

**ICMS workshop on
"Quantile regression, LMS method and robust statistics in 21st century"**

Date: June 19-23, 2006

Venue: 14 India St of Edinburgh

1. The workshop was run in principle as it was proposed. There were just some minor changes in the proposed list of potential participants. Three speakers, for various legitimate reasons, withdrew from the workshop at the last minute (Professor Peter Green and Drs Victor Chernozhukov and Zhije Xiao). We invited Professor Ivan Mizera who indeed gave a very good talk and Mr Michael Sun who was the youngest speaker, as replacements. This resulted in one fewer talk on Friday afternoon.

2. Regression analysis is one of the most popular and powerful techniques in statistics. Quantile regressions, with median regression as a special case, are particularly useful for extracting essential features, and finding structures and relations in complex datasets. Quantile regression has now been used in almost all scientific fields, including potential good applications in two current popular areas: Finance and Bioinformatics. The recent flourishing of publications and research interest in quantile regression, LMS methods and robust regression is a timely reminder that these methods are evolving into mainstream statistical techniques for the analysis of data from today's vast range of application areas.

3. A total of thirty-four participants from Canada, China, European countries, India, UK and USA attended the five-day workshop. These included six newly appointed lecturers/assistant professors/PhD students whose research activities are in the relevant areas of quantile regression, LMS method and robust statistics. Among the participants were females. Most of the participants are experts in the thematic areas of the workshop. Each of the 10 keynote speakers provided a 45-minute presentation followed by a discussant-led 15-minute discussion. These keynote talks plus the remaining nineteen half-hour presentations by other speakers covered a variety of topics that fitted well within the theme of the workshop.

The workshop aimed to provide an overview of the current state of research in quantile regression, LMS methods and robust statistics, discuss and advance leading-edge research on the interface between mathematics, statistics, economics, finance, ecology and public health. A brief summary of the content is as follows: eight speakers gave series of lectures that reflected new developments in quantile regression modelling (including multivariate quantile regression, spatial quantile regression, nonlinear quantile regression, nonparametric quantile regression and quantile regression testing); five speakers outlined the application of LMS and the future of LMS method; two talks discussed advances in quantile regression computation; and other speakers addressed new developments and applications in each of the areas of education, economics, finance, ecology, risk analysis, time series, public health and skewed distribution. For example, Professor Gib Bassett opened the workshop with a stimulating presentation. Professor Roger Koenker's *Quantile autoregression* presentation and description of linkages with functional-coefficient autoregressive were intriguing; the talks given by Professor Tim Cole and Dr Mikis Stasinopoulos indicated that GAMLSS method might be the future of LMS method; Professor Ivan Mizera gave a very entertaining and interesting review of quantile regression estimation and testing; Professor Chris Jones very nicely introduced a class of skewed distribution and discussed its natural connection to

kernel-based quantile regression; Professor Marc Hallin discussed spatial quantile regression; Dr Colin Chen developed a promising automatic quantile regression fitting under Bayesian inference and RJMCMC algorithm; Professor Ying Wei made a brave attempt on defining multivariate quantile regression; and Brian Cade illustrated how quantile regression is useful in ecology.

Although accommodation arrangements were complicated by the concurrent annual Royal Highland Show, most of the participants overcame the inconvenience of the rather lengthy commute between the meeting venue and their lodging locations and maintained their enthusiasm throughout the meeting. The feedback from questionnaires was uniformly positive, as is illustrated by the selection of responses below:

- **What, for you, was the highlight of the workshop?**

___ ``It was a good grouping of individuals with related interests. Interesting to hear the quantile regressionist viewpoints and to get updated on LMS developments.”

___ ``New developments in quantile regression, both in theory and applications.”

___ ``The workshop was well organised and highly interesting.”

___ ``Discovering, and subsequently understanding, the different ideologies of the quantile regression and LMS method contingents at the workshop.”

___ ``Bringing together experts from two different areas with a great overlap, and allowing them to discuss approaches and exchange ideas.”

___ ``The high quality of the participants: there were many senior world leaders in some areas within the participants”.

- **What was your impression of the overall academic value of the workshop?**

___ ``It's a great workshop. Presentations represent the most advanced developments in quantile regression. It should inspire lots of new researches.”

___ ``The quality of the talks was generally quite high. Small workshops like this are almost always much more valuable than larger conventions for advancing academic research.”

``Excellent blend of theory and practice; the main contributors in the field were present.”

- **Did the workshop help you to develop/sustain contacts likely to result in new research?**

___ ``It was very valuable to meet up with colleagues and discuss with them at length current research ideas.”

In general, the organizers and the participants felt that the workshop was a success and had managed to achieve the goals of

- providing an overview of the current state of research in quantile regression both to those already working in the field and to others considering moving into it;
- discussing and advancing leading edge research on the interface between mathematics, statistics, economics, finance, genetics and public health;
- bringing together leading international experts from both academia and statistical practice to promote exchange of ideas and to provide practitioners ample opportunity to inform future research directions.

Moreover, the responses indicate that the workshop helped the participants to establish future collaborative connections. We can also see that the workshop helped spur some very original ideas on topics related to the workshop for some participants. This is a pleasant by-product that has not been anticipated by the organizers.

Finally we wish to extend our sincere thank to Professor John Toland for his very helpful guidance on our scientific questions regarding our original workshop proposal. We would also particularly like to thank ICMS staff Tracey Dart and Morag Burton for their wonderful administration of the workshop.