

The International Collaboration for Research on

STATISTICAL REASONING, THINKING AND LITERACY



### Preliminary Announcement

## The Twelfth International Research Forum on Statistical Reasoning, Thinking and Literacy (SRTL-12)

5-11 July 2021

University of Utrecht, The Netherlands

Conference Theme:

### **Re-thinking learners' reasoning with non-traditional data**

#### **SRTL**

The International Collaboration for Research on Statistical Reasoning, Thinking, and Literacy (SRTL) was established in 1998 to cultivate a community of researchers and statistics educators who share the passion of studying the nature and development of students' statistical literacy, reasoning and thinking, and exploring the challenges posed to educators and researchers at all levels in supporting learners to achieve these goals. Today, SRTL offers scientific gatherings for statistics education researchers every two years.

The SRTL research forums have unique features, such as a small size (around 25 participants), that allow time for in-depth presentation and discussion of research. There is extensive use of videos to present how learners solve problems and reason about statistical information and concepts in classrooms or during interviews. Forums include a statistician-in-residence in addition to the educational researchers in order to provide the perspective of the discipline and to give feedback on the research presented. Participants present, discuss and argue about research related to these topics in a format that facilitates becoming acquainted with key researchers and viewing their work in progress in a stimulating, positive and enriching environment. The SRTL research forums have led to many frontier publications that present new research, synthesise and build on previous research, and form connections among related work in other disciplines (Garfield & Ben-Zvi, 2015; Ben-Zvi, Makar, & Garfield, 2018).

#### **Non-traditional forms of data**

Data come in many forms, although traditional statistics education has mainly focused on data from random samples. Where statistics education has capitalised on knowledge about a sample to understand an unknown population, many ubiquitous forms of data do not clearly fit the sample-population assumptions that underpin statistical reasoning. For example, data collected in real time (GPS, live traffic, tweets), image-based (photographs, drawings, facial recognition), semi-structured (scraped from social media posts), repurposed (school testing data to estimate housing prices) and big data (open access internet data, civic databases) are all examples of non-traditional data.

While non-traditional forms of data have been with us for some time (Donoho, 2017; Frick, 1998), the digital age has led to a pervasive culture of data in all aspects of life,

including those of our students. Widespread availability and access to myriad non-conventional, repurposed, massive or messy data sets necessitate broadening educational knowledge to better understand how learners make sense of, model, analyse and make predictions from these data.

New research directions have emerged, focusing on methods for making predictions from open, semi-related and ubiquitous data, often relying heavily on computational methods and predictive modelling. Concerns have been expressed about the relative lack of attention to how and why data were collected, whether inferences being made are trustworthy and how statistics education might respond (e.g., Wild, Utts, & Horton, 2018). We are united in our goal to develop learners' deep understanding and reasoning with data and models. Therefore, awareness of implications of non-traditional data - including complexities resulting from the contexts in which data are generated - have resulted in multiple discussions about how the field of statistics education may proceed (e.g., Biehler et al., 2018; Finzer, 2013; Gould, 2011; 2017; Hicks & Irizarry, 2018), but many questions remain open.

## **SRTL-12**

The Twelfth International Forum for Research on Statistical Reasoning, Thinking and Literacy (SRTL-12) will build on work in previous Forums (particularly around statistical modelling and informal statistical inference) to re-think and discuss how statistics education research can assist learners to make sense of and reason with data in its many forms and contexts.

Maintaining SRTL's focus on video-rich qualitative research that aims to understand learners' reasoning and thinking with data, we will consider questions such as:

### *Theory*

- What does it mean to reason statistically if data do not fit a conventional sample-population relationship?
- What new uncertainties arise in handling non-traditional forms of data?
- What possibilities, constraints or uncertainties emerge in broadening how statistical or data literacy is approached/nurtured in the school, university or community?

### *Students' reasoning*

- How do learners' reason with non-conventional, repurposed, massive or messy data?
- How do coding, algorithmic or computational methods support or detract from learners' reasoning with data at different levels of schooling?
- What do learners attend to when collecting or using secondary data in messy contexts? How do they decide which data are relevant, trustworthy, or clean enough to make sense of them?
- What ideas and *data moves* (Erickson, Wilkerson, Finzer, & Reichsman, 2019) can students build on or adapt from their current informal statistical reasoning, thinking and tools as they learn to make sense of non-traditional data?

### *Pedagogy, design, tools*

- How can we support students to flexibly clean, record/store, represent or model non-conventional, repurposed, massive or messy data?
- What new "worry questions" are useful for learners to adopt when approaching non-traditional data or engaging in predictive modeling based on computational methods?

- What are new considerations for designing learning environments that support students' reasoning of non-traditional data?
- How can simulations or other statistical technological tools assist learners to make sense of chance and variability when using non-traditional data?
- What and how do we assess students' reasoning with non-traditional data?

## Call

**Expression of interest** to attend the conference can be submitted before **September 1, 2020** to [srtl2021@gmail.com](mailto:srtl2021@gmail.com). Participation in the SRTL-12 Forum can be as a *presenter* or as a *discussant*.

*Presenters* are asked to send a brief letter of introduction of yourself (if new to SRTL) and a two-page overview of work-in-progress relevant to the theme of the Forum, addressing: introduction, literature review and/or theoretical framework, methodology, expected results, and your practical and theoretical contribution to the theme. The overview should particularly emphasise the perspective of new data you are addressing in your proposed presentation. Note that presentations are on incomplete, rather than polished work and are aimed to provoke *discussion* about the theme.

*Discussants* are experienced SRTLers who will actively participate in all sessions and discussions and will share their own reflections and comments in a panel on the concluding day. Discussants are asked to send a brief letter with a formal expression of interest.

## Key preliminary dates:

- September 1, 2020: Expression of interest due
- October 1, 2020: Response to Expression of Interest
- December 1, 2020: Extended abstracts due, if requested
- January 15, 2021: Decision on acceptance
- May 1, 2021: Registration and preliminary paper for Forum (front end of a full paper)
- July 5-11, 2021: SRTL-12 held

## SRTL-12 Local Organising Team:

Arthur Bakker ([A.Bakker4@uu.nl](mailto:A.Bakker4@uu.nl)), Lonneke Boels (<mailto:L.B.M.M.Boels@uu.nl>) and Marianne van Dijke-Droogers ([m.j.s.vandijke-droogers@uu.nl](mailto:m.j.s.vandijke-droogers@uu.nl)) from the University of Utrecht, The Netherlands.

## SRTL-12 Location

The Netherlands (specific location TBC).

## References

- Ben-Zvi, D., Makar, K., & Garfield J. (Eds.) (2018). *International handbook of research in statistics education*. Singapore: Springer.
- Biehler, R., Budde, L., Frischmeier, D., Heinemann, B., Podworny, S., Schulte, C., & Wassong, T. (Eds.) (2018). *Paderborn symposium on data science education at school*

- level 2017: The collected extended abstracts*. Paderborn: Universitätsbibliothek Paderborn. doi:[10.17619/UNIPB/1-374](https://doi.org/10.17619/UNIPB/1-374)
- Donoho, D. (2017). 50 years of data science. *Journal of Computational and Graphical Statistics*, 26(4), 745-766. doi:10.1080/10618600.2017.1384734
- Erickson, T., Wilkerson, M., Finzer, W., & Reichsman, F. (2019). Data moves. *Technology Innovations in Statistics Education*, 12(1), Article 1. <https://escholarship.org/uc/item/0mg8m7g6>
- Finzer, W. (2013). The data science education dilemma. *Technology Innovations in Statistics Education*, 7(2), Article 3. <https://escholarship.org/uc/item/7gv0q9dc>
- Frick, R. W. (1998). Interpreting statistical testing: Process and propensity, not population and random sampling. *Behavior Research Methods, Instruments, & Computers*, 30(3), 527-535.
- Garfield, J., & Ben-Zvi, D. (2015). The International Collaboration for Research in Statistical Reasoning, Thinking, and Literacy (Foreword). In A. Zieffler & E. Fry (Eds.), *Reasoning about uncertainty: Learning and teaching informal inferential reasoning* (pp. xv-xviii). Minneapolis, MN: Catalyst Press.
- Gould, R. (2011, July). *A statistician's view on sampling in relation to inference*. Keynote presentation at the Seventh International Forum for Research in Statistical Reasoning, Thinking and Literacy (SRTL-7). 7-23 July, Texel, the Netherlands.
- Gould, R. (2017). Data literacy is statistical literacy. *Statistics Education Research Journal*, 16(1), 22-25.
- Hicks, S. C., & Irizarry, R. A. (2018). A guide to teaching data science. *The American Statistician*, 72(4), 382-391. DOI: 10.1080/00031305.2017.1356747
- Wild, C., Utts, J., & Horton, N. (2018). What is statistics? *International handbook of research in statistics education* (pp. 5-36). Singapore: Springer.