

The International Collaboration for Research on

STATISTICAL REASONING, THINKING AND LITERACY



SRTL

## Preliminary Announcement

### The Fourteenth International Research Forum on Statistical Reasoning, Thinking and Literacy (SRTL-14)

Penn State University, USA (campus TBD)

26 June – 2 July 2025

#### **Engaging with complex data: Navigating subjectivities and perspectives**

##### **SRTL**

The International Collaboration for Research on Statistical Reasoning, Thinking, and Literacy (SRTL) was established 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. The first meeting took place in Kibbutz Be'eri, Israel in 1999. Since that first meeting, we have met in 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-in-progress. There is extensive use of videos to present how learners solve problems and reason with statistical information, concepts and processes in classrooms or during interviews. Forums include a statistician-in-residence in order to provide a perspective of the discipline and to give feedback on the research presented. Participants present, discuss and debate about research related to the theme 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). Each Forum results in a publication (special issue or monograph) to allow completed work to be shared more broadly.

#### **Engaging with complex data: Navigating subjectivities and perspectives**

*“Given the rise of Big Data as a socio-technical phenomenon, we argue that it is necessary to critically interrogate its assumptions and biases”* (boyd & Crawford, 2012, p. 662)

Data are now ubiquitous, collected incomprehensibly fast, and in many different ways (e.g., sensors, apps, software, imaging technologies, large language models, etc.) and used to make inferences or predictions in every field imaginable. As technologies continue to rapidly evolve, including GenAI, so too will approaches to data analysis. Therefore, the ways in which we consider the teaching and learning of statistics and data science will also need to evolve - and involve multiple disciplines. At the same time, data have a past (how and why

they were collected) and a future (how data will be used, re-purposed, scraped and the implications of doing so) that both impact and are impacted by humans. If the subjectivities and perspectives that underpin human decision-making when investigating data are neglected, it can create an unproductive distrust of data as mismanaged or manipulated, or a naive over-trusting of data taken out of context or used in disinformation campaigns. As Noll and her colleagues (2022) stated,

personal biases and narratives impact how data are collected and created, even by professionals, as well as the inferences and predictions drawn from those data, and the models generated by them. ... [Acknowledging] the complexity of data and the impact of personal and cultural narratives in the production and interpretation of data will provide teachers with opportunities to engage students in working with data as scientists, by interrogating the source and assumptions that support their models.

Engaging with the full investigation cycle, including the shuttling between the context sphere and the statistical sphere (Wild & Pfannkuch, 1999) has always been complex, in which human intention and purpose can both drive and emerge in the process. For learners, focusing on the contextual features of data and incorporating learners' stories about what they are seeing in data acknowledge the human aspect of working with data. Doing so can build learners' reasoning and data practices that cultivate healthy scepticism and support their ability to navigate subjectivities as they consider data ethics, bias and multiple perspectives. In addition to thinking about all the ways learners might collect or source data, engage with the context in which data are situated, interrogate, model and analyse data, draw conclusions or make predictions from data, statistics educators must also consider professional development for teachers and what skills and dispositions teachers need in order to develop learners' data practices and healthy scepticism (not distrust) when working with data.

Therefore, by embracing a theme of subjectivities and perspectives, we seek to emphasise the human element embedded in all aspects of working with complex data, including but not limited to interdisciplinarity, ethics, privacy, sampling and structural biases, human subjectivities, healthy scepticism, personal and cultural perspectives, diverse purposes behind data collection and raising awareness of the implications that predictions from data can have on people.

## **SRTL-14**

Looking back over our previous thirteen forums, the work has evolved from defining (SRTL1-2) and investigating (SRTL3-4) specific aspects of statistical reasoning (e.g., variability, distribution), inferential reasoning (SRTL5-8), statistical modelling (SRTL9-11) and finally non-conventional data and data-ing (SRTL12-13). SRTL-14 seeks to continue the discussions from SRTL-13, in which

we acknowledge a range of elements in terms of the nature, format, source, purposes, processes, generation, contexts, users/access, ethics, visualisation and/or interdisciplinarity that come with learning from/with data. Furthermore, the idea of data-ing can highlight how those who engage with data can draw on their knowledge, purposes, experiences, tools and peers to make sense of and use data (SRTL-13 Preliminary announcement, 2021, p. 1).

The Fourteenth International Forum for Research on Statistical Reasoning, Thinking and Literacy (SRTL-14) will therefore build on working with data in all its forms and complexities while emphasising how learners navigate subjectivities and perspectives. In

considering how statistics education must evolve to begin to address these challenges and opportunities, the following list of questions (not exhaustive) are worth considering:

*Types of data experiences*

- How do students work with complex forms of data that are not usually encountered in school and introductory coursework (e.g., spatial, non-sampled, proxy, text, irregular, incomplete or far data)?
- Given the development of data access, forms and/or structures since Tukey's time, what should students learn about EDA and when should they learn it?
- What new tools can assist students to manage the complexities and decision-making in data investigations, and what skills do teachers need to facilitate these experiences?
- What age-appropriate activities or theoretical frameworks can help educators better understand how to consider perspectives that underpin secondary data drawn from diverse contexts and disciplines?
- How can we better design tasks that support early stages of statistical investigations or consider the implications of predictions post-analysis?
- What sorts of technologies support introducing ideas of machine learning and big data at different stages of development?

*Human impact*

- What changes are needed in curriculum or assessment to build and evaluate skills in data practices that focus on personal, cultural or structural assumptions as well as ethical principles, perspectives and biases?
- What is a reasonable balance of subjective awareness and objective processes for learners in statistics and data science to develop healthy scepticism?
- What insights can social scientists provide into decision-making with data and raise awareness of the human contribution and impact? How and when can these ideas be introduced into the curriculum?
- What roles do emotion and embodiment play in reasoning with data?

*Promoting agency and participation*

- What can we learn about the ways that learners' dispositions, subjectivities, stories or sense of self evolve when working with data contexts that are meaningful to them?
- What kinds of experiences in data and data-ing promote statistical literacy or empower citizens with less-technical backgrounds?
- How do technologies, or offline activities, promote human engagement with complex data?
- How could we broaden participation of persons who are currently underserved in data science and statistically-rich contexts?

*Social, cultural and interdisciplinary perspectives on data and data-ing*

- When and in what form should learners build a social lens on data, such as engaging with data ethics, empathy, issues of privacy, and whose data are *not* collected in the secondary data sets they encounter?
- How could Indigenous and cultural knowledges and perspectives be better represented in statistics education?
- What is the role of interdisciplinary teams and diverse disciplinary perspectives for re-envisioning the opportunities and future for statistics education?

## Call

**Expression of interest** to attend the Forum can be submitted before **October 31, 2024** to [SRTLmailbox@gmail.com](mailto:SRTLmailbox@gmail.com). Participation in the SRTL-14 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 subjectivity or perspectives aspect of engaging with complex data that you are addressing in your proposed presentation. Note that presentations are *intentionally* on incomplete rather than polished work and should seek 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 insights in a panel on the final day. Discussants are asked to send a brief letter as an expression of interest.

### Key preliminary dates:

- October 31, 2024: Expression of interest due
- November 2024: Response to Expression of Interest
- December 20, 2024: Extended abstracts due, if requested
- January 2025: Decision on acceptance
- May 1, 2025: Registration and preliminary paper for forum (front end of a full paper)
- TBD, mid-2025: SRTL-14 held

### Location and local organising team

Penn State University (campus TBC), USA  
Matthew Beckman, Neil Hatfield, Alyssa Hu and others (TBC)

### References

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- 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). Catalyst Press.
- Noll, J., Schnell, S., Gould, R., & Makar, K. (2022). New ways of interacting with data, context, and chance in statistical modeling processes. *Mathematical Thinking and Learning*, 24(4), 331-335. <https://doi.org/10.1080/10986065.2021.1922855>
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