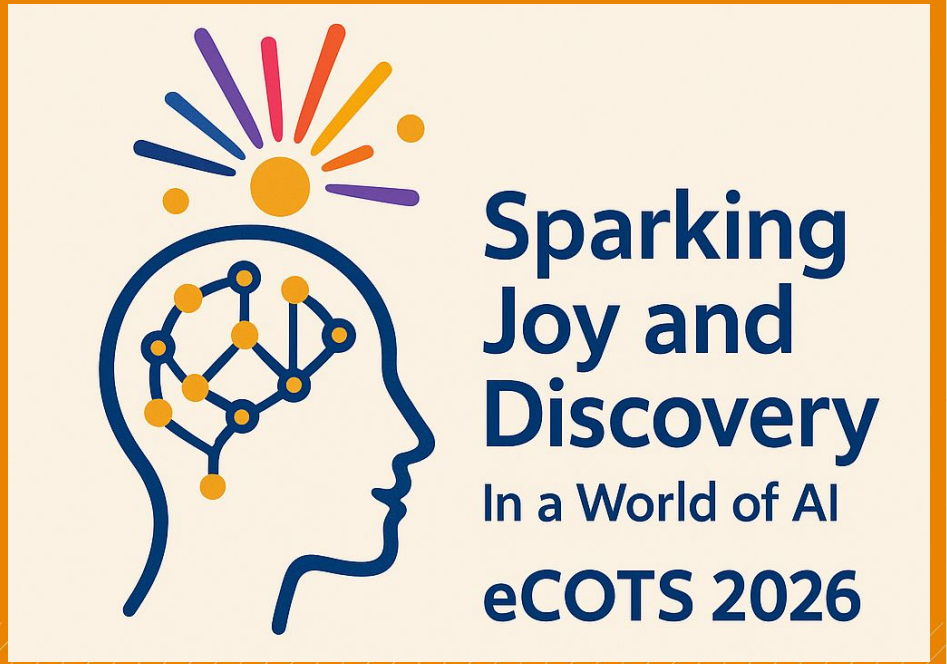
Electronic Conference on Teaching Statistics (eCOTS) 2026

Hope to see you next summer!



Connect. Share. Educate

CAUSE
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