



香港統計學會

Hong Kong Statistical Society

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The University of Hong Kong, Pokfulam Road, Hong Kong
<http://www.hkss.org.hk>

Bulletin

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Editor's Foreword

It is my honour to be elected as the Publications Secretary of the Society. I would like to thank those who supported me on this.

We are planning to publish the Bulletin twice a year. I hope this would provide more information about our activities, events, achievements of members, etc. in a more timely basis.

In the meantime, I would like to invite members to contribute their works for publication in

the Bulletin so that we can exchange ideas and knowledge via this platform. That would also promote discussions on interesting topics, important areas, and further developments in statistics.

I hope this Bulletin can stir up everyone's interest in the field so that we can promote our profession to the outside world as well.

Raymond TAM

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President's Forum

Professor K.W. NG

Our Annual General Meeting (AGM) is scheduled to be held on **17 April 2015 (Friday)** at 6:15 pm at the Immigration Officer Mess, 20/F Immigration Tower in Wan Chai. I look forward to seeing you in the AGM.

It is very good news that we had reached an agreement with the American Statistical Association (ASA) regarding the ASA PStat status for HKSS CStat accreditation as announced on page 22.

In last year, the Statistical Project Competition (SPC) for Secondary School Students has attracted some 130 entries. We are grateful to the SPC organising committee under Mr Alan CHEUNG and colleagues who serve as adjudicators. We are, of course, particularly grateful for the sponsor Hang Seng Indexes Company Limited and the patrons Dr CHAN Ka-ki of the Education Bureau and Mr Leslie TANG of the Census and Statistics Department for their support.

The Statistics Creative-Writing Competition (SCC) for Secondary School Students has just ceased accepting entries. Adjudication will start soon. We are grateful to the SCC organising committee under Dr Philip YU and colleagues who serve as adjudicators. We are also grateful for the support of the sponsors Department of Statistics & Actuarial Science of The University of Hong Kong and the PolyU Hong Kong Community College.

The Society had organised two seminars this year. We were very much honoured to have Dr TAM Siu-ming, First Assistant Statistician in Australian Bureau of Statistics, to give us a talk on “An Inferential Framework with Application to the Analysis of Satellite Imagery Data” on 4 November 2014. Dr TAM is one of the Life Members of HKSS and he worked in the Census and Statistics Department before joining the Australian Government. Another talk was held on

17 March 2015 in The University of Hong Kong. We are happy to have Mr Samson TAI, the Chief Technology Officer of IBM China/Hong Kong Ltd., to deliver a talk to the Society on Big Data showing exemplary cases on how some organisations handle big data nowadays. The title of his talk is “The Insights to Transform Industries & Professions with Speed and Conviction”.

The Society had also organised a one-day tour to Sha Tau Kok Ex-closed Area on 22 March 2015. A total of 26 members and their families/friends participated; see some pictures at the end of the Bulletin.

With the advancement of computer technologies, data collection in conducting surveys can be made easier and simpler. Mr Leo YU of the Census and Statistics Department has written an article on the new approach for data collection for 2016 Population By-Census. In particular, the paperless approach should be most welcomed by the environmentalists.

Mr Y.M. LI and Dr Philip YU of The University of Hong Kong have written an article on how to visualise big ranking data. The graphical method of multidimensional scaling for presenting data is discussed. Movie rating data are used to illustrate the technique.

We are also delighted to have Professor Frederick HO to share with us his various statistical engagements since his retirement from the Government 10 years ago.

Once again, thank you for the support of the 2014-2015 session. I look forward to your continuous support of the Society in the 2015-2016 session.

**An Interview with Professor Frederick W. H. HO,
B.Sc., M.Soc.Sc., C.Stat; *SBS, OBE*
Former Commissioner for Census and Statistics
of the Government of Hong Kong (1992-2005)**

Professor Fred HO worked in the Civil Service of the Government for 39 years, of which 33 were in the Census and Statistics Department. At his retirement in August 2005, he had been in the position of Commissioner for Census and Statistics for 13-1/2 years. Professor HO is currently an Honorary Professor in the Department of Statistics and Actuarial Science of the University of Hong Kong and an Adjunct Professor in the Statistics Department of the Chinese University of Hong Kong. He was President of the Hong Kong Statistical Society (1986-1988), Chairman of the United Nations Asia-Pacific Committee on Statistics (1994-1998), Vice President of the International Association of Official Statistics (1997-1999), Member of the Council of the International Statistical Institute (2001-2005) and Member of the Hang Seng Index Advisory Committee (1994-2006). He is an Honorary Member of the Hong Kong Statistical Society. He was awarded the OBE by the UK Government in 1993, the Spallart Medal by the International Statistical Institute in 1997 and the Silver Bauhinia Star by the HKSAR Government in 2006.



A recent photo of Professor Fred HO

HKSS - Interviewer from Hong Kong Statistical Society
(Ms Agnes LO)
HO - Professor Fred HO

HKSS:

Professor HO, you kindly wrote, in late 2010 for publication in the January 2011 HKSS Bulletin, an article called “**Some reminiscences of My Statistical Career**” wherein, after having retired from the Government for 5 years and having had the chance to relax and to reflect on the many happenings in your long working career in the Government, you recollected for our enlightenment significant and interesting issues and incidents and pointed out the important matters to attend to in a statistical career.

We wonder if you could kindly update us with what you have been doing over the last 10 years or so, since your retirement from the Government. You have not been taking a high profile but we do hear about you and see you from time to time; that is, you have remained quite active.

HO:

That is quite true. I am glad that my health has been generally OK all these years and I have met with various opportunities to enable me to continue pursuing my interests and in fact to extend my scope of interest into areas which are new ventures for me.

HKSS:

Obviously you have not left statistics behind. Can we start with your statistical endeavours?

HO:

Certainly. Shortly after my retirement from the Civil Service, I started to take

up **part-time teaching in degree courses** of limited volume in the Statistics Departments of the University of Hong Kong and the Chinese University of Hong Kong. They were on official statistics and sample surveys. By now I have been doing so for some nine years. I have also been giving occasional lectures in other programmes in the Universities and professional associations, given that the application of statistics can be very wide and that I do hope students and professional workers can come to realise the versatility of the discipline and that statistics are not just chunks of figures but a body of profound knowledge and wisdom.

Meanwhile, I was quite fortunate that **international organisations** (like the United Nations, the International Monetary Fund, the World Bank, the Statistical Institute for Asia and the Pacific) and statistical authorities in a number of countries considered my knowledge and experience useful and got me as a consultant in their statistical events (conferences, training seminars, competitions) or in reviewing their statistical strategies or statistical operational systems. These engagements were interesting and I continued to widen my perspective in the profession. But above all, apart from these and deepening my friendship with former friends and meeting new ones, I have managed to let people know that Hong Kong has been working very well all these years amidst some suspicion that it is not as stable and prosperous as it was prior to the Asian financial turmoil (1997/8), the SARS epidemic (2003) and the global financial tsunami (2008).

HKSS:

We notice that the mass media these days often like to get a former head of a Government department to comment on current issues related to his/her former Department. Is this the same with you? How would you handle such situations?

HO:

Such situations do arise from time to time. Reporters like to write sensational pieces and it would be a sensational one if it contains criticisms (even some mild ones) from a former Head against the current one!! As a matter of fact, a few reporters do know me well since my days as Commissioner – and hence they are also senior and experienced ones! They also know that I am not out of touch of the field. Thus, I probably look like a good target on certain occasions. For me, I always tell them clearly that the most comprehensive and fully up-to-date information and comments are with the Department. However, I do feel an obligation as a professional statistician to ensure those non-statisticians not being on a wrong track. Thus, I would usually not give a direct response to their questions; but would suggest some issues or points that they could usefully touch on when interviewing Departmental staff or other commentators and enlighten them on some technical issues which they might easily get wrong with or might be misled by some commentators with inadequate knowledge or biased views.

HKSS:

We understand that you have been a key member in a **private think tank** since its

inception. Have they been looking to your statistical expertise or something else?

HO:

Yes, I am a member of the Strategic Committee of the Hong Kong Ideas Centre. The sponsors of that think tank have known me personally for a long time. They know I am interested in public policy studies and that I am very keen to see sustainable development of Hong Kong through good application of public policies. Certainly they think my statistical knowledge and experience would contribute to those studies; but they also know I like to observe socio-economic phenomena from a close distance and in relation to other ones. A problem with many analysts is that they tend to be too theoretical or like to look at an issue (or one area) in isolation from others.

香港集思會 HONG KONG IDEAS CENTRE
齊思考 創未來 Think and build for the future

My dedication to this activity is also underpinned by my keen wish to demonstrate to people the usefulness of statistics (in terms of both data and concepts/methods) in the analysis, formulation, implementation and evaluation of policies and that statistics do play an important role in substantiating democracy since the general public, with the aid of statistics, can get to know clearly the societal situation and participate in meaningful debates on policy decisions. **Politics without the backing of proper policy studies or not respecting them will turn out to be low quality politics and does no good to society.**

In fact, now and then I also give lectures to Government officials from the Mainland coming to Hong Kong for training courses organised by various local institutions on Hong Kong's public administration. Apart from talking on administrative structure, I take them through the analysis of Hong Kong's socio-economic developments and inform them about Hong Kong's policy making processes. Often in my lectures I stress on the important role of statistics.

HKSS:

In regard to public policy areas, which ones are you particularly interested in?

HO:

Population policy, in particular the aspects of ageing of the Hong Kong population and its impact on manpower supply/demand, certainly comes forefront. **Housing, healthcare, the environment and the economic structure**, too. Each is a huge area and many people say that looking at any one area is already a paramount task. But in fact they are so related that looking at each area in isolation will fall short of making comprehensive policies and good decisions that balance out the impacts on the various areas.

In possession of an undergraduate degree in science, I continue to feel affection for science and technology. But above that, I do think that science and technology have a strong role to play in Hong Kong's economic development in the decades to come. I am the Vice President of an Association that

promotes science and technology developments in Hong Kong. With possible manpower shortage in Hong Kong, we need to engage in production with higher value added and higher productivity; and for that, science and technology holds the key.

HKSS:

We understand that you have been assisting in the administration of some education institutions. What roles do you take?

HO:

I have been participating in **Committees and Councils of Educational Institutions** dealing with professional/vocational education and continuing/lifelong learning. The world is changing rapidly and upgrading of personal qualities and enhancing the ability and wish to learn on the part of individuals are extremely important. One big worry of mine is the observation that people tend to concentrate on areas of study which seem to promise good prospects in the near term but which are not matching well with the longer term needs of society. The other worry is that many young people are loaded with loan burden accumulated through their study years.



I am an Executive Committee Member of an Association that is sort of a **federation of professional societies**. This federation does not cover those major professional societies which have statutory status, large memberships and strong secretariats. In fact, quite a number of its constituent societies are societies of associate professionals and many of them have just limited resources. In fact, it is worthwhile noting that associate professionals are a huge category of workers in Hong Kong and have collectively contributed greatly to our economic development.

The Government is taking some action in encouraging and supporting career planning of young people. This is a good move. In my undertakings, I offer opinions on the establishment of courses and learning programmes and when doing so I stress that societal needs should be attended to more than current popularity. I also advocate the allocation of public funds and other resources to enable reduction in the loan burden of students.

HKSS:

You are on the Governing Committees of Hospitals. How come you get involved in these?

HO:

Yes, I am on the **Hospital Governing Committees (HGC)** of one public hospital and one private hospital. It probably

started with people thinking that, as a person with considerable numeracy skills, I could contribute to the quantitative aspects of administration of the institutions. Given my concern with healthcare services, I gladly took up the tasks and they have turned out to be very interesting assignments and I have learned a great deal therefrom.

HKSS:

You hosted a 26-episode once-weekly programme series in 2012 on Radio-1 of Radio Hong Kong entitled “Statistics-Life”. How was the experience like?



HO:

The aim of the series was to popularise statistics among the general public; and it was thought that it might provide some useful reference materials to young students pursuing liberal studies courses. It was quite hard work for me during that half a year. A lot of preparations, but I enjoyed doing that. It gave me an opportunity to reflect on a lot of statistical topics and issues and to learn how to present rather technical materials in an interesting, easy-to-understand manner. Hopefully it has achieved the purpose of getting more people to know that statistics are not just numbers but an effective means to reveal facts and analyse issues.

HKSS:

We know that amidst so many things that you are doing you are very much devoted to the **PHAB Association**, which has a mission to **promote *integration among people with and without disabilities*** apart from rendering rehabilitation services to persons with disabilities.



HO:

That's quite true. I have assisted in running the Association for 20 years, among its 43 years' of existence, being its Chairman for the last 12 years. That is, I had been with the Association years before I retired from the Civil Service. PHAB is the acronym for "Physically Handicapped and Able Bodied" but its scope of activities has now extended somewhat beyond physical disability. It is fortunate that there is a team of excellent full-time staff which manages very well the daily operations and helps the Board make good strategic decisions. Apart from services provision, the Association aims to help eliminate discriminatory attitudes and practices and promote integration in society. Gladly, there have been improvements in recent years but more is yet to be done.

Elderly persons are increasing in numbers at an ever-accelerating pace. At an advanced age, many would develop conditions close to disability and at least they would need provisions or services similar to persons with disabilities. **Barrier-free access** facilities will be widely in need. Besides, **carers** of persons with disabilities and elderly persons have not been receiving adequate attention from the community, although they shoulder very heavy daily burden both physically and mentally. The Association is doing a lot in these areas.

In fact, **my involvement in the hospital services area and the science and technology area synergises with my work with rehabilitation/integration.** For the former, if rehabilitation services are coordinated well with a patient's recovery from illness or surgical operation, the degree of permanent disability will be much reduced. And, more importantly, the psychological adjustment can come in time to bring the person to a much better form and within much less time. For the latter, many suitable and highly efficient yet non-costly tools and equipment can be designed and manufactured for use if appropriate science and technology expertise and resources are devoted to this area.

HKSS:

Professor HO, being engaged in such a wide range of activities, are you really a “retired person”? Wouldn’t you want to spare more time to “enjoy” your retirement?

HO:

I won’t say I am not doing quite a lot; but certainly what I do does not match with the vast amount of work being done day in and day out by so many of our members in the Hong Kong Statistical Society!

I won’t find my involvements a burden, though in taking up the tasks I concurrently take up the responsibilities hence I won’t say also there is total absence of pressure. But they are manageable. Hong Kong has given me a lot of opportunities during my working career and I do like to continue repaying the kindness with some contributions, however small, as long as I can still make them. Anyhow, I certainly still find time to enjoy music, recreational sports, watch movies/videos/performances, do a tour once in a while and, above all, chat with friends of different age on anything and everything! And of course, I now can spend much more time with my family than I could before my retirement.

HKSS:

Many thanks for the interview. What you have been doing should be a good reference to other retiring statisticians!

HO:

Thank you for interviewing me. Everyone has a different style and preference for the way of living. I am sure others find great ways for their retirement lives too.

I would just like to take the opportunity to thank my many friends and co-workers for their kind concerns, support and friendship through the years.

Visualising Big Ranking Data

Yiming LI and Philip L.H. YU

Department of Statistics and Actuarial Science, The University of Hong Kong

Introduction

Ranking data commonly arise from situations where it is desired to rank a set of objects in accordance with some criterion. Such data may be observed directly or it may come from a ranking of a set of assigned scores.

Very often, the first step of analysing data is data visualisation. Effective visualisation of ranking data could reveal the patterns and characteristics of the rankers' object preferences such as the clusters with distinct preferences, outliers, and the degree of agreement among the rankers. When the size of the ranking data is big, it is practically impossible to reveal the pattern and characteristics by merely looking at the raw data or by using some simple descriptive statistics such as the means and standard deviations of the ranks.

Popular visualisation techniques for ranking data include permutation polytopes, multidimensional scaling (MDS), multidimensional unfolding and multidimensional preference analysis, and their variants. In this article, we will introduce multidimensional scaling and its application for visualising ranking data. For other visualisation methods, see the monograph by ALVO and YU (2014).

Multidimensional Scaling (MDS)

Multidimensional scaling is a collection of graphical methods for representing data which are in the form of similarities, dissimilarities, or other measures of “closeness” between each pair of objects. The basic idea behind MDS is to search for a low-dimensional space, usually Euclidean, in which each object is represented by a point in the space, such that the distances between the points in the space “match” as well as possible with the original (dis)similarities.

In the context of ranking data, KIDWELL et al. (2008) suggested computing the dissimilarity between any two incomplete rankings on t objects by Kendall distance proposed by ALVO and CABILIO (1995) and then applied MDS to find an embedding of a data set of n rankings assigned by n rankers in a two- or three-dimensional Euclidean space.

Given two complete rankings $\boldsymbol{\mu} = (\mu(1), \mu(2), \dots, \mu(t))'$ and $\boldsymbol{v} = (v(1), v(2), \dots, v(t))'$, the Kendall distance, $d_K(\boldsymbol{\mu}, \boldsymbol{v})$, is a metric that counts the number of pairs of objects for which $\boldsymbol{\mu}$ and \boldsymbol{v} have opposing orderings:

$$d_K(\boldsymbol{\mu}, \boldsymbol{v}) = \sum_{i < j} \{1 - \text{sgn}(\mu(j) - \mu(i)) \text{sgn}(v(j) - v(i))\},$$

where $\text{sgn}(x) = 1$ if $x > 0$ and $= -1$ if $x < 0$. ALVO and CABILIO (1995) extended the notion of distance to incomplete rankings by referring to the corresponding compatibility classes of rankings. The Kendall distance, $d_K^*(\boldsymbol{\mu}^*, \boldsymbol{v}^*)$, between two incomplete rankings $\boldsymbol{\mu}^*$ and \boldsymbol{v}^* is defined to be the average of all values of the distances $d_K(\boldsymbol{\mu}_a, \boldsymbol{v}_b)$ taken over all pairs of complete rankings $\boldsymbol{\mu}_a$ and \boldsymbol{v}_b compatible with $\boldsymbol{\mu}^*$ and \boldsymbol{v}^* respectively. The computation of such average distance may become inefficient when the number of objects is getting large, say greater than 20. To overcome this problem, ALVO and CABILIO (1995) derived an efficient formula for computing $d_K^*(\boldsymbol{\mu}^*, \boldsymbol{v}^*)$ between the two incomplete rankings $\boldsymbol{\mu}^*$ and \boldsymbol{v}^* each expressing preference over k_1 and k_2 objects respectively:

$$d_K^*(\boldsymbol{\mu}^*, \boldsymbol{v}^*) = \frac{t(t-1)}{2} - \sum_{i < j} a_\mu(i, j) a_v(i, j),$$

where

$$a_\mu(i, j) = \begin{cases} \text{sgn}(\mu^*(j) - \mu^*(i)) & \text{if both } i \text{ and } j \text{ are ranked} \\ 1 - \frac{2\mu^*(i)}{k_1 + 1} & \text{if only } i \text{ is ranked} \\ \frac{2\mu^*(j)}{k_1 + 1} - 1 & \text{if only } j \text{ is ranked} \\ 0 & \text{otherwise.} \end{cases}$$

However, the above average distance will no longer satisfy the identity property: $d_K^*(\boldsymbol{\mu}^*, \boldsymbol{v}^*) = 0$ if and only if $\boldsymbol{\mu}^* = \boldsymbol{v}^*$. In this article, we propose a normalised version of the Kendall distance:

$$d_K^{**}(\boldsymbol{\mu}^*, \boldsymbol{v}^*) = \frac{d_K^*(\boldsymbol{\mu}^*, \boldsymbol{v}^*) - m^*}{M^* - m^*},$$

where M^* and m^* are the maximum and minimum values of the Kendall distance as defined in Lemma 3.5 of ALVO and YU (2014).

Application to Movie Rating Data

Consider a movie rating data set containing 72 979 ratings of 55 movies made by 5 625 raters who visited the web site MovieLens (RESNICK et al. 1994) in 2000. These 55 movies were obtained by combining the top ten highest rated movies from each of six genres—action, children, drama, horror, romance and thriller (Figure 1). Although each movie could have multiple genres, it would be assigned to one genre “fan group” in which it is more highly rated.



Figure 1: The 55 selected movies. This is a word cloud generated by Wordle (<http://www.wordle.net>). After assigning each movie to a unique genre, there are eight action movies, ten children's movies, eight drama movies, ten horror movies, ten romance movies and nine thrillers. In this word cloud, the sizes of the movie titles are proportional to the total numbers of times they were rated by the 5 625 raters. The Star Wars series are the most popular in the sense that they were rated by the most people in this data set.

For each rater, we could calculate his or her ranking of the 55 movies based on his or her ratings. Note that this ranking is very likely to be incomplete and contains ties. We then calculate the pair-wise normalised distance d_{R}^{**} , resulting in a $5\,625 \times 5\,625$ distance matrix. Applying two-dimensional MDS to the distance matrix, we obtain a scatterplot of 5 625 points for the movie raters. However, the points are too densely clustered that the scatterplot is ineffective to visualise the patterns of the ranking data. Kernel smoothing is therefore used to produce a heat map for better identification of different clusters of movie raters. The movie-viewing population initially appears to be a single large cluster. A closer look identifies five rectangular regions with the highest local densities (Figures 2 and 3).

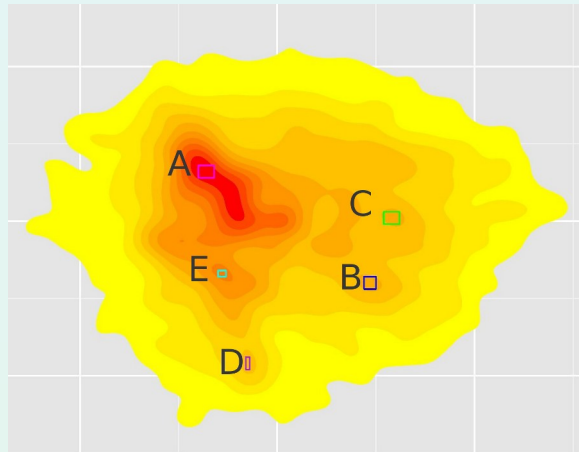


Figure 2: The five regions with local maximum density.

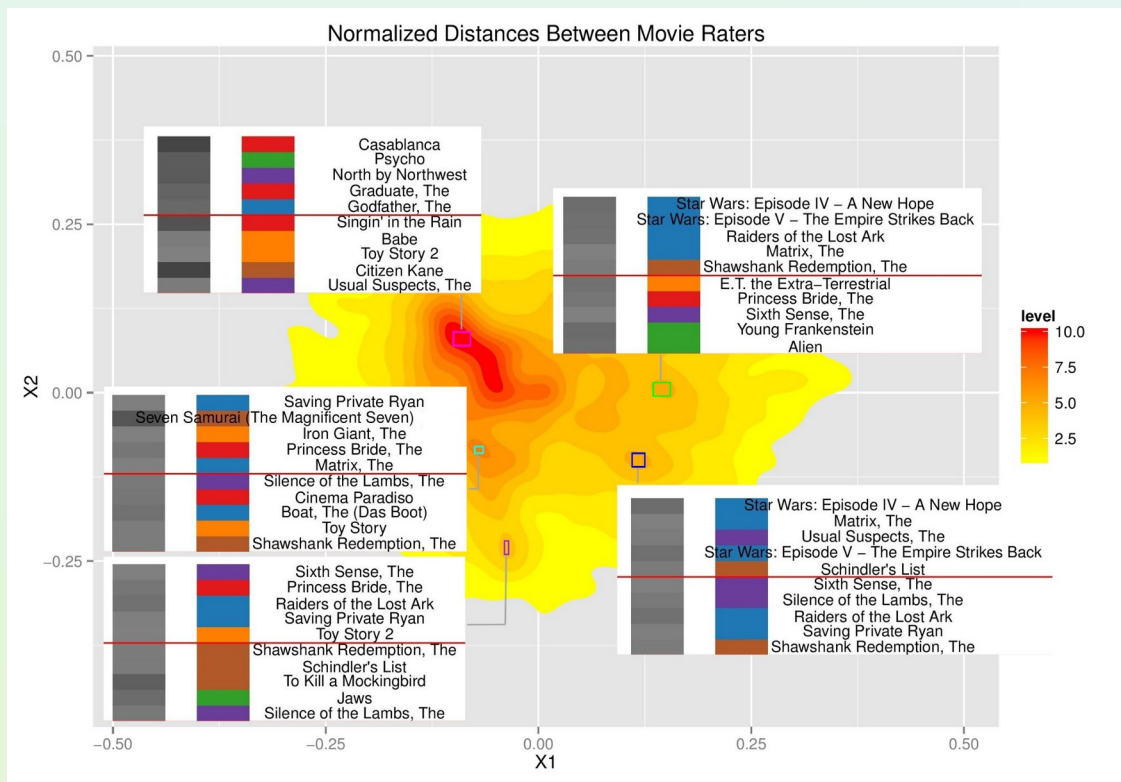


Figure 3: Representative rankings for maximum density regions. Only the top ten movies in the representative rankings are shown in this graph. The color bar denotes the genres of the movies: red is for romance, green is for horror, purple is for thriller, blue is for action, brown is for drama and orange is for children's. The gray-scale bar stands for the year of the movie. A darker shade of gray stands for an older movie.

In Figure 3, we could see that in the highest density region (pink rectangle, A), the genres are rather mixed, though generally speaking, the highly rated movies by the raters in this region mainly deal with romance (e.g. *Casablanca* and *The Graduate*) and tend to have a bubbly tone (e.g. *Singin' in the Rain* and *Babe*) or high suspense (e.g. *Psycho*, *North by Northwest* and *The Godfather*). Intuitively, the movies with these features indeed appeal to the mass.

For the region in the bottom right corner (blue rectangle, B), action movies (e.g. *Star Wars* and *The Matrix*) have aced the representative rankings. The region in the upper right corner (green rectangle, C) is quite similar, with the top four rankings being all action movies.

The regions in the bottom left corner have more drama movies at the top than the regions A, B and C. Between these two, the upper one (cyan rectangle, E) has more obscure movies ranked among the top (e.g. *Seven Samurai* and *Cinema Paradiso*), whereas the lower one (magenta rectangle, D) rated movies dealing with serious issues at the top (e.g. *Schindler's List* and *To Kill a Mockingbird*—both of them are not present in the top ten list of the representative ranking of any of the other five regions).

In conclusion, we identify a dichotomy within the cluster where preferences vary from the left to the right. The right half of the cluster appears to appreciate pure action films with sci-fi elements. In the left half, the upper part mainly consists of people interested in romance and children's movies, or movies with fancier and more exciting elements, while the people in the lower part enjoy serious drama movies more.

References

- ALVO, M., & CABILIO, P. (1995). Rank correlation methods for missing data. *Canadian Journal of Statistics*, 23, 345–358.
- ALVO, M. and YU, P.L.H. (2014). *Statistical Methods for Ranking Data*. Springer.
- KIDWELL P, LEBANON G, and CLEVELAND W.S. (2008). Visualising incomplete and partially ranked data. *IEEE Transactions on Visualisation and Computer Graphics*, 14(6):1356-1363.
- RESNICK, P., IACOVOU, N., SUCHAK, M., BERGSTROM, P., & RIEDL, J. (1994). Grouplens: An open architecture for collaborative filtering of netnews. In *Proceedings of the 1994 ACM Conference on Computer Supported Cooperative Work (CSCW)* (pp. 175–186). New York, NY: ACM.

New Approach for Data Collection for 2016 Population By-Census

Leo YU

Census and Statistics Department

Introduction

The Census and Statistics Department (C&SD) has been conducting a population census in each year ending “1” since 1961, and a population by-census in each year ending “6” since 1966. Following this practice, C&SD will conduct the next population by-census in 2016 (16BC). A two-phase data collection approach combining the use of e-Questionnaires and computer-assisted interviewing (CAI) method will be adopted. By adopting these two data collection channels, the 16BC will be conducted in a paperless manner. Apart from being more environmentally friendly, this approach could further streamline the subsequent processing steps.

2016 Population By-Census

The upcoming 16BC will enumerate one-tenth of the population, or about 300 000 households, for collecting data on their detailed socio-economic characteristics. The operation will involve the recruitment and training of some 6 500 temporary enumerators. The fieldwork period is tentatively scheduled for 30 June to 2 August 2016 and the results will be disseminated in batches from February 2017. A pilot survey will be conducted in July-August 2015 to test the operational flows and designs of the 16BC.

Paperless Data Collection Approach

A two-phase data collection approach using advanced information technology will be adopted in the 16BC. In the first phase, households will be provided with the self-

enumeration option to submit completed e-Questionnaires via a dedicated Internet e-Questionnaire System using desktop computer. An alternative mobile app version of the System will also be provided. For those households who do not respond in the first phase, enumerators will collect the required data by face-to-face interviews using a new CAI method. Under the CAI approach, enumerators will make use of mobile tablets instead of paper questionnaires to record the collected data.



Benefits of CAI Approach

The CAI approach will be newly introduced in the 16BC for face-to-face interviews. Complementing the use of e-Questionnaire System for self-reporting, the adoption of CAI approach will turn the data collection work for 16BC paperless. All data, once collected, will be uploaded to the centralised computer system, thereby greatly shortening the time required for data capturing and integration. Apart from being more environmentally friendly, this approach could further streamline the subsequent processing steps. Improvement will be seen in the following areas.

(a) Reducing paper processing costs

By introducing CAI, million sheets of paper can immediately be saved. The need for a proper archive for the completed paper questionnaires, which will incur large storage space and substantial administrative overheads, as well as staff



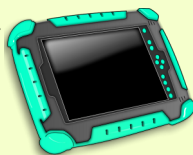
resources to handle the logistics of the paper questionnaires, can be avoided. Most importantly, costly, error-prone and time consuming work on capturing data from paper questionnaires by deploying optical character/mark recognition technique can be eliminated. This enables more efficient workflows in all subsequent processes.

(b) Increasing efficiency in fieldwork support

Enumerators can access fieldwork materials including location maps, up-to-date assignment lists and work manuals via the mobile tablets, thereby increasing operational efficiency and reducing paper consumption. With the aid of mobile tablets, message/information can also be efficiently disseminated to all or some of the enumerators at any time.

(c) Streamlining the distribution of workload to enumerators

The assignment allocation function will take into account the latest e-Questionnaire responses and support timely re-allocation of outstanding assignments among different enumerators through their mobile tablets. This flexible assignment allocation mechanism can help achieve a more even distribution of workload and enhance overall fieldwork progress.



(d) Better fieldwork progress monitoring

The fieldwork progress of individual enumerators will be captured automatically by mobile tablets instead of manual input on a daily basis. Enumeration progress can be more closely monitored to allow timely follow-up on unsuccessful cases.

(e) Enhancing data sharing among sub-systems

The system will enable more timely data sharing among different sub-systems during day time



instead of through batch updating at each day end. This will be achievable as vast majority of the data will be collected online through the streamlined workflow resulting from mobile computing. It will also facilitate the handling of public enquiries by indoor officers with more up-to-date information.

(f) Enhancing data quality

On-the-spot data validation checks will be incorporated in the CAI system of the mobile tablets. It enables early detection of reporting errors and instant clarification with the respondents during the face-to-face interviews. The turnaround time for conducting sample checks on completed questionnaires in the back office will also be shortened as a result of the automation in data collection, thus making it possible to conduct follow-up face-to-face clarification interviews promptly when necessary within the short fieldwork period.



(g) Improving data security

Data collected in mobile tablets will be removed once uploaded. In case of loss of a tablet, the transient data stored in the tablet, which will be protected by encryption, can be wiped out through remote control.

Conclusion

The 16BC will be the first attempt by C&SD to conduct a statistical survey in a paperless approach with the aid of Internet and mobile technologies. Compared to previous censuses/by-censuses, the 16BC will be operated in a much streamlined manner. The experience will be valuable for considering wider adoption of the approach in other surveys.

2014/15 Statistical Project Competition for Secondary School Students

Alan CHEUNG

**Chairperson, Organising Committee of
2014/15 Statistical Project Competition for Secondary School Students**

To promote statistical literacy among the younger generation, the Hong Kong Statistical Society (HKSS) has been organising the Statistical Project Competition for Secondary School Students (SPC) annually since 1986/87. The objectives of the SPC are to promote a sense of civic awareness and encourage students to understand the local community in a scientific and objective manner through the proper use of statistics. Participants are requested to select, analyse and interpret official data on any social and economic issues in Hong Kong.

The 2014/15 SPC, co-organised by the Education Bureau and sponsored by the Hang Seng Indexes Company Limited, is already the 29th round. To help participants prepare for the SPC, an exhibition of past winning projects and a briefing seminar was held on 25 October 2014. The

winners of the 28th round were invited to share their experiences. The briefing seminar attracted an audience of around 150 participants from over 30 secondary schools.

The competition is divided into two sections, the Junior Section for Secondary 1 to 3 students and the Senior Section for Secondary 4 to 6 students. Junior Section participants are required to submit statistical posters on one of the following themes: population, price and environmental protection. Senior Section participants are required to submit study reports with their own choices of themes. For each section, in addition to the first, second, third and distinguished prizes, two special prizes are awarded to teams with the best index application and the best graphical presentation of statistics.



↑ *Students of St. Paul's Secondary School, First Prize winner of the Senior Section of the 2013/14 SPC, shared their experiences in the 2014/15 SPC briefing seminar.*

↓ *Professor WONG Heung shared the review comments on the projects at the 2013/14 SPC Prize Presentation Ceremony.*



The 2014/15 SPC has received good responses, with about 130 statistical projects received. The projects cover a wide variety of themes, focusing on various social and economic aspects of Hong Kong. Contemporary issues studied by participating students include demographic trends, environmental protection issues and Hong Kong's economic development, etc.

The projects are now undergoing stringent scrutiny by the adjudication panel under the leadership of the Chief Adjudicator, Professor WONG Heung of the Hong Kong Polytechnic University. The participants of the more outstanding statistical projects will be short-listed for a selection interview before the awards are finally determined.

Being the Chairperson of the SPC, I would like to take this opportunity to express my heartfelt gratitude to Mrs Lily OU-YANG, the former Commissioner for Census and Statistics, for being the Patron of the SPC; to Dr CHAN Ka-ki, Deputy Secretary for Education, for being the Patron of the SPC and the officiating guest of the Ceremony; to Mr Leslie TANG, the Commissioner for Census and Statistics, for being the officiating guests, and to all members of the Organising Committee for their effort in the past year.

For the 2013/14 SPC, 102 statistical projects from 349 students of 37 secondary schools were received. The prize presentation ceremony was successfully held on 26 April 2014 at the Cultural Activities Hall of the Sha Tin Town Hall. Miss Viviane HO, Vice President of Research and Development of the Hang Seng Indexes Company Limited, delivered an enlightening talk on Hang Seng Index and Statistics, while Professor WONG shared the invaluable comments from the adjudication panel during the Ceremony.

Regarding the results of the 2013/14 SPC, for the Junior Section, students of Shun Tak Fraternal Association Yung Yau College (順德聯誼總會翁祐中學), who applied official statistics from multiple facets to discuss the fertility trends of women for different age groups, won the First Prize as well as the Best Index Application. Students of Stewards Pooi Kei College (香港神託會培基書院) won the Second Prize as well as the Best Graphical Presentation of Statistics, while students of Good Hope School (德望學校) won the Third Prize.

Students from Shun Tak Fraternal Association Yung Yau College, winners of both the First Prize and Prize for the Best Index Application for the Junior Section, shared the memorable moment with the Patrons and honourable guests.



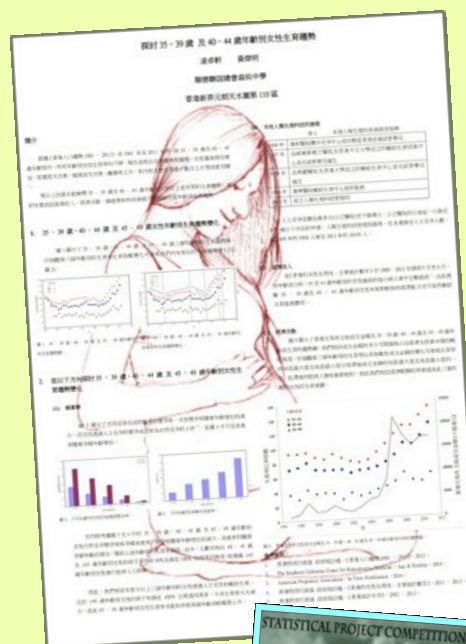
Students from St. Paul's Secondary School, winner of the First Prize for the Senior Section, shared the memorable moment with the Patrons and honourable guests.

As for the Senior Section, the statistical report from students of St. Paul's Secondary School (聖保祿中學) was appraised as the best amongst all the projects. Through logical statistical analyses and projections, they explored the feasibility of the implementation of universal retirement protection scheme in Hong Kong. Students of Sha Tin Methodist College (沙田循道衛理中學) won the Second Prize as well as the Best Graphical Presentation of Statistics, while students of Shun Tak Fraternal Association Yung Yau College (順德聯誼總會翁祐中學) won the Third Prize as well as the Best Index Application.



First Prize winner of the Junior Section

*“探討 35 - 39 歲及 40 - 44 歲年齡別女性生育趨勢”
by Shun Tak Fraternal Association Yung Yau College*



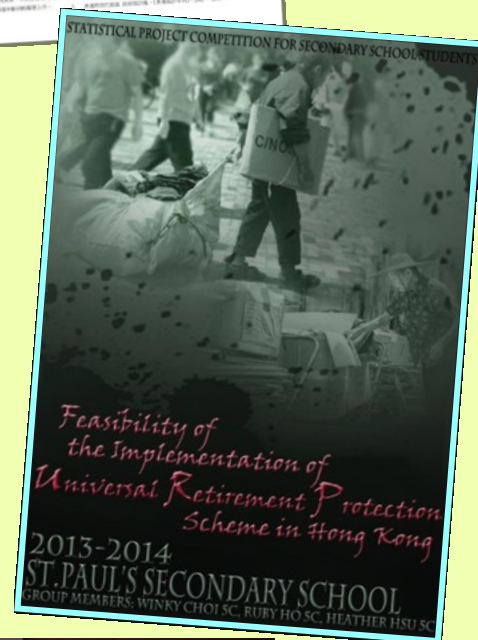
The winners of the First Prize of both the Junior and Senior Sections were invited to give a summary account of their winning projects and shared with the audiences their valuable experience in the course of preparing the projects. The performance of the students was greeted by the audiences with rapturous applause.

The SPC could not be accomplished without the contributions from the patrons and sponsors, and a group of zealous statistical practitioners serving as the Organising Committee of the SPC.



First Prize winner of the Senior Section

“Feasibility of the implementation of Universal Retirement Protection Scheme in Hong Kong” by St. Paul's Secondary School



Patrons, sponsors, honourable guests, HKSS Council members and SPC Organising Committee

NEWS

◆ Promotion

- ✚ Mr Leslie TANG, Mr Stephen LEUNG and Ms Marion CHAN were respectively promoted to Commissioner, Deputy Commissioner and Assistant Commissioner of the Census and Statistics Department in November 2014.
- ✚ Prof M.L. TANG of the Hang Seng Management College was promoted to the Acting Dean of the School of Decision Sciences.

◆ Awards

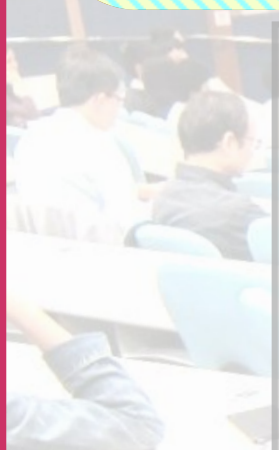
- ✚ The International Chinese Statistical Association (ICSA) is honoured to present the ICSA 2014 Distinguished Achievement Award to Professor Kai-tai FANG, BNU-HKBU United International College, China, for his broad and significant contributions in statistical theory and applications, his dedication and excellence in teaching statistics and fostering young statisticians, and his long and distinguished services to the ICSA and statistical profession.
- ✚ Dr Eddy LAM of The University of Hong Kong was awarded the 2013-14 Award for Teaching Excellence of the Faculty of Science.
- ✚ Prof H.L. YANG of The University of Hong Kong was awarded the University's Outstanding Research Award 2013-14.

◆ Retirement

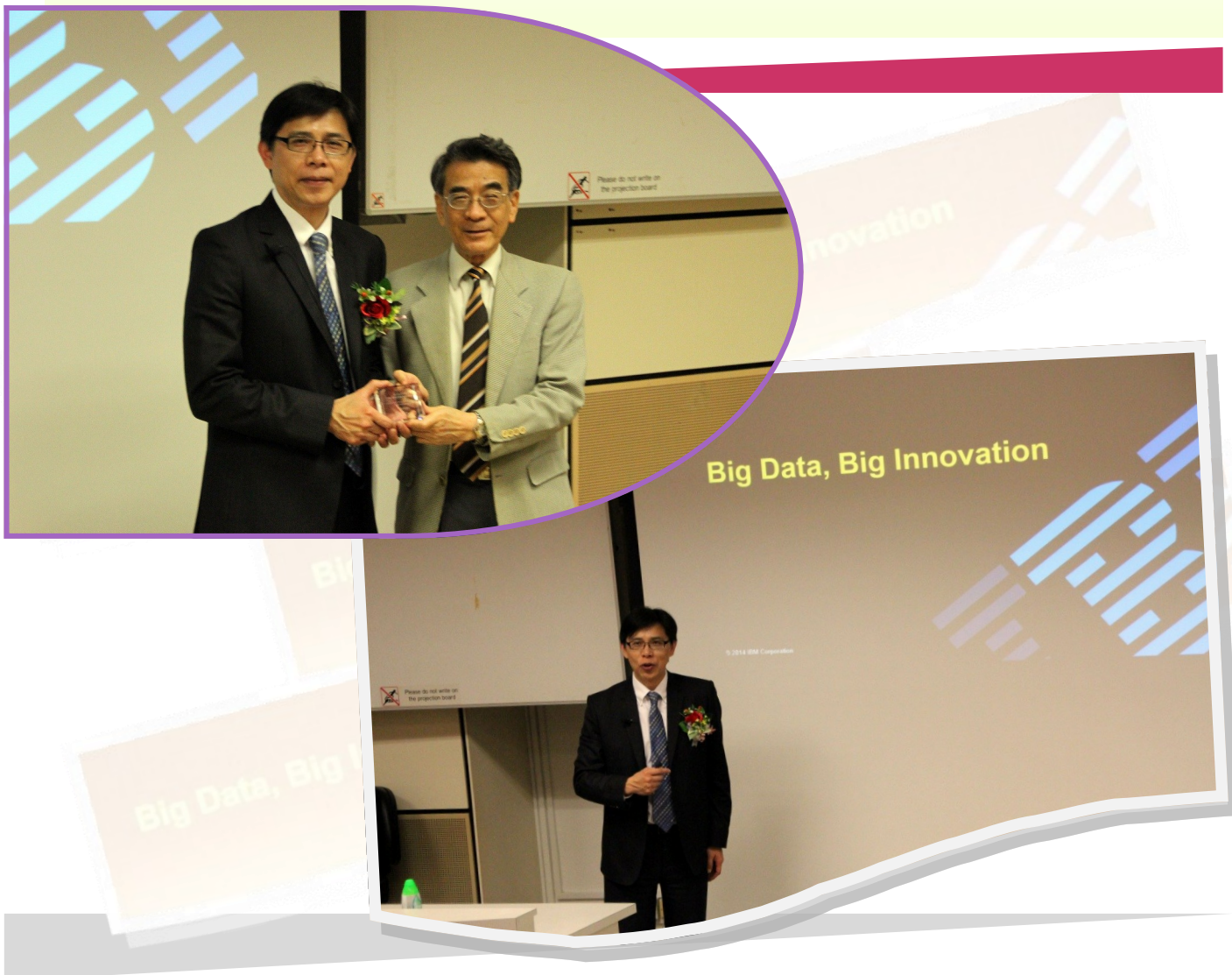
- ✚ Prof K.W. NG, the first Patrick S.C. POON Professor in Statistics and Actuarial Science of The University of Hong Kong, was retired in 2014 after employment extension beyond retirement age at The University of Hong Kong since 2006.
- ✚ Mr Raymond TAM of the Hong Kong Institute of Vocational Education was retired in 2014.

◆ Talks

- ✚ Dr TAM Siu-ming, First Assistant Statistician in Australian Bureau of Statistics, had given us a talk on Big Data on 4 November 2014. Dr TAM is one of the Life Members of HKSS and he worked in the Census and Statistics Department before joining the Australian Government. The title of his talk is “An Inferential Framework with Application to the Analysis of Satellite Imagery Data”. About 60 participants attended the seminar.



- ✦ The Society had organised a seminar on Big Data on 17 March 2015 at the University of Hong Kong. The speaker, Mr Samson TAI, is the Chief Technology Officer from IBM China/Hong Kong Ltd. The talk was about how some organisations handle big data nowadays. The title of the talk is “The Insights to Transform Industries & Professions with Speed and Conviction”. About 45 participants attended the seminar.



◆ *Obituary*

It is with great sadness that Mr John LAM passed away in December 2014. John joined the Census and Statistics Department in 1983 and had worked in various branches of social and economic statistics, including population statistics and prices statistics. He was an active member of the Society and had served as the Secretary of the Editorial Board for more than a decade. In addition, John was the founding member of the Examination Board of the HKSS and had served as the Secretary of the Professional Affairs Committee for a long time. He had provided valuable contributions to the setting up of the professional examination of the HKSS, and offered continuous support and assistance to the smooth running of the annual examination in Hong Kong. John will be remembered for his kindness and as a friendly and trustworthy person.

◆ *Agreement with the American Statistical Association*

The HKSS had reached the following agreement with the American Statistical Association (ASA) :

“Anyone who receives HKSS’s CStat accreditation will, upon application to the American Statistical Association, be automatically granted ASA PStat status, provided that such individuals maintain their membership in HKSS.”

◆ *Service Award of the Society*

The Society would grant its Service Award every three years to show recognition to members who have rendered sustained and/or significant support to the running of the Society and its activities. Nominations for the 2014/15 round were invited openly from all members in January 2015. A Selection Committee was set up to examine the nominations and decide who should receive the award. The composition of the Selection Committee of the Award was as follows:

Chairperson: Professor CHAN Ngai-hang

Members: Professor Alan WAN Tsz-kin
Dr Mike SO Ka-pui
Ms Marion CHAN Shui-yu

Secretary: Miss Jennifer WONG Shin-chon

The Selection Committee met in early March 2015 and selected the following six awardees (in alphabetical order of family name):

- (i) Ms Clora CHAN Pui-shan
- (ii) Mr FUNG Hing-wang
- (iii) Miss Aster LEUNG Nga-woon
- (iv) Mr Leslie TANG Wai-kong
- (v) Dr May WONG Chun-mei
- (vi) Professor WONG Heung

The awards would be presented in the Annual General Meeting for the 2014/15 Session. Congratulations to the awardees!

◆ Social Activity

A one-day tour was organised by the Society on 22 March 2015. A total of 26 members and their families/friends participated. All participants enjoyed a very relaxing day trip to the Sha Tau Kok Ex-closed Area and Fung Ying Seen Koon in Fanling. Some snapshots of the day tour are given here to highlight this enjoyable social activity.



