

CanCOTS 2025

Addressing current questions in post-secondary statistics and data science education through an **unconference**

Léo R. Belzile, Wesley S. Burr, Bruce Dunham and Alison L. Gibbs

ICOTS 12

Acknowledgments

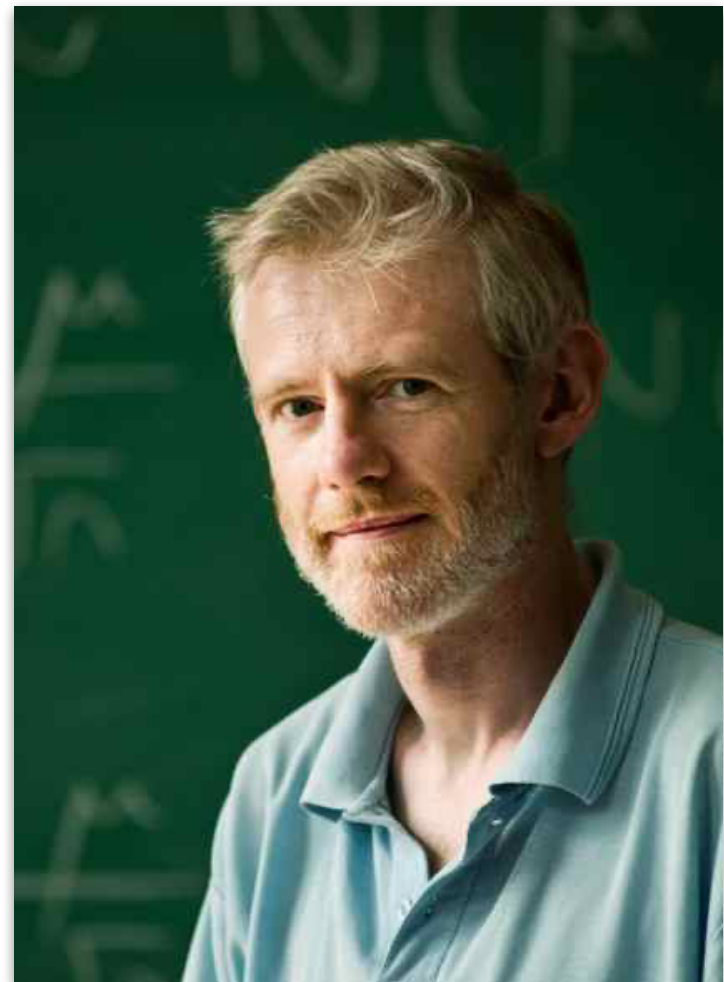
CanCOTS 2025 team



Léo Belzile, HEC Montréal



Wesley Burr, Trent University



Bruce Dunham, UBC



Alison Gibbs, University of Toronto

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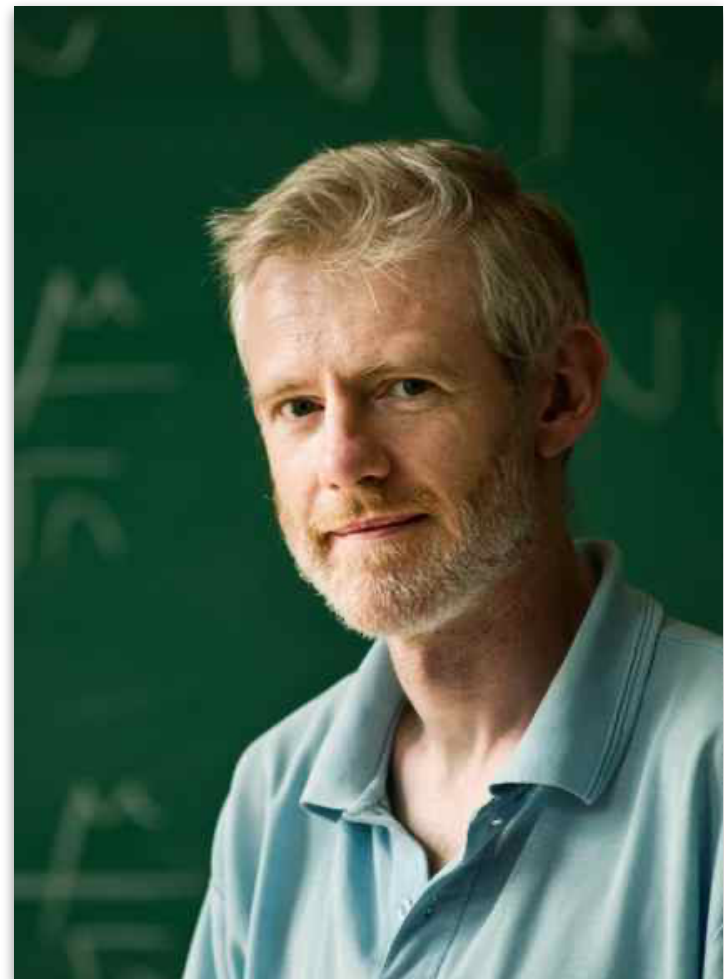
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CanCOTS 2025 participants



Agenda

Unconferences:

- Why?
- What?

CanCOTS:

- How? and Who? and What?
- What did we learn?
- What would we do differently?

Why an **un**conference?

We are asking big questions

Significant shifts lead to significant questions

Significant shifts

- Emergence of data science
- Need for statistical literacy and interdisciplinary thinking to combat misinformation, disinformation, and malformation
- Diverse student backgrounds
- Advances in and availability of Generative AI
- Curriculum development that lags behind methodological development

Significant questions

- What do we teach?
- How do we teach?
- How do we keep up?
- How do we effectively engage with each other to effectively grapple with these changes?

Why and how do we gather?



**A typical
academic
meeting?**



**Hopefully raises
many more
questions...**



**And sparks new
ideas**



And sparks new ideas

What if our goal for the meeting is to advance ideas?

“Reverse engineer an outcome: Think of what you want to be different because you gathered, and work backward from that outcome.”

Priya Parker in “The Art of Gathering” (2018)



**What if the
meeting looked
like this?**

What is an unconference?

Features of an unconference

- Active working meeting
 - Minimal structure
 - Participant driven
 - Non-hierarchical
- Other goals:
 - Interaction
 - Networking
 - Meaningful conversations and work towards solving current problems

(O'Sullivan 2022, Budd et al. 2025)

Features of an unconference

Open Space Technology: Four Principles and a Law

1. Whoever comes are the right people
2. Whatever happens is the only thing that could have
3. Whenever it starts is the right time
4. When it is over, it is over

The Law of Two Feet

- If you're not learning or feel you could contribute better elsewhere, go to a more productive place.

CanCOTS

The Canadian context for post-secondary statistics education

- Small population, large geography, two official languages
- School curricula vary with province and territory
- Young but growing statistics education community
- A challenge:
 - Diverse group of participants, many of whom had never participated in an organized education innovation or research project
- Addressing the challenge:
 - Curation

“[A] carefully controlled balance between order (top-down, lecture-only conferences) and chaos (bottom-up, created-on-the-fly unconferences). You could call this hybrid model ‘the carefully curated unconference’.”

Carmichael (2011)

CanCOTS: How, who, and what?

How?

Before the meeting

- Organizers proposed a list of current priority areas in statistics education
- Distributed a survey to:
 - learn which priority areas were of most interest
 - solicit leaders for working groups

How?

During the meeting

- In person
- HEC Montréal
- 2 full days
- <https://cancots.netlify.app./en/>

How?

During the meeting

Day One

09:00-10:00 - Welcome & pitch by each group lead

10:00-10:15 - Coffee break

10:15-12:15 - **Breakout 1**

12:15-13:45 - Lunch

13:45-16:00 - **Breakout 2**

16:00-16:25 - Coffee break

16:25-17:30 - Group updates

Day Two

09:00-09:10 - Welcome back

09:10-12:00 - **Breakout 3**

12:00-13:30 - Lunch

13:30-14:15 - Group presentations of accomplishments, framework for remaining work, timelines, discussion of final objective deliverables

14:15-14:30 - Coffee break

14:30-17:00 - **Final breakout to plan forward**

Who?

41

Participants

7

Provinces

10%

Students / Post-docs

54%

Teaching-focused

6

Working groups

**All
career
stages**

Participants + WG leaders

The six working groups

1. Incorporating causal inference in statistics courses
2. Interactive R tutorials for learning and assessments
 - 3 subgroups
3. Evidence-based learning
4. Teaching advanced analytical topics in biostatistics
5. Incorporating AI and ethics in statistical teaching
 - 3 subgroups
6. Designing a modern master's program in statistics or data science

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And two organizers who floated among working groups to encourage, advise, ask probing questions

Working group outputs

1. Incorporating causal inference in statistics courses
 - [Fully developed course on Github](#)
2. Interactive R tutorials for learning and assessments
 - [Various outputs in progress](#)
3. Evidence-based learning
 - [Summary white paper](#)
4. Teaching advanced analytical topics in biostatistics
 - [Presentation at Statistical Society of Canada meeting](#)
5. Incorporating AI and ethics in statistical teaching
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Potential for development of cross-institutional hubs?

What did we learn?

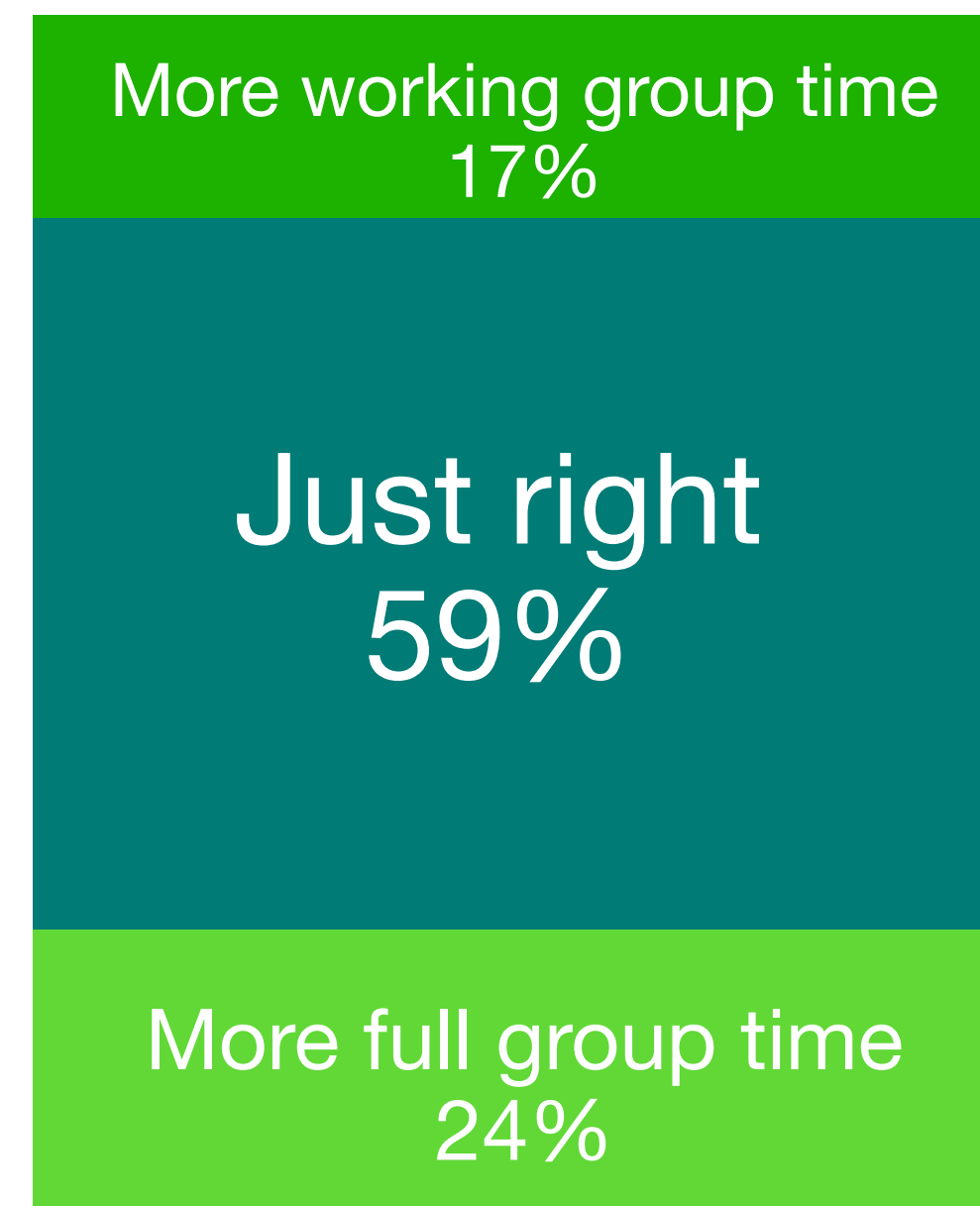
Participant feedback

Structure

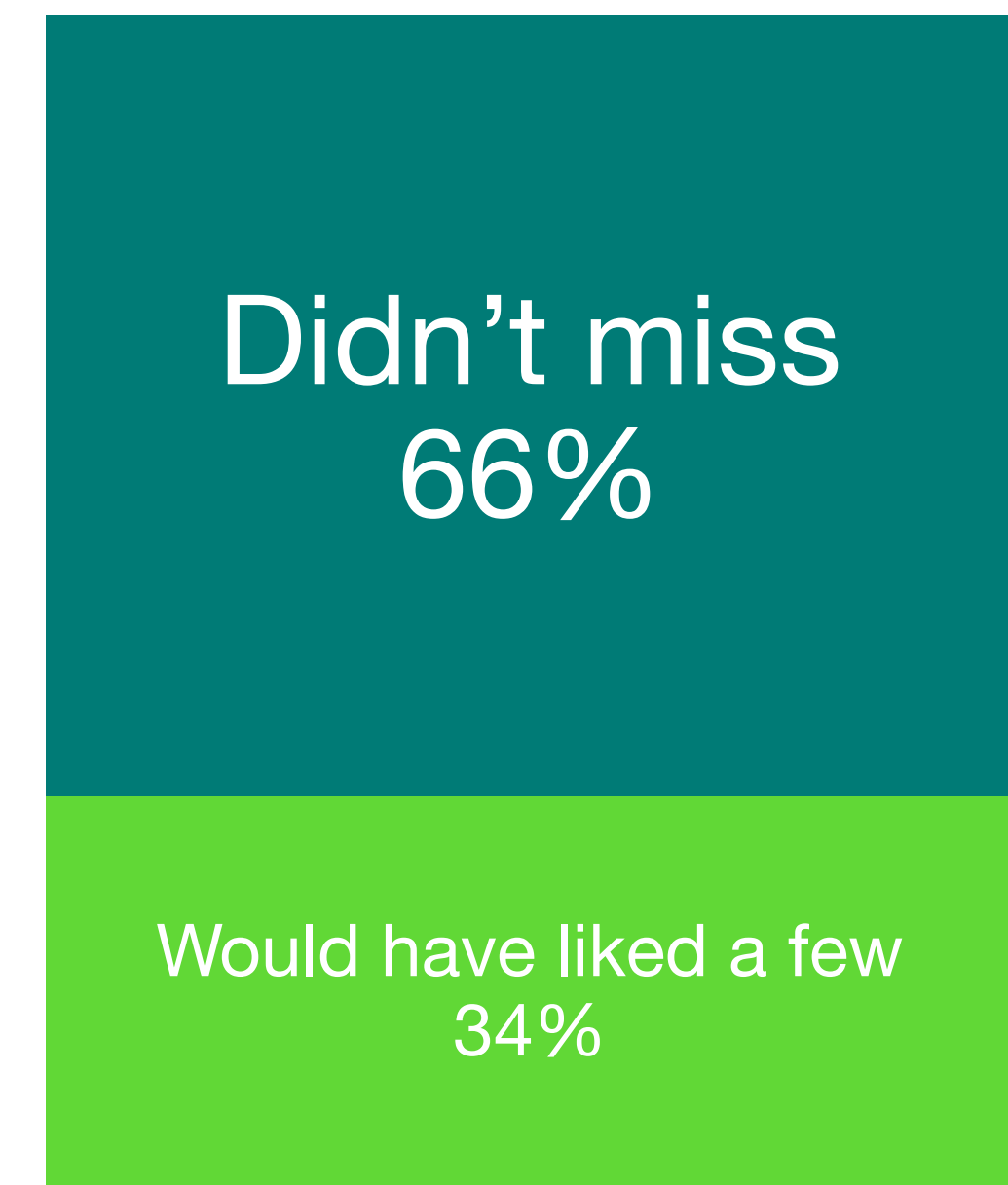
Length in days



Balance of working group time and full group discussions



Absence of research style presentations



“ I appreciated the opportunity to discuss specific issues in statistics education in detail with like-minded colleagues who teach different audiences. Brainstorming is better with more brains, and some nice ideas and topic explorations came out of my group.”

CanCOTS participant

“The working group structure was very engaging. This was pedagogically optimized to ensure attendees achieved what they needed / wanted from the conference. I really liked having an idea of what was on offer before arriving so that I could maximize the impact of the conference to my own interests and needs.”

CanCOTS participant

Participant feedback

Factors mentioned as contributors to project success

- Right-sized project
- Optimal group sizes
- Set of working group resources curated in advance
- Expertise in the working group
- Accountability
- Deliverable that was “bounded, achievable, and definitive”

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“Whoever comes are the right people”

“Whatever happens is the only thing that could have”

What would we do differently?

What we'd do differently

Ideas for CanCOTS 2027



Image credit: Isaac Maffeis on Unsplash

- Create a **proceedings platform** to document the outcomes
- Create infrastructure for **ongoing Communities of Practice** (Wenger-Trayner & Wenger-Trayner 2015)

CanCOTS working groups have:

- A shared domain of interest
 - A community
 - An interest in putting ideas into practice
- Identify components of a **theory of change** to assist groups with their thinking (Reinholz & Andrews 2020)
 - Context
 - Outcomes, Preconditions, Rationales
 - Indicators
 - Interventions
 - Assumptions

More acknowledgments

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CENTRE
DE RECHERCHES
MATHÉMATIQUES

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Your questions?

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