Istat | Italian National Institute of Statistics

FOURTH WORKSHOP ON METHODOLOGIES FOR OFFICIAL STATISTICS

1-2 December 2025

SESSION 1: Statistical Models for Official Statistics

in collaboration with International Association of Survey Statisticians (IASS)

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INTERNATIONAL ASSOCIATION OF SURVEY STATISTICIANS

International Association of Survey Statisticians (IASS)

a network of professionals engaging in survey research ensuring ethical standards, best practices and mutual sharing of information

IASS objectives are:

- To promote the study and development of the theory and practice of sample surveys and censuses;
- To maintain and increase interest in surveys and censuses among statisticians, governments and the public in countries of the world;
- To promote the modern data ecosystem providing new data sources, including non-probability surveys, that provide granular data often very timely in comparison with surveys and censuses;
- To promote the modernization of national statistical systems through the interoperability of data sources, including surveys, and integration of surveys with non-survey data.

To achieve objectives, we engage in sponsoring invited sessions at regional Conferences on active areas of research

Other activities of the IASS: **https://isi-iass.org/home/**

- The Survey Statistician, issued twice a year, including country reports, new and emerging methods, ask the experts, young survey statistician, book reviews and upcoming journal articles and conferences
- A program of short courses prior to each ISI WSC and program of invited paper sessions
- Website giving access to past material and up- to- date information through our monthly newsletters: http://isi-iass.org/home/services/newsletters/
- Monthly IASS Webinar Series showcasing distinguished speakers on the theory and practice of surveys and censuses: http://isi-iass.org/home/events/
- Conference support for workshops and conferences related to survey statistics
- The Cochran-Hansen Prize, awarded every two years for the best paper on survey research methods submitted by a young statistician from a developing country
- The Hukum Chandra Memorial prize, awarded every year to a mid-career researcher who has made an important contribution in survey research

The Role of Statistical Societies

- Professional societies (e.g., ISI, IASS, RSS, ASA, SIS) play a pivotal role in the shaping of new strategies for statistical systems
- The success, development and growth of official statistics is fundamental to professional statisticians as producers, users and quality assurance
- We have a role in:
  - Ensuring leadership, training, coordination of research and capacity building
  - Set standards, codes of practice and adherence to quality controls
  - Support ethical and responsible use
  - Maintaining confidence in new systems including through good data governance, ethics and public engagement
  - Providing support for innovation and collaborations

The Role of Statistical Societies

Join the IASS:

To renew your membership:
https://isiportal.odoo.com/web/login
or get a colleague to become a new member:
https://isi-portal.odoo.com/become-a-member

Why focus on Statistical Models for Official Statistics?

- Since the first developments of design-based inference, statistical models have increasingly been used in official statistics to ensure accurate, timely and consistent statistics from imperfect and diverse data sources
- Some classical examples:

Regression and calibration models for survey weighting

Imputation models to compensate for missing data

Models for quantifying uncertainty

Small Area Estimation models for small domain estimation

Data integration and record linkage models

Confidentiality and privacy models

Time Series models for forecasting and seasonal adjustments

Microsimulation models for policy evaluation

Measurement error models to correct for misreporting

National Accounts models for reconciling macro-level statistics

Demographic models for population projections and demographic components

And the list goes on…

Why focus on Statistical Models for Official Statistics?

- Increasing use of Machine Learning approaches in official statistics particularly applied in classification, prediction, and anomaly detection problems, but there is little attention on the impact of these methods on statistical inference

But:

- Need to address concerns about the changing landscape of methodologies for official statistics and avoid public and private backlash on the use of statistical models for official statistics
- Statistical Professional Societies have a pivotal role to play in ensuring and maintaining public trust in official statistics

Support your Professional Society and join the IASS

Introduction of the Papers

- All papers in Session 1 focus on new developments in statistical modelling with the aim to improve official statistics production

- **Master Class: On Adversarial Risk Analysis in Official Statistics**

  by Fabrizio Ruggeri | Italian National Research Council (CNR), Milan, Italy

  Introduces ideas and methods developed in Adversarial Risk Analysis that can be utilized for applications in Official Statistics

  Coffee break

Introduction of the Papers

- **Invited Talks**

Statistical Inference for a Finite Population Mean with Machine Learning-Based Imputation for Missing Survey Data, by David Haziza | University of Ottawa, Canada and **Mehdi Dagdoug** | McGill University, Montreal, Canada

Introduces approach to obtain valid statistical inference when imputed estimates are derived from ML procedures

A Contamination Model for Multivariate Zero-Inflated Data, by Davide Di Cecco, Danila Filipponi | Istat and **Ugo Guarnera** | Italian Revenue Agency, Rome, Italy

Introduces parametric model for statistical data editing for error detection in zero-inflated continuous multivariate data with application to business data

Small Area Estimation via Spatio-Temporal M-Quantile Modeling, by Nicola Salvati, Francesco Schirripa Spagnolo | University of Pisa, Italy and **Maria Bugallo, Domingo Morales** | Miguel Hernández University of Elche, Spain

Advances in SAE M-Quantile approach by incorporating spatial and temporal effects

Introduction of the Papers

Discussion: **Marco Alfò** | Sapienza University of Rome, Italy and Istat Advisory Committee on Statistical Methods

Thank you for your attention….