BIOMETRIC BULLETIN

International Biometric Society Internationale Biometrische Gesellschaft Société International de Biométrie

"Biometry, the active pursuit of biological knowledge by quantitative methods." - R.A. Fisher, 1948

President's Corner

Welcome! I hope that many of our members from the northern hemisphere have been able to enjoy the summer and some vacation. Members from the southern hemisphere still have their summer ahead of them. A few more months to go before 2020 ends. For many years to come, 2020 will be remembered as a very special year. Indeed, COVID-19 has changed our lives completely and has affected our professional and social activities in many ways. It also affected our society.

As announced in my previous contribution, we had no other choice than to cancel IBC2020, scheduled for early July to take place in Seoul, South Korea. Together with my fellow-officers, I feel very sorry for all who had worked hard, for many years, to the success of the meeting. We fully understand and share your feeling of disappointment. The local organizing committee, responsible for all local arrangements, had been able to secure a venue with modern facilities for the various sessions and they had put together a very nice social program, which would have allowed attendees to explore the local culture. Furthermore, there was the international program committee, chaired by Renato Assuncao from the Brazilian region. Renato and his committee had worked very hard to put together a very promising scientific program with short courses, invited sessions, contributed sessions, and poster sessions. All the local and scientific planning

had been done in close consultation with Louise Ryan, Outgoing President & IBC Organizing President, as well as with the staff members from our Business Office, in particular Kristina Wolford and Peter Doherty.

Once the decision was made not to hold the meeting in person, the same team immediately switched gears and started putting together a virtual program, containing various aspects of the original program, and spread over the entire summer. This has been a major endeavor, and I would like to take the opportunity to thank the entire team for their efforts, in particular Louise Ryan who was the driving force behind vIBC2020, the virtual version of IBC2020. The program officially started on July 6 with an opening session, and ended on August 31 with the closing and awards ceremony. There were various keynote lectures, some invited sessions, and several showcase sessions, but also a selection of contributed presentations. Recordings of all sessions as well as some poster presentations are still available to all IBC registrants, through our website. Further in this issue is a contribution of Louise Ryan with some key statistics about attendance and a summary of the sessions presented.

In good tradition with IBC, we handed out various conference awards for outstanding publications or presentations during the awards ceremony. At each IBC, a JABES showcase session is organized during which the two best papers in JABES by an IBS member, one for each of the two preceding years, are presented. As a society, we very much welcome the selection of those papers, as we believe this is the best kind of publicity for the research of our members. The two papers, selected by the JABES editor Brian

IN THIS ISSUE

Region Key

Regions

RArg - Argentinean Region
AR - Australasian Region
ROeS - Austro-Swiss Region
RBe - Belgian Region
GBot - Botzwanian Region
RBras - Brazilian Region
BIR - British and Irish Region
RCAC - Central American-Caribbean Region
GCl - Chilean Region
CHINA - Chinese Region
EMR - Eastern Mediterranean Region
ENAR - Eastern North American Region
ECU - Ecuadorian Region
GEth – Ethiopian Region
RF - French Region
DR - German Region
GGha - Ghanian Region
IR - Indian Region
RItl - Italian Region
JR - Japanese Region
GKe – Kenyan Region
RKo - Korean Region
GMal - Malawi Region
GNi – Nigerian Region
NR - Nordic-Baltic Region
PKSTAN – Pakistani Region
GPol – Polish Region
GRo – Romanian Region
SING – Singaporean Region
GSaf – South African Region
REsp - Spanish Region
ANed - The Netherlands Region
GUgan – Ugandan Region
WNAR - Western North American Region
GZim – Zimbabwean Region

Networks
CEN - Central European Network
CN - Channel Network
EAR – East Asian Network
SUSAN - Sub-Saharan Network

From the Editor

The long-cherished firm belief of ours that IBS academic activities continue uninterrupted worldwide round the clock has not just been an assumption, rather a fact. It's established now that the strong foundation of the Society at IBO along with its strength of regional offices allows us to ensure that the functions of progressive IBS never get affected even with serious global hazards like COVID-19 pandemic.

Our editorial team had successfully been organizing best feasible information on overall quarterly activities of IBS to be disseminated timely to its members. Despite several constraints, we feel happy that in continuity with recent issues of the Bulletin the current one shall prove to be more exciting due to a couple of added reasons.

Of course, during the past the post IBC issues of the Bulletin were always of especial interest to every member irrespective of their participation in the conference. But the eagerness and enthusiasm to know how the leadership for the success of the first ever-virtual IBC2020 made the quick alternative arrangements is but natural. The decision to purposefully have staggered sessions for over two months to accommodate convenience of the members spread over more than thirty-five geographical regions must be appreciated. With some breathing time we now have the opportunity to enjoy many poster sessions online. An overview by Professor Louise Ryan on various sessions conducted during the months of July and August for the first ever-virtual IBC2020 and a concise 'President's Corner' focused on curious awards certainly would draw the attention of the readers.

It is our pleasure to bring with gratitude a dedicated outline on the birth centenary celebrations of Professor C R Rao, one of the glorious past Presidents of IBS earlier years. We are grateful to Professor T Krishna Kumar for a quick response to our request for a brief write-up on the event. This time the 'Response to the Editor' column has come from Professor Abhaya Indrayan, titled as 'Medical Uncertainties, Statistical Errors and Data Biases: A Dangerous Triad for Empirical Research'. We respect his continued interest and periodic contributions quite useful to the readers. Hopefully, the Basic Theme – VII, on 'Experimental and Observational Study Designs' should be published in the next issue to provoke a natural response from the readers to help its continuance.

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Ajit Sahai
Biometric Bulletin, Editor

Response to the Editor

Medical Uncertainties, Statistical Errors and Data Biases: A Dangerous Triad for Empirical Research

Abhaya Indrayan, Biostatistics Consultant, Max Healthcare, New Delhi
Email: a.indrayan@gmail.com

With the explosion of medical journals and articles in the past decade, the concern regarding their real contribution to improved health has been rising. Several pieces of advice have been issued and guidelines have been framed from time to time to improve the quality of medical research in terms of replicability, truthfulness, and robustness of the results, but their faithful implementation remains a worry.

Even if these advice and guidelines are followed in full, there is still a sizable chance that the results will not replicate and will fail to produce the desired results in applications. Although issues relating to design, sample size, and representative sample have been widely discussed in this context, several other factors, which can be conjectured for this malaise, have not received much attention. These include issues relating to medical uncertainties, statistical errors, and data biases. This triad is dangerous and can completely derail the empirical research findings despite best efforts.

Medical Uncertainties

We live in an uncertain world. Besides intrinsic variation from person to person, which nobody wishes to avoid, Man is celebrated as a dynamic entity who adapts and changes as per his or her perception of the ground situations at the time any assessment is made. Whereas blood pressure level will certainly differ from person to person, response to a question, such as, "How satisfied are you with the treatment being given?" will also differ by the same person not just from time to time but also at the same time depending who is asking and with what intent. Many researchers feel that a reliable answer can be obtained by using a quality instrument in standard conditions or by posing the same question to a homogenous group of people by the same interviewer but ensuring such uniformity is a challenge in practical situations. Even if this is achieved, replicating the exact same instrument and maintaining the same conditions in settings where the results are applied are extremely difficult. Research is generally done in standard conditions, but the practical situations are different, and the results do not replicate the way they are expected because of unavoidable variation in the actual setting.

Uncertainties in a medical setup are enormous. For proper understanding of their implications the uncertainties need to be dissected with a precision blade. Any dissection almost invariably results in blurred division. Consider their division into aleatory and epistemic uncertainties now being talked about in the context of empirical research. Aleatory uncertainties are intrinsic to the study and arise from inter-individual variation, sampling method and sample size, environmental conditions, social support, and random variation due to observers, instruments, and laboratory. Epistemic uncertainties are extrinsic and arise mostly from the limitation of our knowledge, including non-availability of proper instruments, conceptual errors, and individual biases. Despite such sharp distinction between these two types of uncertainties,

it is difficult to categorize some uncertainties, such as due to non-response, in one division or the other Uncertainties due to non-response can be aleatory due to personal characteristics of the non-responders such as absence of social support to provide the correct information or could be epistemic due to lack of knowledge to provide the correct information. Whereas the sources of aleatory uncertainties are generally known and can be considered at the time of planning, managing epistemic uncertainties can be challenging. The unknown segment of our knowledge is much larger than the known segment. Although some factors causing epistemic uncertainties can be conjectured, some may be even beyond our imagination. Who imagined just a year ago that an enormous pandemic would occur due to hitherto unknown virus SARS-CoV2?

Irrespective of whether the uncertainties are aleatory or epistemic, these have potential to cause immense damage to the results. (See https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7239410/). A perfectly executed study may provide frail results that do not replicate in a practical setup due to unaccounted aleatory factors and unknown epistemic factors. Thus, it is necessary to be extremely careful in drawing conclusions from an empirical study and be modest in stating the conclusion.

Statistical Errors

Two kinds of statistical errors arise in an empirical setup. First are known Type-I and Type-II errors, which are generally accepted around the world, and the second are errors in the design, data, analysis, and interpretation. Although questions have always been raised regarding the utility of P-values that delineate the Type-I error, serious issues have been lately raised regarding their validity in reaching to a conclusion (See https://www.tandfonline.com/doi/full/10.1080/00031305.2019.1583913) even when this error is rightly interpreted as to probability of the sample values given the null hypothesis. Pleas have been made to use a balanced approach so that P-values are considered in reaching a result but do not play a dominant role in the final conclusion. Suggestions have been made to test a null corresponding to a medically significant effect instead of no effect. This has brought focus on the statistical power, which is the complement of the Type-II error, and to work with a predefined and fully justified medically significant effect for a given situation. Empirical studies based on the samples will continue to have such errors – the only satisfaction is that these errors are known and can be measured. This can help in drawing a cautious conclusion.

Several alternatives have been suggested to overcome the problems relating to the P-values but they are yet to be tested on a large scale. Nobody knows yet that a problem of the kind we have detected after several decades of the use of P-values may be found with these new methods also. Thus, we have to live with these errors, at least till a better alternative emerges and is tested for sufficient periods in varied conditions. Perhaps most we can do is to factor the possibility of reaching a false-positive result and realize that the results may fail to replicate in some situations. But the fallacies due to use of multiple P-values in the same study and use of suboptimal method of calculation of P-values in some studies because of lack of appropriate software or lack of understanding can be controlled with some extra efforts.

The other statistical errors, such as with design, data, analysis, and interpretation, are tractable and can be controlled by exercising extra care at the time of planning and in executing a study. Despite utmost care at that stage, some problems may persist. For a variable such as satisfaction with the care in a hospital, no perfect instrument is available. Such shortcomings exist with almost all the instruments. Some of these deficiencies come from epistemic domains for which hardly anything can be done except to broaden the horizon by more research. Responses such as for physical health of a patient depend on the psychological conditions of the responder at the time of the interview and convey his or her perception instead of the actual situation. This will continue to be so for such variables. Most of us realize this limitation but tend to forget when the results are applied to a new setup.

Proper interpretation of data is a casualty in some cases. In the current CoViD-19 scenario, the media everyday reports mortality from the disease on the basis of currently reported cumulative cases and the cumulative deaths, and ignores many cases who have not reached their endpoint (recovery or death) yet. These should be excluded from such calculations. Also, deaths can rarely be an under count (except for cause assignment), whereas the cases are those detected and exclude possibly many undetected ones. Another example is a recent internal study on hospital patients on routine care that reported better outcomes in CoViD patients receiving drug A compared to those who received drug B. It turned out that drug B was given to more serious patients who were more vulnerable, resulting in worse outcomes in them. Such inconsistencies can be addressed by being more critical in examining the data. Many researchers are alive to such fallacies, but miscues are not uncommon.

Data Biases

Many researchers consider systematic reviews and meta-analysis results as the gold standard to reach to a conclusion. The basic difficulty with these is that these are based on published findings and publications are known to have a serious bias for "positive" findings. Although the attitude of some journals is now changing but the bias continues to be sizable. Thus, the results of systematic reviews and meta-analysis too remain biased in most cases. This will continue to be so till such time those null or negative results are also published with the same frequency with which they are obtained.

Data biases occur in several subtle ways. A study on the incidence of cataract and mortality is bound to be biased because both are related to old age and some patients with cataract may have died and were not available at the time of the investigation. This kind of bias is present in all studies involving old age subjects. Older subjects are vulnerable to death even without any disease and this adjustment is seldom made. Studies on volunteers and clinic cases also many times suffer from the same bias. Confounding bias is also quite common in medical studies because it remains unapparent in some cases.

Conclusion

The triad of medical uncertainties, statistical errors, and data biases is real, and its dangerous consequences are rarely realized. A new generation of scientists has emerged who has given a call for more truthful research, although that kind of research can be difficult too. We cannot sacrifice truthfulness for expediency and must put in more efforts to come to robust conclusions from empirical studies with proper accounting for this dangerous triad.

International Biometric Conference

Virtual IBC2020, by Outgoing President Louise Ryan

2020 IBC · The 30th International Biometric Conference · Virtual

As 2019 drew to a close, who knew what the world would soon be facing! I had expected to spend the first six months of 2020 working with my fellow officers, the International Business Office, the Local Organizing Committee and the International Program Committee to finalize plans for the Seoul IBC. Instead we faced the escalating challenge and uncertainty of deciding what to do in the face of a rapidly spreading global pandemic! By March, it was quite clear that the meeting could not proceed as planned in July. For a number of weeks, we discussed various alternatives, including postponing the meeting to 2021. However, by late May, as things continued to worsen, we decided that even planning for a meeting in 2021 was risky and problematic, with the potential for major financial loss for the Society. At that time, we decided to convert IBC2020 to a virtual format. Amanda Bignall from the Business Office applied her creative skills to modify the IBC2020 logo, Kristina Wolford started revamping the conference website and we started contacting the various session organizers to gauge their interest in participating. Given the complexity of time zone differences, it seemed impossible to run the whole conference virtually during the originally planned time frame of July 6-10. Instead, we decided to offer select offerings over a period of weeks, throughout July and August. This allowed us to offer sessions, roughly one a day, at a variety of different time zones chosen so that all our IBC members could be assured of having at least a selection of offerings at times suitable for them. All sessions were delivered via Zoom webinar. In order to make the virtual IBC available to as many people as possible, registration fees were very modest and indeed free for students and our IBS members from Low and Middle Income Countries (LMICs). As of the end of August, 725 people representing 61 different countries had registered, including 279 students and 206 participants from LMICs or requesting reduced attendance fees.

If you didn't register yet, it's not too late since recordings are still available on our website (https://www.ibc2020.org/home) and we plan to keep it open through the rest of this year.


There was quite some serendipity in the fact that thanks to the hard work of IBS Executive Director Peter Doherty, the IBS had just earlier in the year launched our brand new website. In addition to having a more modern, visual appeal, the new website had a lot of great technical features that significantly enhanced our ability to host the virtual conference. In particular, using the Community facility of the new website made it really easy to ensure that only registered attendees could access the session links. The Community facility also allowed registrants to comment on sessions or send other messages to conference registrants. A special thanks is due to our IBS Director of Operations, Ms Kristina Wolford, who not only designed the IBC2020 website, but also continually updated it with session information throughout the conference. Our website even included links to some virtual tours of Seoul, including my favorite, "Seoul from your living room" (see https://www.ibc2020.org/travel/excursions)!

The Virtual IBC kicked off with an opening ceremony on Monday July 6th, including greetings from the Co-Chairs of the Local Organizing Committees, Professors Taerim Lee and Taeseung Park. President Geert Verbeke then introduced Professor Peter Diggle who delivered the Presidential Invited Address, "Model-based geostatistics for better global health". It really was a great opening session, with Peter giving lots of interesting examples of his work on spatio-temporal modelling of disease. He even included an analysis of the spread of COVID in the UK! Peter's was just the first of four different keynote sessions offered as part of the vIBC (https://www.ibc2020.org/scientific-programme/keynotespeakers). David Donoho's presentation on July 13th was also excellent and highly topical, with a focus on innovative strategies such as group testing for efficient and rapid testing for COVID-19. In her keynote address on July 20, Dianne Cook presented some fascinating tools for effective visualization of longitudinal data. Our final keynote address was given by Yoav Benjamini on 17th August. This was a special session organized by the International Statistics Institute where Yoav was presented as the winner of the 2019/2020 Pearson Prize for his work on the False Discovery Rate.

Meanwhile back in the UK...the arrival of COVID-19
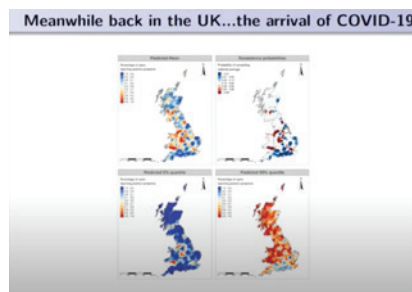
The virtual IBC offered a number of special Showcase sessions. For example, there were sessions highlighting the best papers from 2018 and 2019 from our Flagship Journals, Biometrics and JABES. As with all IBCs, a real highlight was the Young Statisticians' Showcase where five winning papers, one from Africa, Asia & Australasia, Europe, North America and South America, were selected. The image below shows our five Showcase speakers, clockwise from top, Luca Maestrini (Australasia/Asia), Wende Safari (Africa), Hyo Young Choi (North America), Franca Giannini Kurina (South America) and Mirko Signorelli (Europe). This may have in fact been one of my favorite sessions since it is always so refreshing and energizing to see what the best and brightest of the next generation are working on! Alison Kelly, Chair
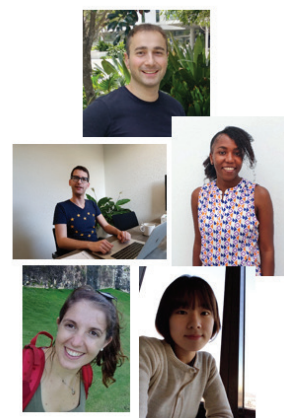
of the IBS Representative Council, and Pamela Shaw, member of the International Program Committee, both deserve a lot of credit for their successful running of the Young Statistician Showcase.

Another excellent session, organized by Professor Taesung Park from the IBS Korean Region, was the Korean Biostatistics Showcase. This session included four presentations, organized around a theme of analysing high dimensional genetic biomarker data. Samuel Mueller and Garth Tarr from the Australasian Region delivered the Statistics In Practice Session, focussed on Fast algorithms and modern visualizations for feature selection. They had an innovative format where interested participants were invited to watch a couple of pre-recorded lectures and then the live sessions were organized as interactive tutorials.

Sixteen different invited sessions were offered over topics ranging from Capture/Recapture methods to Bayesian and longitudinal modelling and cancer clinical trials (see https://www.ibc2020.org/scientific-programme/invited-sessions for the full list). One of my favorite sessions, "Biostatistics and Team Science" organized by Knashawn Morales (pictured here) from the University of Pennsylvania, brought together three very interesting speakers and a discussant talking about the opportunities to forge an exciting career as a biostatistician working as part of a larger interdisciplinary team. The session offered some useful insights for young statisticians just starting out in their careers and stimulated some great discussion among attendees. We are grateful to Knashawn and all the other Invited Session organizers for their hard work in coordinating and running these sessions.
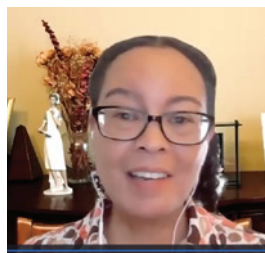
I was delighted that the vIBC was able to host ten different contributed sessions, featuring approximately 70 speakers from all over the world. These were organized into 10 different sessions offered towards the end of August. To manage the contributed sessions effectively, we required every speaker to pre-record and upload their talk, with a strict limit of 12 minutes. Pre-recorded talks were played during the live sessions, with participants encouraged to engage during each presentation via the Zoom chat facility. Speakers then had a few minutes to respond, live, to questions at the end of their presentation. Each contributed session had a moderator responsible for keeping things timely, as well as the discussion leader who made some comments and asked questions, their own as well as those from the audience, at the end of each presentation. We were lucky to have some pretty high powered discussion leaders including past IBS Presidents (Kaye Basford, John Hinde and Tom Louis), our IBS Treasurer (Vicente Nuñez Anton), our International Program Chair (Renato Assunção) as well as current and past Regional Presidents (Werner Branath, Katerina Kechis, Ying Lu, Sarah Ratcliffe, Alan Welsh). Many people commented on the fact that the contributed talks were all of exceptionally high quality. Discussions with some of the speakers suggests that most people worked hard to hone their message fit clearly within the 12 minute limit and most recorded and re-recorded several times before they were happy with the final product. In my opinion, this effort really paid off. Twelve minutes really seems like the ideal length for an online presentation: It is enough time to convey a fairly detailed story, yet short enough that participants don't get bored or distracted. If we were to do a virtual conference again, I would be very tempted to use a similar format for all sessions. Working with pre-recorded talks also lessened the likelihood of technical problems such as signal loss. Here's a screenshot from our very last contributed session. I must confess this session was one of the few I did not attend since

it ran at 5am on a Saturday morning in my timezone! As you can see, quite a few speakers opted to use the zoom background option. I see that WNAR President Ying Lu took the opportunity to use his background to plug the upcoming WNAR meetings planned for next June in Alaska!
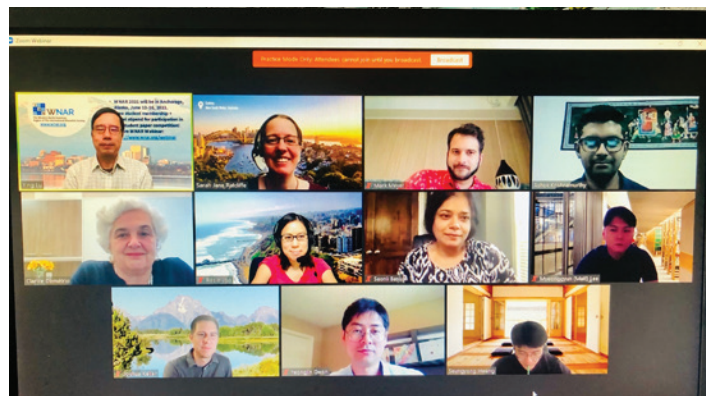
The IBC awards and closing session on August 31st provided an opportunity to look back over the conference and to reflect on all that had been accomplished. President Verbeke presented a number of our IBS awards (see his President's Corner piece in this issue) and the session had quite a positive and celebratory tone. We took the time to thank and present certificates of appreciation to IBS Executive Director Peter Doherty and all the head office staff who had worked tirelessly, often in the middle of the night or very early in the morning, to make sure the sessions ran smoothly. Special thanks and a Distinguished Service Award went to Kristina Wolford who had worked exceptionally hard developing and maintaining the IBC website, scheduling all the sessions and generally going well above and beyond the call of duty to ensure the overall success of the virtual conference.

Peter Doherty, Executive Director | Kristina Wolford, Director Operations | Amanda Bignall, Membership & Awards | Starr Ellis Janes, Membership | Cat Wilson, Communications

While the live part of the virtual IBC2020 is now over, it is not too late to participate. Recordings are posted on the website for all IBC registrants to see. Registration is very easy and free for students and for IBS members from Low and Middle Income Countries. Other IBS members can also request a fee waiver, though of course it helps offset some of the costs of running the conference if you can pay the modest $100 fee. There is still one active and very important event, namely our IBC poster session. A repository has been created, which allows you to browse the submitted posters, as well as all the various oral presentations and abstracts. While you are in the repository, take a look at Poster Group 1 -- there is a competition where you can vote for your favorite poster. The top choices will receive a prize. Here is a link that tells you more about the criteria for judging the posters and also instructions on how to vote.

In the grand scheme of things, interruption to the planning of conferences such as IBC might be regarded as a relatively minor impact of the pandemic. However, conferences are critically important for the scientific community because they provide one of the major ways in which we share ideas, build our networks and develop new collaborations. So our inability to meet in person potentially has important

long-term implications, especially for younger people who are still building their careers. For this reason, it was actually quite critical that we find a way to facilitate a virtual meeting. IBS is of course only one of many societies who have had to grapple with turning on a dime to convert a major conference to virtual format. It has been interesting to see how the different societies have tackled the challenge. While many chose to still run their conference in the same timeframe as originally planned, we chose the different path of spreading the offerings over 8 weeks. While this strategy ended up creating a lot more work in terms of organisation, I think it served the members well and quite a lot of people have commented that they enjoyed that format. I would love to hear your opinions! Who knows, but I suspect that there are likely to be more virtual conferences in our future! There are indeed some silver linings since the virtual format allows the participation of some members who might have otherwise found it very difficult to attend the IBC in person. I believe there will be some useful learnings for the future. If you get a chance, we'd really appreciate it if you could fill out the post-conference survey, since this helps us a lot with planning future events. You should have received an email about this already, but if not, you can access the survey here. As a reminder, you should only participate in this survey if you attended any of the virtual meetings during IBC.

Louise M. Ryan
IBS Outgoing President & IBC Organizing President

IBC On-Demand! - You still have the opportunity to register for IBC 2020 and view 30+ session recordings. Additionally, we're happy to announce that the IBC Repository is now open. Through this repository, you can browse through all Oral and Poster contributed papers that were accepted for the IBC 2020.

Don't miss out! While you're exploring the repository, don't forget to review the collection of virtual posters and choose your favorites from Poster Group 1 by 31 October 2020. Click to view Poster Group 1 - when you're ready, click here to view the criteria and to cast your 3 favorites!

IBS Conference Advisory Committee's Selection of Host for IBC 2024

By: Peter Doherty, Executive Director

After many months and a detailed, thoughtful judging process, the IBS Executive Board has approved the Conference Advisory Committee's recommendation to convene IBC 2024 in Buenos Aires, the capital of Argentina.

Situated on the shore of the Río de la Plata, this cosmopolitan South American city of 2.8 million people with interesting European and Latin influences is ready to welcome the IBS. The event is expected to be held in early December, 2024, during the southern hemisphere summer. IBC events will be held in the heart of the city. This will be the IBC's first visit to South America in 14 years, having last journeyed to Florianópolis, Brazil in 2010.

Thanks to committee Chair Satoshi Hattori and our committee members for their excellent work! And congratulations to the Argentinean Region of the IBS on this honor! We look forward to working with the Region and its Local Organizing Committee as we welcome the world to yet another memorable IBC!

Awards and Honors during the IBC 2020:

Honorary Life Membership has been awarded to Warren J. Muller from the Australasian Region during the Virtual IBC 2020 for his many and diverse contributions to the IBS and the Australasian Region over many years, serving in notable capacities at the international and region levels, and for his work developing student and young researcher support programs while continuing to collaborate on scientific sessions and works in a wide range of publications.

Warren has been a hard-working member of the IBS Australasian Region for many years, serving as treasurer of the region until 2019. Additionally, he has served as a volunteer on the IBS Communications Committee, IBS Budget and Finance Committee, including 2 years as Chair, and the Australasian Region representative on the IBS Council.

He is also a prolific author/co-author of over 120 articles. This impressive publication record is focused on the application of Biometric methods to solve important applied problems in a very wide range of research areas, including agricultural, and the biological and environmental sciences.

We are thankful for volunteers like Warren. The Honorary Membership is well deserved. Click here to watch his acceptance video that was presented during the Awards Ceremony on 31 August 2020.

The Rob Kempton Award for Outstanding Contributions to the Development of Biometry in the Developing World was bestowed upon Henry G. Mwambi, of the South African Region for his sustained contributions towards biostatistics research and training in Kenya, South Africa and the Sub-Saharan African Countries. This award was supported by the Malawi Region, German region and the IBS Sub-Saharan Network (SUSAN).

Henry is known for his passion for research and education. He is a long standing member of the South African Region, co-founder of SUSAN and co-founder of the Sub-Saharan African Consortium for Advanced Biostatistics Training (SSACAB), funded by Wellcome Trust and working to establish masters and PhD programs. Henry is also the academic leader for research at UKZN for School of Mathematics, Statistics and Computer Science.

The list of achievements continues for Henry -- He initiated collaborative research with the Centre for Aids Programme Research in South Africa (CAPRISA) to enhance training in biostatistics and research. Supervisor of PhD thesis for several forma doctoral students who are now leaders in biostatistics at African Universities. Most surprising is his publication list given the challenging research circumstances, 61 papers listed in Web of Science and the highest number of citations: A simulation model of African Anopheles ecology and population dynamics for the analysis of malaria transmission (Malaria J 2004 3:29)

Congratulations to Henry G. Mwambi on being named the recipient of the Rob Kemption Award! Click to view Henry's acceptance video.

The award for Outstanding Contribution to the Development of the International Biometric Society (IBS) was presented to Motomi (Tomi) Mori of the Western North American Region. This award was supported by the WNAR, the Eastern North American Region and the Japanese Region of the IBS. Tomi is known for her long record of serving in regional and international leadership roles on behalf of the Society, including participation in COPSS, the IBS Awards Fund Committee and numerous WNAR roles, and her successful management of the WNAR Portland, Oregon conference as well as her support for inter-region collaboration and advocacy for women in the profession.

Tomi has been a member of the Society since 1998, serving on the IBS Awards Fund Committee and as the WNAR President-Elect, President and Past President. Additionally, Tomi served as the WNAR Representative on the Committee of the Presidents of Statistical Societies (COPSS), and Elizabeth L. Scott Award Committee. Currently, Professor Mori is Chair and Member of the Department of Biostatistics, St. Jude Children's Research Hospital, USA and prior to January 2020 she held a position at Walter & Clora Brownfield Professor of Cancer Biostatistics, Oregon Health and Science University.

We are thankful for Professor Mori and her commitment to fostering relationships across IBS Regions. This has resulted in significant contributions to IBS and especially WNAR members. Congratulations! Click here to watch Motomi (Tomi) Mori's acceptance video.

Florence Nightingale Award Winner

Florence Nightingale (1820-1910) was an inspirational person with a passion to serve and care, for example she cared for wounded soldiers in the Crimean War; Nightingale was an acclaimed and compassionate statistician who among others pioneered visual statistics.

To honour this spirit in the 200th birth year of Nightingale, the Florence Nightingale Award has been established and will be given to the most outstanding eligible candidate who has demonstrated exceptional scholarship. Candidates who have a record of services and care for the cause of women and other honourable causes that raise the standing of disadvantaged groups in the profession are encouraged to describe this work in their application, which will be viewed favourably. Congratulations to:

Sayantee Jana, Indian Institute of Management, Nagpur -- **Title: Application of multiple testing procedures for identifying multi-morbidities preceding a condition of interest in big health-administrative data**

Highly Commended

Collins Okoyo, School of Mathematics, University Nairobi, Kenya -- Title: Mathematical Modeling of the Interruption of the Transmission of Soil Transmitted Helminths Infections in Kenya

Best Student Oral Presentation

Mirrelijn Van Nee, VU University Medical Center, Epidemiology & Biostatistics, Amsterdam, The Netherlands -- **Title: Co-Data Learning in Ridge Models for High-Dimensional Data**

Best Paper 2018-2019 - Biometrics

John D. Rice, Robert L. Strawderman, and Brent A. Johnson (2018). **Regularity of a renewal process estimated from binary data.** *Biometrics 74, 566-574*

Andrew G. Chapple and Peter F. Thall (2019). **A hybrid Phase I-II/III clinical trial design allowing close re-optimization in Phase III.** *Biometrics 85, 371-381.*

Best Paper 2018-2019 - JABES

Erin M. Schliep, Alan E. Gelfand, James S. Clark, and Roland Kays (2018). **Joint Temporal Point Pattern Models for Proximate Species Occurrence in a Fixed Area Using Camera Trap Data. Journal of Agricultural, Biological and Environmental Statistics 23, 334-357.**

Matthew J. Heaton, Abhirup Datta, Andrew O. Finley, Reinhard Furrer, Joseph Guinness, Rajarshi Guhaniyogi, Florian Gerber, Robert B. Gramacy, Dorit Hammerling, Matthias Katzfuss, Finn Lindgren, Douglas W. Nychka, Furong Sun & Andrew Zammit-Mangion (2019). **A Case Study Competition Among Methods for Analyzing Large Spatial Data. Journal of Agricultural, Biological and Environmental Statistics 24, 398-425.**

Young Statistician Award

Representing Australia/Asia (Australasian Region)
Luca Maestrini, Faculty of Science, School of Mathematical and Physical Science, University of Technology Sydney -- **Title: Variational approximate inference for inverse problems motivated by medical tomography**

Representing Africa (Tanzanian Region)
Wende Safari, Department of Mathematics, Universidad A Coruña -- **Title: Nonparametric estimation of mixture cure model when cure status is partially known**

Representing Europe (Netherlands Region)
Mirko Signorelli, Biomedical Data Sciences, Leiden University Medical Center -- **Title: How to predict a survival outcome using longitudinal and high-dimensional omics data**

Representing South America (Argentinian Region)
Franca Giannini Kurina, Statistics and Biometrics, Faculty of Cs. Agricultural, Universidad Nacional de Córdoba -- **Title: Two step procedure to model site specific herbicide soil persistence**

Representing North America (Eastern North American Region)
Hyo Young Choi, University of Tennessee Health Science Center -- **Title: SCISSOR: a novel framework for identifying structural changes in RNA transcripts**

President's Corner

Reich are "Schliep et al., Joint temporal point pattern models for proximate species occurrence in a fixed area using camera trap data, JABES (2018) 334-357," and "Heaton et al., A case study competition among methods for analyzing large spatial data, JABES (2019), 398-425." Likewise, a team of current and former Biometrics co-editors, chaired by the executive editor Geert Molenberghs, selected the two best papers published in Biometrics in 2018 and 2019, respectively. The selected papers were "Rice et al., Regularity of a renewal process estimated from binary data, Biometrics (2018) 566-574," and "Chapple and Thall, A hybrid Phase I-II/III clinical trial design allowing dose re-optimization in Phase III, Biometrics (2019) 371-381."

At each IBC, one best student oral presentation is selected. This year, the winner identified by the International Program Committee chaired by Renato Assuncao, was Mirrelijn Van Nee, from the free University Medical Center, Amsterdam, the Netherlands, with her presentation about "Co-data learning in ridge models for high-dimensional data."

Prior to each IBC, five papers, one from Africa, one from Asia & Australia, one from Europe, one from North America and one from South America are selected in a Young Statisticians Showcase Competition. Presenters must be graduate or postgraduate students and the selected papers are presented during a dedicated showcase session. This year, the selection committee chaired by Pam Shaw identified the following winners : Luca Maestrini from the Australian region, representing Australia and Asia; Wende Safari from the Tanzanian region, representing Africa; Mirko Signorlelli from the Netherlands region, representing Europe; Franca Giannini Kurina from the Argentinean region, representing South America; and Hyo Young Choi from ENAR, representing North America.

The Caucus for Women in Statistics has established a special award at IBC2020 to honor Florence Nightingale's birthday, for a presenter at IBC with an outstanding record of services and care for the cause of women and other honorable causes that raise the standing of disadvantaged groups in the profession. There were several very good candidates. After intensive deliberation, the committee chaired by Shili Lin identified Sayantee Jana from the Indian Institute of Management as the winner. The committee also identified a runner-up and recommended special mentioning of Collins Okoyo from the University of Nairobi (Kenya) as highly commended.

I hereby would like to congratulate all presenters and prize winners.

During the closing ceremony, we also thanked several of our members who served our society in a very special way, and I would like to repeat here our recognition for their service. First of all, Malka Gorfine and Debashis Gosh have ended their three-year terms as co-editor of Biometrics. Furthermore, Brisa Sanchez will soon end her term as Biometrics Book Review Editor. A very special thank you also to our outgoing treasurer/secretary Brad Biggerstaff. I have been privileged to work with Brad for almost two years, and I have learned a lot from the way he approaches difficult and sensitive issues. Furthermore, he agreed to stay on board in an un-official role, to help us with the financial aspects related to IBC2020. This is very much appreciated. Thank you also to our Outgoing Committee Chairs Kyungman Kim and Martina Mittlebroeck who chaired the Committee on Communications and the Budget and Finance Committee, respectively. The governance of IBS highly depends on input from the various committees. It is very important that we can rely on committee chairs who can motivate their committee members and can provide input in an accurate and timely manner. Thank you also to all Committee Members who ended their terms at the end of 2019. Our society very much depends on volunteers who are willing to take up responsibility.

At each IBC, a number of awards are handed out to members who have served our profession in an exceptional way. The Rob Kempton award which is given to a member who has shown outstanding contribution to the development of biometry in the developing world. The awardee this year was Henry Mwambi from the South African Region, for sustained contributions towards biostatistics research and training in Kenya, South-Africa and the Sub-Saharan African Countries. The nomination has been supported by the Malawi Region, the German region, and the Sub-Saharan Network SUSAN. Dr. Mwambi is a very active long standing member within our society. He is known for his passion for research and education, and he is co-founder of the SUSAN network as well as of the Sub-Saharan Africa Consortium for Advanced Biostatistics Training, funded by the Wellcome Trust. The consortium establishes masters and PhD programs. Dr. Mwambi has initiated collaborative research with the Centre for Aids Program Research in South Africa to enhance training in biostatistics and research. He has been a role model to numerous undergraduate and postgraduate students at his home university, which is the University of KwaZuLu-Natal. Several of his former PhD students are now leaders in biostatistics at African universities. He had to work in very difficult circumstances. Yet accomplished to publish many papers in peer-reviewed journals.

Our second award was for outstanding contribution to the development of IBS. The selection committee identified Tomi Mori from WNAR as recipient of this award for her long record of serving in regional and international leadership roles on behalf of the Society, including participation in COPSS, the IBS Awards Fund Committee and numerous WNAR roles, and for her successful management of the WNAR Portland, Oregon conference as well as her support for inter-region collaboration and advocacy for women in the profession. Her nomination was supported by the WNAR and ENAR regions as well as by the Japanese region. Prior to 2020, Dr. Mori was Walter and Clora Brownfield Professor of Cancer Biostatistics at the Oregon Health and Science University, and she is currently Chair of the department of biostatistics of St.Jude Children's Research Hospital. She has been an IBS member since 1998, and served on the Awards Fund Committee between 2010 and 2012. She also served in various other committees such as the Elizabeth Scott Award Committee responsible to identify an individual who exemplifies the contributions of Elizabeth Scott's lifelong efforts to further the careers of women in academia. Dr. Mori has been committed to fostering relationships across IBS regions and this has made significant contributions to IBS in general and to WNAR in particular.

Our final award was the IBS Honorary Life Membership award. At each IBC, the society can give up to four such awards. Nominations must be supported by at least five members, including at least two from outside the region of the candidate. The Representative Council selects the awardees with a 2/3rd majority of those voting. Honorary life members have the same rights of regular members but are dues exempt. This year, Warren Muller from the Australasian Region was selected to become Honorary Life Member of the International Biometric Society. Warren received this award in honor of his many and diverse contributions to IBS and the Australasian Region over many years, serving in notable capacities at the international

and region levels, and for his work developing student and young researcher support programs while continuing to collaborate on scientific sessions and works in a wide range of publications. Warren has been a member of the Australasion region for over 20 years. He served as treasurer of the region between 1999 and 2019. He served 2 years as Australasion representative in the IBS council, served 4 years in the IBS communications committee, and served another 4 years on the IBS budget and finance committee, two of which as chair of that committee. He has an impressive publication record focused on the application of Biometric methods to solve important applied problems in a very wide range of research areas including agriculture and biological and environmental sciences.

On behalf of all officers and our entire society, congratulations to all awardees!

Right before the closing and awards ceremony, we held a virtual membership meeting during which I gave a brief update on some recent IBS activities and our secretary/treasurer Vicente Núñez-Antón presented the societal financial summary and a membership report. A lot of attention was given to the recently approved amendment of the bylaws related to a change in governance structure. Under the old structure, one officer served in the combined role of Secretary and Treasurer. Vicente Núñez-Antón currently fills this position, and his predecessor was Brad Biggerstaff. A first problem with the old structure was that, in line with the stated duties of the position, the time of the secretary/treasurer was largely devoted to treasurer activities, with many aspects of budgeting and budget execution requiring time throughout the year and with financial oversight activities intermittent but also year-round and not allowing sufficient time to really cover all secretary related duties. A second problem was that the secretary/treasurer was elected to a three-year term, which was not aligned to the two-year terms of president and, more importantly, IBC meetings. This implied that a treasurer starting in an IBC year was responsible for the meeting while not having been involved at all in any of the planning that occurred prior to taking office. Officers and board members agreed that a better model would be one where the treasurer who is involved in the planning of the meeting and in any decisions impacting the budget of the meeting remains in charge until all financial aspects of the meeting are finalized. To solve both issues, we proposed to split the position into two separate roles. In the future, the secretary and treasurer will be elected in odd numbered years, for two-year terms, renewable once, and both officers will take office at the beginning of an IBC year. However, when a new treasurer is elected, the previous one will continue to serve for an additional period of one year as Outgoing Treasurer, with primary responsibility for financial aspects of the IBC that will be held during that same year. Membership recently voted on these proposed changes in the governance structure and I'm happy to report that the changes have been approved by a majority of more than 99% of the voting members.

Now that vIBC2020 has ended it is time to move on, and the officers are focusing again on topics which were put on hold during the course of the meeting. First, we are further extending the website both in terms of functionalities and content. For example, regional mini-sites will be added as a service to our regions which can use their own mini-site for regional activities and communication, including registration for regional meetings. We are also exploring ways to exchange membership data between regions and the central office in a semi-automated way. This way, we hope to avoid errors due to manual handling of membership information but we also hope to gain efficiency such that more time and efforts can be devoted to new initiatives in an attempt to better serve our members. Content wise,

we are currently updating our history page and our Communications Committee was asked to reflect on a procedure to provide us on a regular basis with content, of interest to the majority of our members, but also to check whether information already on the website is still up-to-date. I intend to report on the progress in one of my future contributions to the Biometric Bulletin.

To conclude, I would like to express that I am deeply sorry for the fact that I have not been able to visit the regions which I intended to visit this year. I was looking forward to interacting in person with regional officers and members but COVID-19 has imposed major travel restrictions and continues to do so. I therefore want to reiterate my earlier call to regions and members to share thoughts or suggestions with me and the other officers. Please do not hesitate to contact me or any of our contact persons at the business office. We may not always be able to offer immediate solutions but we definitely will take suggestions into account and we very much value your input.

Geert Verbeke
President, IBS

Editorial Update
Biometrics

December 2020 Issue Highlights

The December issue features articles across a broad spectrum of applications and methodology. Included in the Biometric Methodology section are "Weight calibration to improve the efficiency of pure risk estimates from case-control samples bested in a cohort," by Yei Eun Shin, Ruth M. Pfeiffer, Barry I. Graubard, and Mitchell H. Gail; "A unified evaluation of differential vaccine efficacy," by Erin E. Gabriel, Michael C. Sachs, Dean A. Follmann, and Therese M-L. Andersson; "Power analysis for cluster randomized trials with multiple binary co-primary endpoints," by Dateng Li, Jing Cao, and Song Zhang; "Highly efficient stepped wedge designs for clusters of unequal size," by John N.S. Matthews; "On using electronic health records to improve optimal treatment rules in randomized trials," by Peng Wu, Donglin Zeng, Haoda Fu, and Yuanjia Wang; "Partial Least Squares Method for Functional Joint Models with an application to the Alzheimers Disease Neuroimaging Initiative Study," by Yue Wang, Joseph G. Ibrahim, and Hongtu Zhu; "Doubly robust tests of exposure effects under high-dimensional confounding," by Oliver Dukes, Vahe Avagyan, and Stijn Vansteelandt; "Censored quantile regression model with time-varying covariates under length-biased sampling," by Zexi Cai and Tony Sit; and "A Bayesian nonparametric testing procedure for paired samples," by Luz Adriana Pereira, Daniel Taylor-Rodriguez, and Luis Gutierrez.

The Biometric Practice section sets out with a discussion paper, entitled: "Testing small study effects in multivariate meta-analysis," by Chuan Hong, Georgia Salanti, Sally Morton, Richard Riley, Haitao Chu, Stephen E. Kimmel, and Yong Chen, and discussion contributions by Hans C. van Houwelingen, Hisashi Noma, James R. Carpenter, Gerta Rucker and Guido Schwarzer. Further papers are: "Operating characteristics of the rank-based inverse normal transformation for quantitative trait analysis in genome-wide association studies," by Zachary R. McCaw, Jacqueline M. Lane, Richa Saxena, Susan Redline, and Xihong Lin; "Relapse or

reinfection: Classification of malaria infection using transition likelihoods," by Feng-Chang Lin, Quefeng Li, and Jessica Lin; and "PA-CRM: A continuous reassessment method for pediatric Phase I oncology trials with concurrent adult trials," by Yimei Li and Ying Yuan.

As a reminder, lists of papers to appear can be found at the Biometrics website. Papers to appear in future issues may also be found under the "Early View" link at the Wiley-Blackwell website, which may be accessed by IBS members by visiting http://www.biometricsociety.org/, selecting "Biometrics" from the drop-down menu at the "Publications" link at the top of the page, and accessing the "Click here" link.

Editorial Board News

Two Biometrics board meetings were planned during major scientific gatherings: at IBC2020 in July, Seoul, South Korea, and at JSM2020 in August, Philadelphia, Pennsylvania. IBC2020 was canceled and was replaced by a collection of virtual sessions. JSM2020 was repackaged as a virtual meeting. Therefore, no conventional face-to-face Editorial Board meetings could take place in 2020. As an alternative, a pair of online sessions were offered on July 15, 2020 and July 31, 2020. Different times of day were chosen so that every Associate Editor from around the globe could participate in at least one of them. The attendance was unparalleled! Over the two sessions combined, we had well over 60 participants.

The idea is to hold on to the online meetings in the future, even when the pandemic situation clears. Arguably then, a face-to-face meeting will be supplemented with an online version, so as to allow conference-going AEs as well as those not attending a chance to participate.

Biometrics News

The journal's impact factor was 1.524 in 2017 and 1.755 in 2018. For 2019, the figure is 1.711. Impact factors for the immediately preceding years are typically released around June of the current year. The journal ranks 35/124 in the category "Statistics & Probability;" 56/93 in "Biology;" and 33/59 in "Mathematics & Computation." All of these ranks are slightly lower than the year before, but in 2018 they had gone up. Some year-to-year variation is to be expected.

The journal has had a backlog of around 9-12 months for its print version for well over a decade. Thanks to a number of efforts, the backlog has decreased to roughly a quarter.

Find us on twitter at @Biometrics_ibs.

The Journal of Agricultural, Biological, and Environmental Statistics (JABES)

Greetings everyone,

JABES recently received the great news that our 2019 impact factor is up to 1.65. Our impact factor has steadily increased from 0.79 in 2015 to 1.20 in 2018. In this time, we have also reduced the median time to first decision to 24 days. These are very exciting trends!

The September, 2020 issue features many examples of novel statistical methods motivated by applications in environmental and agricultural science. The issue is comprised of the following papers:

- Robust Nonparametric Regression for Heavy-Tailed Data by Ferdos Gorji and Mina Aminghafari;

- Estimating Changes in the Observed Relationship Between Humidity and Temperature Using Noncrossing Quantile Smoothing Splines by Karen A. McKinnon and Andrew Poppick;

- A Distance-based Method for Spatial Prediction in the Presence of Trend by Carlos E. Melo, Jorge Mateu and Oscar O. Melo;

- Systematic Statistical Analysis of Microbial Data from Dilution Series by J. Andrés Christen and Albert E. Parker;

- A Bayesian Markov Model with Pólya-Gamma Sampling for Estimating Individual Behavior Transition Probabilities from Accelerometer Classifications by Toryn L. J. Schafer, Christopher K. Wikle, Jay A. VonBank, Bart M. Ballard and Mitch D. Weegman;

- Vecchia Approximations of Gaussian-Process Predictions by Matthias Katzfuss, Joseph Guinness, Wenlong Gong and Daniel Zilber;

- A Nonstationary Spatial Covariance Model for Processes Driven by Point Sources by Joshua L. Warren; and

- Spatial Spread Sampling Using Weakly Associated Vectors by Raphaël Jauslin and Yves Tillé.

If you have a suggestion for a special issue, we would be pleased to hear from you. We are also keen to publish papers that summarize the state of methodological development in subject areas for which technological advances are generating a demand for new statistical approaches. If such papers also speculate on likely future developments, so much the better. If you feel that you could offer such a paper, or can suggest a topic together with possible authors, please let me know.

For more information on upcoming issues, the editorial board, and the aim and scope of the journal, please visit our website http://link.springer.com/journal/13253. We also accept submissions of books to review in the upcoming issues of JABES; to submit a book for review, please see the above website (click on "Editorial Board") or contact Eleni Matechou (e.matechou@kent.ac.uk).

Please follow us on Twitter: @JabesEditor.

Brian Reich
Editor in Chief

Software Corner

mcvis: Multi-collinearity Visualisation

Kevin Wang & Samuel Mueller

Introduction

What is the most popular statistical model for a statistician? We think most statisticians would say the linear regression model. Indeed, linear regression is both rich in theory and powerful in practice with many flexible extensions such as generalised linear models and linear mixed models.

But what about the model limitations? Multicollinearity is perhaps the most obvious limitation of regression models, which can cause the least squares regression to produce unreasonable coefficient estimates and standard errors.

Multicollinearity ≠ high correlation!

So what is multicollinearity? Formally, it is defined as the phenomenon when a group of predictor variables are exactly or approximately linearly dependent. In other words, if one predictor variable can be approximately expressed as a linear combination of other predictor variables, then we have a situation of multicollinearity.

It is a common misconception that multicollinearity equals to high correlation between variables! Consider the following example where we generate $p=5$ normally distributed predictor variables. The first predictor is constructed as $X_1=X_2+X_3+X_4$ plus some random noise. Looking at the correlation matrix, we don't necessarily see anything alarming with all correlation coefficient being below 0.6. This might give us the false sense of security that no multicollinearity exist when in fact, the correlation of X_1 and the sum $X_2+X_3+X_4$ is approximately 0.998, enough to trigger multicollinearity for regression!

```
set.seed(123)
p = 5; n = 50
X = matrix(rnorm(n*p), ncol = p)
X[,1] = X[,2] + X[,3] + X[,4] + rnorm(n, 0, 0.1)
round(cor(X), 2)
```

```
##        [,1]  [,2]  [,3]  [,4]  [,5]
## [1,] 1.00  0.42  0.57  0.55  0.02
## [2,] 0.42  1.00 -0.16 -0.16 -0.13
## [3,] 0.57 -0.16  1.00 -0.01 -0.04
## [4,] 0.55 -0.16 -0.01  1.00  0.20
## [5,] 0.02 -0.13 -0.04  0.20  1.00
```

```
cor(X[,1], X[,2] + X[,3] + X[,4])
```

```
## [1] 0.9978913
```

If we blindly fit a linear regression model not knowing of the existence of multicollinearity, then two things can happen. One is with the regression coefficient estimate itself, where we can obtain an estimate of β_1, the slope parameter corresponding to the first regressor X_1, that is opposite in sign to how we generated our response variable, y. Another consequence is on the standard error of the coefficient estimate. Looking at the summary output of the "full model" (with all $p=5$ predictors fitted), we see that the standard error of $\hat{\beta}_1$ is ten times larger than that of the "true model" with only X_1 fitted.

```
y = 1 * X[,1] + rnorm(n)
full_model = lm(y ~ X)
broom::tidy(full_model)
```

```
## # A tibble: 6 x 5
## term      estimate std.error statistic p.value
##    <chr><dbl>       <dbl>      <dbl>     <dbl>
## 1 (Intercept)  0.0148    0.162    0.0911   0.928
## 2 X1          -0.318     1.67    -0.191    0.850
## 3 X2           1.41      1.66     0.847    0.401
## 4 X3           1.28      1.64     0.779    0.440
## 5 X4           1.27      1.69     0.752    0.456
## 6 X5           0.0618    0.167    0.370    0.713
```

```
true_model = lm(y ~ X[,1])
broom::tidy(true_model)
```

```
## # A tibble: 2 x 5
##    term        estimate std.error  statistic   p.value
##    <chr>          <dbl>     <dbl>      <dbl>     <dbl>
## 1 (Intercept) 0.00192    0.147    0.0131   9.90e- 1
## 2 X[, 1]      0.997      0.103    9.66     7.66e-13
```

Classic ways of diagnosing multicollinearity

So why do these strange phenomena occur? In least squares regression, both the estimator and its variance depend on the precision matrix $(X^\top X)^{-1}$, where each column X_j of X represents an explanatory variable X_j, $j=0,\ldots,p$ if the linear regression model includes an intercept term, and $j=1,\ldots,p$ otherwise. However, when the model design matrix, X, is numerically "close" to having linearly dependent columns, as we do have when multicollinearity occurs, the matrix $X^\top X$ is not numerically invertible. Hence, elements of the precision matrix, regression estimators and standard errors start to behave erratically from a numeric perspective.

One way to "diagnose" multicollinearity is to compute the eigenvalues of the matrix $X^\top X$ and examine the value $\sqrt{\lambda\_max/\lambda\_min}$, where λ_max and λ_min are the maximum eigenvalue and the minimum eigenvalue, respectively. This ratio is known as the "condition number" of the design matrix and a rule of thumb is that if a condition number is larger than 30, then this indicates a severe case of multicollinearity (see e.g. Belsley et al. (1980, Section 3.2)). In our data example, we do indeed have such a severe case of multicollinearity.

```
evalues = eigen(t(X) %*% X)$values
(condition_number = sqrt(evalues[1]/evalues[p]))
## [1] 35.51142
```

However, if we didn't simulate the data above and we obtained such a large condition number, how would we know which variables are contributing the most to cause multicollinearity? After all, the condition number only tells us of the existence of multicollinearity, but not which predictors are causing this. Knowing this information may help us to decide if any variables should be dropped or alternative modelling strategies might be needed (e.g. averaging these variables).

This is where mcvis can help!

Introducing mcvis

The recently developed mcvis package computes a new statistic called the MC-index which can diagnose multicollinearity. The theory behind this MC-index is published in Lin et. al. (2020).

Briefly, MC-index is a vector of length matching that of the number of columns of X. Each element of the MC-index vector is a number between zero and one, connecting the ith MC-index with the smallest eigenvalue, $\tau_p = \lambda_{min}$, which measures X's proximity to linear dependence, with the ith regression predictor variable. A larger MC-index value indicates that a variable is causing more multicollinearity than another variable. The computation of the MC-index uses a bootstrap resampling scheme to stabilise estimations. The process is simple to implement through the mcvis function in the mcvis R package which is available on CRAN.

```
# install.packages("mcvis") or
```

```
# remotes::install_github("kevinwang09/mcvis") for
the development version
library(mcvis)
mcvis_result = mcvis(X)
print(mcvis_result)
```

```
##          X1     X2     X3     X4    X5
## tau5  0.51   0.12   0.15    0.22    0
```

In the output above, we see that X_1 with the largest value of the MC-index, is identified as the main variable causing multicollinearity. We can further visualise this via a (bipartite) graph that shows this connection between τ_p and the p predictor variables. The size and colour of the lines are categorised by the magnitude of the MC-index value. This plot gives us a quick indication of the sources of the multicollinearity, ordered by the magnitude.

```
plot(mcvis_result)
```
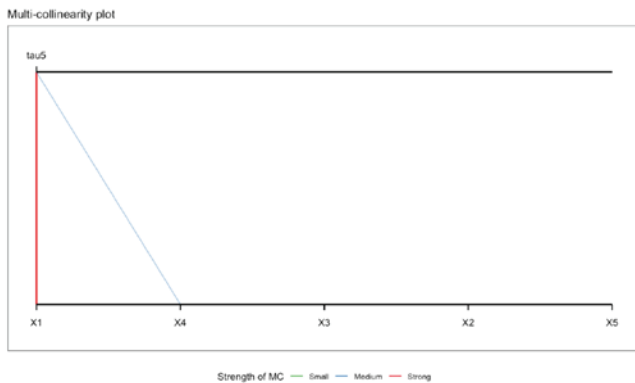

Breast cancer

We will illustrate the use of the mcvis package using a real example from the dslabs data package. The brca data contains various important biopsy features for breast cancer cell nuclei. The original data measures features such as the radius for a collection of cell nuclei in a tumour and summarises these into mean, standard error and the worst value. The response variable is a factor with two levels denoting whether a tumour is malignant ("M") or benign ("B"). To simplify interpretations, we will only focus on the first ten predictors, which correspond to the mean measurement of cell nuclei.

We do expect multicollinearity in this data because measures such as radius, perimeter and area of nuclei should be highly correlated. Performing mcvis on this data, we do indeed see that this is the case and we will demonstrate that more than one group of variables are linearly highly correlated. We add some extra plotting parameters for mcvis to improve visibility.

```
library(dslabs)
library(dplyr)
library(ggcorrplot)
data(brca)
x = as.data.frame(brca$x[,1:10])
colnames(x)
```

```
## [1] "radius_mean"          "texture_mean"
"perimeter_mean"    "area_mean"
## [5] "smoothness_mean"   "compactness_mean" "con-
cavity_mean"    "concave_pts_mean"
## [9] "symmetry_mean"        "fractal_dim_mean"
```

```
ggcorrplot(cor(x), type = "upper", lab = TRUE)
```
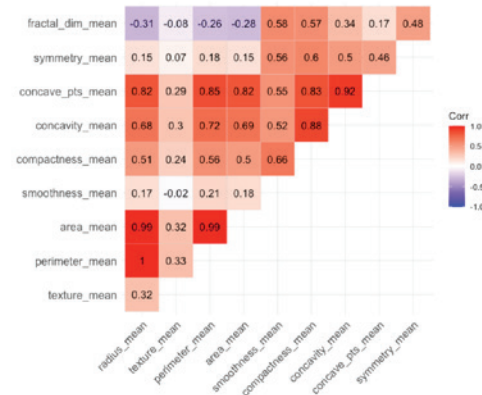


```
(mcvis_result = mcvis::mcvis(x))
```

```
## radius_mean texture_mean perimeter_mean area_mean
smoothness_mean
## tau10      0.36            0         0.64            0
0
##          compactness_mean concavity_mean concave_
pts_mean symmetry_mean
## tau10                    0            0            0
0
##          fractal_dim_mean
## tau10                    0
```

```
plot(mcvis_result, var_max = 5, label_dodge = TRUE)
```
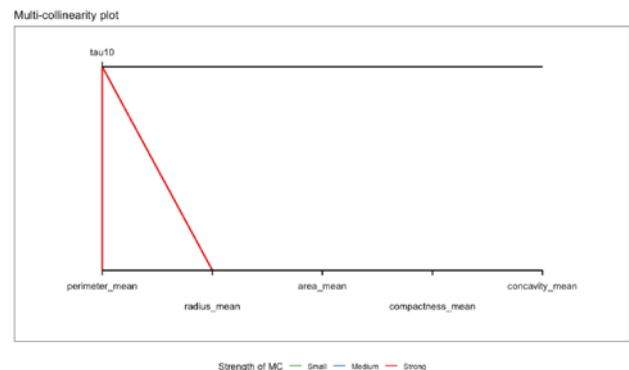

The MC-index identifies two variables as having a "Strong" MC-index value. Therefore, in this case we might be tempted to remove the perimeter_mean and area_mean from our design matrix as they provide very similar information as radius_mean. Once the strongest sources of multicollinearity is addressed, additional groups of variables causing multicollinearity may be identified. We can repeat mcvis to identify concavity_mean and concave_pts_mean as highly correlated variables.

```
x2 = dplyr::select(x, -perimeter_mean, -area_mean)
(mcvis_result2 = mcvis::mcvis(x2))

##         radius_mean texture_mean smoothness_mean
compactness_mean concavity_mean
## tau8         0.03            0              0.01
0            0.23
##    concave_pts_mean symmetry_mean fractal_dim_mean
## tau8            0.72             0                0

plot(mcvis_result2, var_max = 5, label_dodge = TRUE)
```
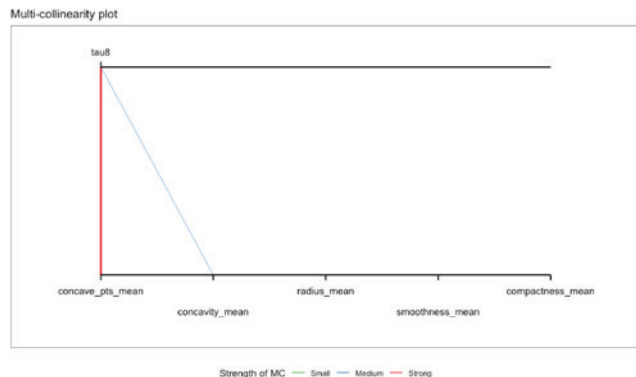

Repeating mcvis again, we can also find that concave_pts_mean and concavity_mean as another potential source of multicollinearity and as their definition are very similar according to the documentation, we may decide to remove one of these.

Of course, depending on data context, we might not want to simply remove the collinearity causing variables as we have done here. Some common alternatives include averaging collinear predictors or using models that can decorrelate the predictor variables (e.g. random forest). Nonetheless, the diagnosis of multicollinearity is an important part of choosing which modelling strategy one should take.

Conclusion

The linear regression model is arguably the most powerful tool in statistics. However, using it in practice may require extra checks and practical considerations with one often ignored issue being multicollinearity. The R package mcvis provides tools that can help statisticians to identify different sources of multicollinearity to better decision making and the application of linear regression model.

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STRengthening Analytical Thinking for Observational Studies (STRATOS)

Introducing the Visualisation Panel (SP)

Marc Baillie (1) and Marc Vandemeulebroecke (1); on behalf of the Visualisation Panel (1) Biostatistical Sciences and Pharmacometrics, Novartis Pharma AG, Basel, Switzerland

Previous issues of this Bulletin have introduced the nine Topic Groups (TGs) and the simulation panel of the STRATOS initiative. In this note, we introduce the newly formed visualisation panel (https://stratos-initiative.org/node/61). The aims of the visualisation panel are to promote the use of good graphical principles (https://graphicsprinciples.github.io/) for effective visual communication, providing guidance and recommendations covering all aspects from the design, implementation and review of statistical graphics.

Why do we need a visualisation panel? The use of appropriate statistical graphics is essential throughout a project, from formulating the research question, initial data analysis, execution of the analysis plan, through to communicating results, recommendations and conclusions. Researchers must not only "get the question right" (understand contextual subject matter) and "get the methods right" (technical expertise) but also "get the message right" (clear reporting). In other words, effective visual communication is a core competency for the applied researcher [1].

What is effective visual communication? Scientific influence relies on clear, transparent and effective communication. Reporting guidelines for example promote accurate and transparent written scientific documentation, e.g. see the EQUATOR (Enhancing the QUAlity and Transparency Of health Research) network that acts as an umbrella for reporting guidelines (https://www.equator-network.org/). Visual communication is one of the most effective channels for displaying quantitative information, and as with written communication, it is also important to be clear and accurate. Effective visual communication means using the visual channel to deliver the right information or messages clearly and concisely. By following the right graphical principles, we can better understand data, highlight core insights and influence decisions toward appropriate actions. Without it, we can fool ourselves and others and pave the way to wrong conclusions and actions.

Why is this important to researchers? The role of the "pragmatic statistician" in this process is to ensure that relevant information (concepts, assumptions, patterns, trends, signals, and conclusions) is clearly described and easy to interpret [2]. For this, we must understand the laws and principles of effective visual communication, such as the grammar of a (visual) language [3]. Visualisation is more than "plotting data"; it can lead to a deeper understanding and inform next steps.

A lot of ground has been covered on this theme from Tukey [4], Tufte [5] and Cleveland [6], collaborative initiatives such as

CTSpedia (https://www.ctspedia.org/do/view/CTSpedia) and PSI SIG VIS (https://www.psiweb.org/sigs-special-interest-groups/visualisation) to guidelines and recommendations [7] and [8], through to flexible tools to support statistical graphics (https://ggplot2.tidyverse.org/). However, traditional university and professional training curricula have not placed a lot of focus on effective communication [9]. Many researchers have to learn on the job through trial and error. This often leads to poor practice [10] or the avoidance of graphics [11].

While numerous literature, guidance and solutions exist how do we put this in practice in an accurate, transparent and reproducible way? This brings us back to the aims of the visualisation panel: to promote the use of good graphical principles for effective visual communication, providing guidance and recommendations. An additional aim is to support a cultural change in the adoption of these principles within applied research.

Some of these topics will be addressed in the near future. For example, after the 2nd general meeting of the STRATOS members at the Banff International Research Station in 2019 (https://www.birs.ca/events/2019/5-day-workshops/19w5198), the visualisation panel began working with other topic groups. One initial focus is to look at appropriate graphical and analytical tools to enable a researcher to perform initial data analysis (topic group 3) for regression modelling (topic group 2) in order to avoid misinterpretation, poor presentation and analysis errors. These necessary preparations are often forgotten even by experienced data analysts.

The panel is presently chaired by Mark Baillie, and Tim Morris, Rachel Phillips, Willi Sauerbrei, Svenja Seide and Marc Vandemeulebroecke are members. The panel is actively looking for another co-chair and members interested in contributing. Please reach out to learn more.

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Past President and Honorary Life Member of IBS Dr. Calyampudi Radhakrishna Rao (C.R. Rao) Turns 100

By: T. Krishna Kumar, Rockville Analytics - 13201 Carriage Court, Rockville, MD 20850

The International Biometric Society must be very proud that among all statisticians of eminence there are only two who became Centenarians, and both are past presidents of the society, and its honorary life members. These are D.J. Finney and C. R. Rao. Sir R.A. Fisher, the doctoral supervisor of C.R. Rao, founded the Biometric Society in 1947 (when Rao was his Ph.D. student) with five regional Chapters, comprising of Britain, France, Australia, the United States and India. The Indian Region of the Biometric Society was established with Prof P. C . Mahalanobis (C.R Rao's professor in India) as its President, and C.R. Rao as the Secretary. Rao was one of the founding members of the Indian Society of Medical Statistics. Rao was accepted as a student by Fisher only on the condition that he would work in his genetics laboratory to map chromosomes of mice. Dr Rao's earliest statistical work was on application of multivariate analysis to anthropometrics and biometrics. For our training in advanced statistics at ISI in 1959-61, we used extensively Rao's book "Advanced Statistical Methods in Biometric Research" (Wiley (1952)).

Dr. Rao was born on September 10, 1920 in *Huvina Hadagali, now in Karnataka state of India. (for an earlier account of Dr. Rao's achievements see 2015 ISMS Bulletin: http://isms-ind.org/ISMS%20Bulletin%20Septmber%202015.pdf, page 61, and for a more detailed*

recent profile refer to: CR Rao: A Life in Statistics by BLS Prakasa Rao: https://bhavana.org.in/c-r-rao-a-life-in-statistics/). *He proved by his own example that a global maximum will always be local maximum by standing first in class in every school he attended, almost moving once in two years from one school to another and one town to another, as his father was in a transferable job with frequent transfers. He stood first in class with a First Class, and held record marks in his B.A.(Hons) degree in mathematics at Andhra University. A chance encounter took him to learn statistics from Professor Prasanta Chandra Mahalanobis, who established in 1931 the world renowned Indian Statistical Institute (ISI), much before statistics was introduced as a separate department in many universities around the world. It was in his Master's degree that Rao wrote a research paper that contained most of his fundamental path-breaking results such as Cramer-Rao inequality, Rao-Blackwellization, Fisher-Rao Distance, and Characterization of Distributions. In 1946 Cambridge University requested Mahalanobis to send his students to work with an anthropometric problem of applying multivariate analysis to identify to which of two populations a given skeleton belonged. CR Rao was one of two students sent by Mahalanobis. Rao used his work at Cambridge University as a Ph.D. thesis and submitted it to R.A. Fisher and was awarded a Ph.D. degree from Cambridge in 1948.*

Dr Rao returned to India and became a Professor at an early age of 28 years and developed a unique statistics curriculum integrating statistics with various fields of its application such as physical, biological, and social sciences. Ten batches of professional statisticians and 20 batches of students at B. Stat and M.Stat graduated from ISI under his Directorship and direct teaching by him. He also directed doctoral dissertations of other eminent statisticians such as SRS Varadhan (Raghu Varadhan, the Abel Prize winner of 2007), D. Basu, J.K. Ghosh, and others. After retiring from ISI, he was a professor at the Center for Multivariate Analysis at University of Pittsburgh (1979-87). From 1987-2001 he was Eberly Chair Professor at Penn State University. He continued as the Director of the Center for Multivariate Analysis at Penn State University until 2008, when he moved to University of Buffalo as a Research Professor. He is currently Professor Emeritus at Penn State University and Research Professor at University of Buffalo. He directed 51 doctoral students, and including their doctoral students Dr. Rao has 670 descendants.

Dr. Rao published about 250 journal articles before retiring from ISI in India at age 60, and he published more that 280 papers after his retirement. Dr. Rao received 38 honorary doctoral degrees from universities in 19 countries around the world and numerous awards and medals for his contributions to statistics and science. He is a member of eight National Academies in India, the United Kingdom, the United States, and Italy. He was the recipient of US Presidential Medal of Science in 2002, India Science Award in 2010, Guy Gold Medal from the Royal Statistical Society in 2011, Neyman medal 2014, and of several other awards and distinctions. Several statistical tools bear his name such as Cramer-Rao inequality, Rao-Blackwellizaation, Fisher-Rao distance, and Rao score test. His contribution on fractional factorial designs of experiments with orthogonal arrays are widely applied in industrial quality improvements as Taguchi designs. One could say that today's advanced research in classifying bioinformatic data into cancerous cells and normal cells, the basis for development of cancer markers, originated in Dr Rao's multivariate analysis for identifying the skeletal bones as belonging to one or the other of two populations.

During this year of Covid-19 pandemic Dr Rao's students, friends, admirers, and well-wishers from all over the world celebrated his birth centenary using a Facebook Group Page "Dr CR Rao Birth Centenary" and four Zoom sessions on four different days with face-to face virtual interactions, the last session being on his 100th birthday on September 10, 2020 with a birthday cake cutting function from his home. This was organized by me in cooperation with Dr Nagaraj Neerchal, Dr. Anil Bera, Dr Somesh Mathur, and Dr. Sudeshna Basu. The highlight of the celebration was the simultaneous celebration of the Platinum jubilee of the Cramer-Rao inequality by Peter Kootsookos reading the lyrics he wrote in 2001, to the tune of John Denver's "Country Road Take me Home" as popularised by Simon and Garfunkel (https://imstat.org/category/ims-bulletin/page/183/). This was followed by a recorded song sung by a professional singer.

On his 100th birthday greeting his well-wishers Dr Rao said: "Statistics is the science of learning from data. Today is the age of data revolution. There is therefore, a heightened need for statistics—both in terms of training in statistics to help analyze and interpret the data, and in terms of research to answer new questions arising from the data. .. Therefore, we have our work cut out for us as researchers and as teachers. This is the challenge for all of you".
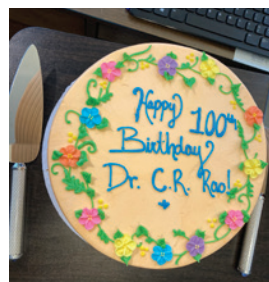
Region News

British Irish Region (BIR)
https://biometricsociety.org.uk/

The IBS-BIR co-sponsored the 4th Annual David Finney Lecture given by Professor Sir David Spiegelhalter on "Communicating statistics, risk and uncertainty in the age of Covid" which took place on the 9th July, 2020. The talk presented a strong challenge to the claim that we live in a 'post-truth' society in which emotional responses dominate balanced consideration of evidence. The presentation focused on those who value quantitative and scientific evidence: How can we communicate statistics, risks and unavoidable scientific uncertainty in a transparent and trustworthy way? Prof. Spiegelhalter, who has been advising the UK government in its response to COVID, talked about the challenges of communicating during the epidemic and asked: Can we communicate deeper uncertainty about facts, numbers, or scientific hypotheses without losing trust and credibility?

The talk was given virtually after being rescheduled due to COVID and attracted an extremely engaged audience of over 900 people watching Live via Zoom and a Youtube livestream. A recording of the presentation is available at https://media.ed.ac.uk/media/Communicating+statistics%2C+risk+and+uncertainty+in+the+age+of+Covid+-+Prof.+David+Spiegelhalter/1_y2lw3u6d

The annual meeting was co-organised by the Centre for Statistics within the University of Edinburgh, hosted by the International Centre for Mathematical Sciences (ICMS) and sponsored by the IBS-BIR.

Dr. Kirsty Hassall

Eastern North American Region (ENAR)
https://www.enar.org/

WebENARs

Be sure to check the ENAR Webinar website for updates regarding the upcoming WebENAR series, as well as for links to past WebENARs and their recordings: http://www.enar.org/education/index.cfm.

2020 JSM, 1-6 August

The 2020 JSM was held as a virtual meeting from 1-6 August due to concerns regarding travel and large group gatherings during the COVID-19 pandemic. The theme of the 2020 meeting was "Everyone Counts: Data for the Public Good." This year's program included 12 invited sessions primarily sponsored by ENAR, covering topics about oncology drug development, semi-parametric inference, methods for precision medicine, genetic/genomic and microbiome data analysis, causal inference with interference, graphical models, electronic health record and public data analysis, and mentoring. An additional 4 topic-contributed and 2 contributed paper sessions primarily sponsored by ENAR included presentations on spatial, functional, and neuroimaging data, informative cluster size methods, network-based studies and meta-analyses, rare disease drug development, and Bayesian methods. Slides and several video recordings from JSM sessions are available at https://ww2.amstat.org/meetings/jsm/2020/index.cfm. ENAR received many proposals for invited and topic-contributed sessions and thanks everyone who put forth an idea. ENAR extends a huge thank you to Jeremy Gaskins of the University of Louisville for serving on the Program Committee for the 2020 JSM.

2021 ENAR Spring Meeting, 14-17 March, Baltimore, MD, USA

The 2021 ENAR Spring Meeting is currently scheduled to take place in-person in Baltimore, Maryland at the Baltimore Marriott Waterfront. Submissions to the student paper competition are due earlier this year on 1 October, and all other contributed oral and poster presentation submissions are due 15 October. ENAR would like to thank Program Chair Howard Chang (howard.chang@emory.edu), Associate Chair Yize Zhao (yize.zhao@yale.edu), and the Local Arrangements Chair Vadim Zippunikov (vzipunn1@jhu.edu) for their hard work in planning the ENAR Spring Meeting. More details may be found at: https://enar.org/meetings/spring2021/.

2021 JSM, 7-12 August, Seattle, WA, USA

The 2021 Joint Statistical Meetings are currently scheduled to take place in-person in Seattle, Washington, USA from 7-12 August, 2021. ENAR is fortunate to have Mark Meyer (mjm556@georgetown.edu) be our representative to the Program Committee. ENAR members may contact Mark with any ideas or questions. The theme for the 2021 meeting is "Statistics, Data, and the Stories They Tell." Invited Session Proposal submissions were accepted until 8 September with decisions expected by 9 October.

2022 ENAR Spring Meeting, 27-30 March, Houston, TX, USA

The 2022 ENAR Spring Meeting will be held in Houston, Texas, USA from 27 to 30 March, 2022 at the Marriott Marquis Houston.

German Region (DR)
http://www.biometrische-gesellschaft.de/

Invitation to attend online meetings

Some meetings had to be canceled because of the COVID-19 pandemic. This year's summer schools were postponed to next year. Some meetings from the large conference of the Central European Network in September down to special interest workshops usually attended by just a dozen or so colleagues were shifted online. This opens the opportunity for members worldwide to attend. Language need not be a barrier, as many talks are given in English. So, check out the links in the Meeting Calendar! The next are:

Academy Meets Industry

Workshop of working group Bayes-methods themed "Copulas"

Central European Network Meeting

A joint online meeting of German, Polish and Austro-Swiss regions together with the GMDS (a german society for medical data sciences) was held starting September 6, hosted by

Geraldine Rauch of Charité, Berlin. A detailed report will follow in the next Biometric Bulletin.

Young Talents Awards

New laureates of the Gustav Adolf Lienert Award are Tobias Bluhmki (Ulm) for "Bootstrapping complex time-to-event data without individual patient data, with a view toward time-dependent exposures." Statistics in Medicine. Dennise Dobler (Amsterdam) for "Confidence bands for multiplicative hazards models: Flexible resampling approaches." Biometrics. The Bernd Streitberg Award for pre-doctorate scientists went to

Moritz Herrmann (Munich) for his master's thesis "Large-scale benchmark study of prediction methods using multi-omics data".

Officers

Annette Kopp-Schneider was elected to be vice-president now and president 2021-2022. Martin Scharpenberg was elected secretary.

Meetings Calendar

Academy meets Industry, online, 29-30 October 2020.

Joint online workshop of working groups Statistical Methods in Epidemiology and Statistical Methods in Medicine, 19-20 November 2020.

Online meeting of working group Teaching and Didactics: Awards and discussion of syllabus for medical schools, online, 26 November 2020.

Online workshop of working group Bayes-methods: "Copulas", 4 December 2020.

Fall meeting of working group Pharmaceutical Research on "COVID-19: Effect on statistics, methodic aspects and implications on operations", online, 27 November 2021.

Workshop of working group Nonparametric Methods in Dortmund, 8-9 March 2021.

Joint meeting of working group Agricultural Experimentation with three other societies at LTZ Augustenberg near Karlsruhe, 30 June to 2 July 2021.

The annual conference of the German Region will be held online 14-17 March 2021, organized by a team of Universität Münster.

The annual conference of the German Region in 2022, March 28 to April 1, will be a joint meeting of statistical societies that are members of DAGStat hosted by three Hamburg Universities.

Reinhard Vonthein

Japanese Region (JR)

http://www.biometrics.gr.jp/

The 2020 Annual Membership Meeting of the Biometric Society of Japan

The Biometric Society of Japan (BSJ) canceled the annual meeting scheduled for 15-16 May 2020, due to the ongoing pandemic. The virtual annual membership meeting was held on 9 September

2020 during the 2020 Japanese Joint Statistical Meeting.

The BSJ is pleased to announce that the society conferred the BSJ Award for Outstanding Scientific Contribution on Prof. Yutaka Matsuyama (University of Tokyo) for his valuable contributions to development of biostatistical methodologies in clinical and epidemiological research, especially causal inference, missing data analysis, and longitudinal data analysis. The BSJ Honorary Award was conferred on Prof. Yasuo Ohashi (Chuo University) for his long-term

For contributions to the society, the Young Biostatisticians Award was conferred on Dr. Toshifumi Sugitani (Astellas Pharma Inc.) for his recent publication in Japanese Journal of Biometrics (JBS), which is the official journal of the society. This award is annually conferred by the BSJ for researchers, who are less than 40 years old and publishes their research of high standard in recent issues of Biometrics, JABES, or JBS.

The 2020 Japanese Joint Statistical Meeting

The Virtual Japanese Joint Statistical Meeting was held on 8-12 September 2020. It was hosted by Japanese Federation of Statistical Science Association, which consists of six sponsoring organizations, including the BSJ. As an invited session, the BSJ organized the Biometric Symposium about statistical methods to evaluate the treatment effect based on Pr[X>Y]. Dr. Sakamaki (Yokohama City University) organized and chaired the session. The society invited four speakers. Dr. Sakamaki presented an overview of statistical methods related to Pr[X>Y] in clinical trials. Dr. Shinozaki (Tokyo University of Science) presented Pr[X<Y] in the hazard ratio and survival time in matched-pair data and unmatched data. Dr. Chiba (Kindai University) presented Bayesian inference of causal effects for an ordinal outcome in randomized trials. Dr. Fukuda (Astellas Pharma Inc.) and Dr. Oba (University of Tokyo) presented estimation methods of net benefit for survival time data with informative censoring.

The society also organized another invited session of the virtual annual membership meeting of the BSJ and the presentation by the winner of the Young Biostatisticians Award. Dr. Sugitani presented his recent work on the science of validation and multiple comparisons in drug development.

Ikuko Funatogawa

Singapore Region (SING)

IBS Singapore Region member Jialiang Li was elected ASA Fellow in 2020. Dr Li is affiliated with National University of Singapore and his research interests include personalized medicine and diagnostic medicine. He was awarded "for outstanding contributions to statistical methodology; for outstanding mentoring of students; and for sustained research and collaboration involving statistical analysis of medical data".

Western North American Region (WNAR)

http://wnar.org/

2020 WNAR/IMS/KISS/JR Meeting

The 2020 Annual Meeting of WNAR/IMS/KISS/JR was cancelled due to COVID-19. The Student Paper Competition was still held virtually.

2020 WNAR/IMS/KISS/JR Student Paper Competition

Twenty-four students participated in the virtual student paper competition. The winners in the written category were:

- Lingjing Jiang, University of California San Diego: "Assessing Reproducibility of Selected Features with Big Data"

- Kwangho Kim, Carnegie Mellon University: "Causal Clustering"

The winner of the oral category was:

- Jinyuan Liu, University of California San Diego: "Regression Models for within-subjects Responses with between-subject Explanatory Variables: Applications to Microbiome Data"

The students received their award at a virtual meeting. Certificates were mailed.

We give a special thanks to the Chair of the student paper competition, Harold Bae from Oregon State University and the other Student Competition judges: Jay Barber (Northern Arizona University), Fang Chen (SAS), Charlotte Gard (New Mexico State University), Tusharkanti Ghosh (University of Colorado Anshutz Medical Campus), Jessica Minnier (Oregon Health & Sciences University), Camille Moore (National Jewish Hospital), Debmalya Nandy (University of Colorado Anshutz Medical Campus), and Laura Saba (University of Colorado Anshutz Medical Campus).
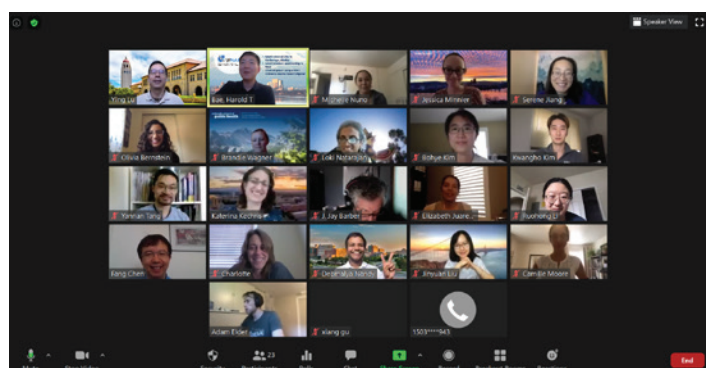

Figure 1. Screenshot of Zoom Student Competition Award Ceremony

WNAR Webinar Series

WNAR has started a webinar series this year. Three successful webinars have been completed so far:

- Brad Efron (Stanford University) presented "Prediction, Estimation, and Attribution" on 6 March 2020.

- Xihong Lin (Harvard University) presented "Learning from COVID-10 Data in Wuhan, USA and Europe on Intervention Strategies" on 14 May 2020 (jointly sponsored with NISS and COPSS).

- Trefor Bazett (University of Victoria), Xiao-Li Meng (Harvard University), and Kristen Lynn Sainani (Stanford University) held a panel discussion on "Remote Teaching" on 31 July 2020.

We invite those interested to look for invitations to register to the upcoming webinars:

- Daniel Fink (Cornell Lab of Ornithology) will present "eBird: Monitoring Biodiversity Over Space, Through Time, and Across Scales) on 8 October 2020.

- James Thorson (NOAA Fisheries), title to be announced on 20 November 2020.

Congratulations to Tomi Mori for Outstanding Contribution to the Development of the IBS!!

Congratulations to Professor Tomi Mori, President of WNAR in 2018, who has received the prestigious Award for Outstanding Contribution to the Development of the IBS.

Professor Mori is the Chair and Member of the Department of Biostatistics at St. Jude Children's Research Hospital. Prior to January 2020, she was the Walter & Clara Brownfield Professor of Cancer Biostatistics at Oregon Health & Science University and Portland State University School of Public Health.

She has been a member of IBS since 1998 with a long record of serving in leadership roles for WNAR and IBS, including serving as WNAR President-Elect, President, and Past-President between 2017-2019.

Among her many accomplishments, she has forged ongoing relationships between WNAR and the IBS Japanese and Argentinian Regions and with the Korean International Statistical Society. Due to her role as the ASA representative to the AAAS Medical Science Section she was a liaison between WNAR and AAAS and was instrumental in helping WNAR become a founding member of the Societies Consortium on Sexual Harassment in STEMM. She has made many contributions to making meetings more accessible and promoting participation in IBS.

Congratulations to Professor Mori!

Work to Rename the COPPS Award

With sister IBS region ENAR, WNAR was actively engaged in the discussion and decision to rename the R.A. Fisher Award and Lectureship in the Joint Statistical Meetings in North America, in efforts to improve equity, diversity and inclusion in the statistical profession.

2021 WNAR/IMS/KISS/JR meeting

After needing to cancel the 2020 meeting due to COVID-19, WNAR has rescheduled the 2021 WNAR/IMS meeting to be in Anchorage, Alaska from 13-16 June 2021.

Anchorage is Alaska's largest city, and is picturesquely located on the Cook Inlet. The Chugach mountains, multiple national parks, and 60 glaciers are all a short drive away. The WNAR conference is held in June, when the long summer days can be enjoyed. Jiaqi Huang (Alaska Department of Fish and Game) is the Local Organizer, Yingqi Zhao (Fred Hutchinson Cancer Research Center) is the Program Chair, and Laura Saba (University of Colorado Anshutz Medical Campus) will be the Chair of the Student Paper Competition. Registration information and other details about the meeting available on the WNAR web page www.wnar.org.

2021 WNAR Student Paper Competition

WNAR sponsors students who enter the student paper competition. All WNAR-region entrants receive their registration fees and banquet dinner ticket for free. Monetary prizes will be awarded to the best papers in written and oral competitions. Information on the 2021 WNAR Student Paper Competition, registration information, and program details for the meeting will be posted as they become available: http://www.wnar.org. We look forward to seeing you there.

Megan Othus

Announcements & Upcoming Events

Network and Inter-Regional Activities Funding Program

We are now accepting applications for Network and Region joint activities that are scheduled to start in the first half of 2021 (January 1 - June 30). We understand that we might not be able to meet in person during this period due to the continuing COVID-19 pandemic so we will be accepting applications for joint virtual conferences as well. The guiding principle is that the activity must encourage inter-regional interaction. Additionally, there should be some contribution from the participating regions and some general benefit to the Society at large.

As a reminder, the Executive Board allocates $20,000 in total per year to this funding program. Each activity award is subject to a maximum of $5,000. Applications can be submitted twice a year: by March 31 for activities that are scheduled to start in the second half of the same year (July 1 - December 31) and by September 30 for activities scheduled to start in the first half of the following year (January 1 - June 30). **We of course have extended the submission deadline for the second half of the year and request that all submissions be sent to Regions@biometricsociety.org by October 30, 2020. If you need additional time past this deadline please let us know and we will do our best to work with you and the regions.**

Additional details about the submission can be found on the IBS Website here:

https://members.biometricsociety.org/meetings/funding-programme

IBS Journal Club

The Journal Club is open to all IBS members free of charge. The primary purpose of the Journal Club, apart from presenting worthy papers in a more public setting, is to widen the scope for understanding these papers and to provide a new networking opportunity for IBS members through a regular internet forum. All sessions are recorded and are available on the IBS website here, http://www.biometricsociety.org/education/video-sessions/. To access the recording you must login to your IBS account.

Due to the Virtual IBC the 2020 Journal Club sessions have been postponed. You can still register to view 38+ sessions from the Virtual IBC at www.ibc2020.org.

IBS, IBS Regional and Non-IBS Events and Meetings
View the meetings calendar here!

Is something missing? Would you like to add your meeting or event to our calendar? If so, please send an email to IBS@biometricsociety.org with the following information:

1. Event Title
2. Event Description & Location
3. Event Category (IBS Regional Event, IBS Event, Non-IBS Event)
4. Event Link
5. Start/End Date

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LinkedIn @International Biometric Society

Get Connected!

Join the IBS Members Community::

1. Sign in to biometricsociety.org with your existing credentials. Contact us if you need assistance.

2. Visit your **profile** to update your personal information and edit privacy settings.

3. Click **Community** in the main navigation and select **All Communities.** Members will see a brand new **IBS Members** community to join.

4. After you join the community, be sure to click on the group **Settings** and customize **Email Notifications** so you can only receive the information you want (real-time updates, a daily digest, or no emails). You may set your preferred **email** address here as well.

5. The final step, **post an update or topic!** This channel is for IBS members, the goal is to empower 6,000 colleagues worldwide to share their unique perspectives, reach out, and connect. It will take some time to cultivate these discussions organically so we appreciate your patience and also your input.

We welcome all comments and feedback about the new website. Let us know what you think!