Editorial

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This special issue of Economic Quality Control (EQC) contains selected talks presented at the Flint International Statistics Conference (FISC) held at Kettering University in Flint, Michigan. This was a distinct international event for Kettering and for the institutions in Flint. More than 40 researchers gathered at FISC. There were participants from Sweden, France, Germany, Bulgaria, Italy, United Kingdom, Spain, South Africa, Canada, Cyprus, Barbados, Georgia, Moldova, and USA. The title of the conference “Flint: One City, One Hundred Years under Variability” reveals its central subject: Statistical Methods and Studies of Historical Data. More specifically, the participants discussed challenging problems in studies of multiple parallel series of historical data on various objects in the areas of public life, industrial and service development. Historical data are often comprised by huge worldwide arrays of BIG DATA and require not just specific statistical methods for excerpption of useful information and learning, but also development of specific tools for data mining and reducing the data dimensions. Hence, to be properly addressed, many of the existing questions require collaboration between Computer Science and Statistics in data manipulations. The participants at FISC enjoyed discussions on a broad variety of topics including algorithmic and numerical data techniques, modeling using traditional analytical methodology, and applied data analysis.

For the proceedings of FISC we selected a total of 23 articles classified in two categories:

- (i) Statistical Methodology, to be published in Economic Quality Control (De Gruyter).
- (ii) Computational Extensive Analysis, to be published in Serdica Journal of Computing (Bulgarian Academy of Sciences).

This Special Issue of EQC contains six of the selected eleven articles in the category Statistical Methodology. The remaining paper will appear in the next issue. All manuscripts passed the scrutiny of a peer review process. We are proud to present to the attention of the EQC audience the following papers.

- Urban Planning for Change: Data and Projections in City of Flint Master Plans (1920, 1960 & 2013), by D. Walling, City Mayor of Flint, Michigan.

Dayne Walling, the City Mayor of Flint, was the opening keynote speaker of the conference. We could not expect better support for our conference. In his article Mayor Walling analyzes three comprehensive historical master plans in order to assess available data, make projections and propose recommendations, focusing on historical statistical methods and urban planning, particularly as it relates to spatial data. The three plans are considered in three main sections: planning for population growth (1920), planning for regional rationalization (1960), and planning for a flexible future (2013). Population projections, residential density patterns, and economic and employment data are reviewed and compared against the planning recommendations and realities. We value his vision on ways how data and statistical analysis can be utilized in public decision-making and in assisting governing agencies.

- More Equal and Poorer, or Richer but More Unequal? by F. Greselin, University di Milano-Bicocca, Italy.
- How We Can Evaluate Inequality in Flint, by F. Porro, University di Milano-Bicocca, Italy.

There were three presentations by invited Italian colleagues from the cradle of Gini's home university (everyone should know about the Gini's Index in statistics) who were interested in interpreting historical Flint data in the light of contemporary statistical achievements. Professor Greselin debates how to measure inequality, how inequality has been assessed through a relative approach from Gini's 1914 pioneering article. Analyzing historical census data from Flint and other U.S. cities, the author explains how the mean income in population subgroups captures the shape of the income distributions and how to use it in evaluating inequality. One interesting finding shows that prosperity is distributed unevenly across America's metropolitan areas. More interestingly, unbalanced wealth can be related to other concomitant facts. She uses modern graphing technologies to visualize these complex statistical results. Her former student continues this review on special analysis of various measures and indices of inequality utilizing Flint historical data. It is remarkable how the investigation of this interesting topic, initiated a century ago, can be continue involving all the power of the contemporary IT tools.

- Comparing Data Envelopment Analysis and Human Decision Making Unit Rankings: A Survey Approach, by S. Dimitrov, University of Waterloo, Canada.

The author discusses what is a better ranking method: an objective one, using some criteria (called by him DEA for Data Envelopment Analysis), or a subjective one, based on results of multiple opinions, affected by the same criteria. The study indicates that there are other subjective factors which make sometimes one approach to be closer to the output than the other. Many open questions for further research are discussed.

- Discrete Pareto Distributions, by A. Buddana and T. J. Kozubowski, University of Reno, Nevada.

We could never suspected that discretization of a continuous distribution may create a number discrete versions of this distribution. The authors of this article show how this may happen, and how virtuously it can be used for some practical purposes (like simulation or estimation). Discretization may utilize the probability density, or the cumulative distribution function, or the moment generating function. Sometimes the constructed discrete versions coincide, sometimes they differ.

- Leverage Effect for Volatility with Generalized Laplace Error, by F. Javed and K. Podgórski, Lund University, Sweden.

In Finance being negative is a bad news, while being positive is a good news and these two options do not necessary carry symmetrical weights. To analyze the consequences, especially in the environment of historical data, one needs good models. The authors suggest the use of a generalized (asymmetric) Laplace distribution and analyze its features. Using data from almost a centurial period from S&P 500, the authors convince readers in the attractiveness of their approach in modeling financial data. This paper is an excellent source for further research opportunities.

- Failure Rate Estimation in Dynamic Environment, by E. Gouno and L. Guérineau Université de Bretagne Sud, France.

Dynamic environment means changes of conditions under which technical products operate. The chances to survive also change. The authors are modeling these changes assuming the time-to-failure follows a piecewise exponential model where one takes into account the effect of the stress. Their analytical study results in constructing maximum likelihood estimates of the model's parameters, investigating the properties of these estimates, and an application to data from an equipment exposed to thunderstorms.

- Bayesian Analysis of Brown–Proschan Model, by D. T. Nguyen, Y. Dijoux, and M. Fouladirad, Université de Technologie de Troyes, France.

This is yet another article on reliability. It focuses on analysis of the lifetime of a system following the Brown–Proschan model (it offers in a long run either minimal repair, or a complete repair depending on the wear estimate), and using the information about its wear. The authors offer a Bayesian approach using in a most efficient way the information from the past. Under certain assumptions, they find Bayesian parameter estimates and compare them with estimates obtained by traditional frequentist's methods. Numerical and graphical illustrations are provided.

- Forecasting Stock Market Trends, by G. N. Nedeltcheva, Sofia University, Bulgaria.

The article deals with macro forecasting, namely with the process of deriving patterns from price movement. The goal, of course, is to predict stock market returns by tracing historical data from the market. An analysis of the critical characteristics of forecasting trend techniques is performed. Some interesting conclusions are drawn.

- Life in Bridgetown, Barbados, According to Westbury Cemetery Records 1877–1976 by P. Chami, T. Inniss, and B. Sing, University of the West Indies, Barbados.

This paper discusses an excellent application of survival analysis, which helps gaining deep and useful insights into interesting aspects of the life in British West Indies. The authors do a very good job providing a solid background, which allows readers to easily follow the analysis. A great read indeed!

- Numerical Methods of Karhunen–Loeve Expansion for Spatial Data, by J. Hu and H. Zhang, DePaul University, Chicago and Purdue University West Lafayette, Indiana.

In geo-statistics, the ultimate goal is to predict values at unobserved locations. A well-known statistical method, called kriging, is commonly used in practice. It requires modeling and estimating the covariance function of the underlying spatial process. Massive spatial data impose a challenge to the traditional spatial data analysis primarily because of the large covariance matrix. To overcome the computational burden, low rank models are used as an alternative. Optimal low rank models are provided by the Karhunen–Loeve (KL) expansion of the spatial process. The paper analyses four algorithms for calculating the KL expansion. Numerical methods for KL expansion are reviewed and a new approach based on Gaussian quadrature approximation to integration is proposed. The new method is easy to implement and runs sufficiently fast.

In the end of this note, we include the following excerpt from one participant's reflection on FISC 2014.

“My name is Ernest Fokoue. I am an Associate Professor of Statistics at Rochester Institute of Technology. I was very fortunate to be invited to the Flint International Statistics Conference 2014. Under dynamic leadership... the conference committee offered all the participants a unique and memorable intellectual and social experience. The conference committee masterfully achieved a balanced scientific schedule with applications, computation, methodology and theory all equally represented. Besides, by avoiding parallel sessions and sticking with one single session at a time, not only did participants get to spend more time together and network, but also each person had the tremendous opportunity/privilege of learning a vast array of statistical concepts from peers without the pressure of having run from one session to another and debating which session to choose. The variety of topics covered also greatly enhanced and enriched the scientific/intellectual experience of the participants as we all had the opportunity to be introduced to many facets and applications of statistics. As delightful and delicious icing on the cake, the social events were carefully chosen and scheduled in such a way that participants had manifold opportunities to get to know one another and initiate new research partnerships and friendships. As a matter of fact, my graduate students – the ones who came with me to the conference to present their research – made new friends and research collaborators with whom we are actively collaborating right now. It is my humble opinion that FISC 2014 was a resounding success and that this initiative should be supported in coming years.”

We hope this Special Issue will be useful to many scientists working in the fields touched by the included papers.

We would like to express our sincere thanks to all authors and reviewers who made this publication real and valuable. Lots of thanks to all the folks from the editorial staff of EQC for assembling this issue. Special thanks are also due to the Editorial Board of EQC and in particular to Elart von Collani and George Yanev. Without their positive attitude, constant encouragement and support this collection would have failed.

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FISC Organizers and Guest Editors