

## A week in Będlewo, Poland

August 21st-August 27th, 2003

It was with great pleasure that I accepted an invitation from the Deputy Director of the Institute of Mathematics in the Polish Academy of Sciences to speak at STATLIN'03, the eleventh international conference on mathematical statistics. The conference was to focus on *Statistical Inference in Linear Models* and to be held in the Mathematical Research and Conference Centre, Będlewo, about 30 kilometres outside of Poznan in Poland. More recent conferences in this series had been held in Poznan 1993, Jachranka 1996, Lagow 1998, and Szklarska Poreba 2000. This was my fifth visit to Poland and it turned out to be one of the best. All presentations at the conference were in English.

My journey to Będlewo began at Frankfurt airport where I met Richard Huggins from La Trobe University who was waiting at the gate for the flight to

Poznan. Richard and I had first become acquainted on a previous visit to Lagow in Poland in 1998. The flight to Poznan was in a twin-engine propeller driven aircraft, not unlike the one that flies between Perth and Albany in Western Australia. While I breezed through passport control, the bearded Richard had the uncomfortable experience of having to establish his credentials by submitting documentation, which he had brought with him for just that purpose. We were greeted at the airport by representatives of the conference organizers and taken to the conference centre along with other delegates who had arrived on the same flight. The conference centre was in two parts: one was an old castle (pictured) that contained dining rooms and a bar in the basement so that conference delegates could relax and talk statistics; the other was a modern building that included a seminar room with up to date electronic

facilities and accommodation. There were single bedrooms for those travelling alone and twin bed and double bedrooms for those with partners. All bedrooms contained modern ensuites. The modern building was not incongruous with the castle as it had beautiful architecturally designed facades. The buildings were set in a few acres of wooded land surrounded by a high wall, outside of which were walking paths through pine forests to sown fields. Despite the recent hot weather that Europe had been experiencing, the weather during the conference was pleasant and conducive to the exchange and dissemination of ideas.

Richard and I were the only two Australians at the conference; however, there were other Australian connections. Mohammed Ghitany, who completed his PhD at the University of Western



*The Australian Connections: (from left to right) Richard Huggins, Elvezio Ronchetti (Swiss), Christine Müller (German), Tadeusz Bednarski (Polish), Brenton Clarke, Mohammed Ghitany (Egyptian).*

Australia and is now working in Kuwait University, greeted me on arrival. Professor Elvezio Ronchetti of the University of Geneva was also invited. He was known to both Richard and me, and has visited La Trobe University, the Australian National University and Murdoch University. In fact, I was a colleague of his for one year at the Swiss Federal Institute of Technology in Zurich in 1983. Also in attendance was Professor Tadeusz Bednarski with whom I collaborate. He has visited Murdoch University in Western Australia on two previous occasions, and we used this conference to continue discussing further collaboration. Tadeusz is one of the Polish members of the Scientific Committee that invited Richard Huggins and me.

Eminent statistician Professor Tadeusz Caliński, who has worked widely in the area of linear models and experimental design, chaired the opening ceremony. This included welcomes from Roman Zmyślony, our prime contact for day-to-day details at the conference, and Professor Marian Nowak, the Rector of the University of Zielona Góra.

In talking prior to commencement of the conference the accidental similarity between the acronym of the conference and the name of STALIN had been noted, particularly by those from Eastern Europe. Roman Zmyślony was keen to put minds at ease and pointed out that this conference was about 50 years after the death of the former dictator. Professor Sinha, from the University of Baltimore in the USA, spoke about methods for aggregating several ranking statistics. This was followed by a talk on "Future Directions in Robust Statistics" from Professor Ronchetti who emphasized the need for development of robust methods in wider fields including finance and biology. It was flattering that he acknowledged the importance of Fréchet differentiability as developed in works by myself and Professor Tadeusz Bednarski in relation to the development of robust statistics in these other fields of research.

Richard and I both spoke on the opening day of the conference in a session chaired by Professor Ronchetti. Since the conference theme was linear models, we had both worked hard to deliver in this area. I spoke first on results related to the two way layout, with discussion of both robust and classical approaches to modelling, illustrating methodology on a barley



*The family Filzmoser (from Vienna) in front of the main building containing the seminar rooms, administration and accommodation at the Conference Center.*

variety data set of Immer et al. found in R.A. Fisher's book *Design of Experiments*. Questions involved identification of outliers or the lack of them in the two way layout. There was discussion about an evaluation of an exact test of heteroscedasticity proposed in Clarke and Godolphin (1992) that proved empirically more powerful than several other tests for heteroscedasticity proposed by Shukla in earlier literature. This work on power comparisons was joint work with a former Honours student at Murdoch University, Antony Monaco. A question of whether the proposed test was indeed the most powerful was mooted. Finally, a related problem was posed: When do the Best Linear Unbiased Estimator (BLUE) and the Least Squares Estimator (LSE) agree for a partition of the fixed effects parameter? I received a number of responses from my presentation. Professor Caliński was quick to notice that with the data I used it was more common to think of the locations at which the barley varieties were grown as random effects in Poland. Professor Simo Putanen, from the University of Tampere, Finland, revealed that in his presentation he was in fact solving the question of when the BLUE and LSE agree for a partition of the fixed effects parameters. This was a twofold surprise for me - not only was he in the audience, but he was considering the problem I'd raised. I had referred to his earlier work in my presentation. It just proves how invaluable an international conference

can be for keeping abreast of current work in the field.

Richard Huggins followed my presentation with a talk on "Application of the Rasch model in categorical pedigree analysis using MCEM: I Binary data." His presentation was on joint work with Guoki Qian & Danuta Loesch. Richard noted that the analysis of quantitative family data using mixed linear models was well established, has been extensively applied and the parameters are readily interpreted. On the other hand, the analysis of categorical and binary outcomes from family data is not well developed. He pointed out that the Rasch model is a type of random effects logistic regression model. By using correlated latent variables to model the relationships between individuals within the same family, it allows the standard mixed linear models used in quantitative genetics to be applied to binary family data. Moreover, in relation to his joint collaboration, the resulting models are readily interpretable by biologists familiar with standard analyses of family data. However, in relation to these models, directly maximizing the associated likelihood is computationally difficult as many multiple integrals are involved. Richard proposed the use of the EM algorithm, with MCMC in the E-step (MCEM) to find the MLE's. Under regularity conditions the MCEM sequence becomes close to the MLE with high probability, and the MLE's may be retrieved from the

stationary distribution. There were some complications in estimating the information matrix as the estimate may not be positive definite and, as the data was binary rather than continuous, there were also practical limits on the complexity of the models that could be used for the dependence between individuals. The method was illustrated on data on psychological scores from 218 individuals in 46 families affected with the fragile X condition. The scientific interest was in the relationship between the score and the level of a specific protein and IQ, and in the estimation of the heritability of the score. The extension of established mixed linear models to correlated binary data is theoretically interesting, and from a practical point of view it allows biologists to retain the intuition and models they have developed for continuous traits. Richard's exposition on the MCMC method was complemented later in the week when Mohammed Ghitany spoke on his joint work titled "Modelling the presence of long-term survivors using generalized Burr XII mixture model".

Having given our presentations on the first day, Richard and I had the luxury

of attending talks, enjoying the Polish hospitality, fine dining, and going on a superb Sunday bus tour. We visited ruins of castles of former Polish Kings, museums, cathedrals and a palace dating back to the 1800's or thereabouts that had been recently renovated. We talked about current ideas in statistics and upcoming conferences. Richard ran each morning in the pine forests surrounding the grounds. I had not packed running togs on this trip and am currently working off the good Polish food, which included a delicious smorgasbord dinner on the night of the bus tour (including plentiful supplies of vodka, the national drink) and a closing barbecue held in the conference grounds. We were entertained by the Viennese family Filzmoser, consisting of Peter, Heidi and their three young children, who sang several songs in their native language.

Professor Anthony Atkinson from the London School of Economics gave the address on the closing day on "Adaptive Designs for Clinical Trials".

It was a splendid conference in all respects. The Polish hospitality was exemplary, and Richard and I wished

there was that there was such support for one or more conference centres in Australia. Resulting from discussions at the conference, Professor Benarski has arranged to visit Murdoch University later this year for an ongoing collaboration, and Richard Huggins and I hope to bring out to Australia Professor Christine Müller from Germany. Richard intimated to me that he had ideas for at least three works based on the interaction that he had at the conference. The Polish statistical community is to be congratulated on a conference that was well organized and well supported. We can only feel lucky that we were selected to be ambassadors for our country at this conference that included 52 participants. The conference presentations will be published after appropriate refereeing in the journal *Discussiones Mathematicae: Probability and Statistics*.

*Brenton R. Clarke*

Reference: Clarke, B.R. and Godolphin, E.J. (1992) Uncorrelated residuals and an exact test for two variance components in experimental design, *Commun. Statist.-Theory Meth.*, 21, 2501-2526.



*The palace containing dining rooms.*