THE ISBA BULLETIN

Vol. 10 No. 3 *September 2003*

The official bulletin of the International Society for Bayesian Analysis

ISBA 2004
VIÑA DEL MAR, CHILE

CALL FOR SESSION PROPOSALS, STUDENT PAPERS AND POSTERS

The ISBA 2004 World Meeting will be held in Viña del Mar, Chile on May 23-27, 2004. The scientific program will include opening and closing plenary talks, technical sessions including debates, student paper sessions, tutorials and contributed posters. Details regarding the program and the meeting will be posted at the conference web site `http://isba.mat.puc.cl` as they become available. Please check the web site regularly.

➤ Scientific Committee

Fabrizio Ruggeri, CNR-IMATI, Italy (Chair)
Alicia Carriquiry, Iowa State University, US
Dipak Dey, University of Connecticut, US
Carmen Fernndez, Lancaster University, UK
Pilar Iglesias, Pontificia Universidad Catlica, Chile
Kerrie Mengersen, University of Newcastle, Australia
David Ros Insua, Universidad Rey Juan Carlos, Spain
Hal Stern, University of California - Irvine, US

➤ Call for session proposals

The conference scientific program will include approximately 25 technical sessions each consisting of three 30-minute talks. The Scientific Committee invites proposals for technical sessions.

To be considered, the Scientific Committee must receive a proposal containing the names and contact information for the organizer and speakers and a 1-2 page extended abstract for each speaker. Extended abstracts are to be at most two A4 or American letter size pages, in 10pt font or larger. The proposal must be submitted on or before NOVEMBER 15, 2003. A speaker may only appear in one proposed session. Only electronic submissions will be accepted (extended abstracts should be in PDF format). Proposals should be submitted using the conference web site `http://isba.mat.puc.cl`.

A list of possible topics is included below but this is not intended to limit submissions in any way. The Scientific Committee will choose sessions for inclusion in the program based on scientific content and originality. The Committee encourages session organizers to include the work of young researchers.

Organizers of technical sessions selected for the program will be notified by DECEMBER 31, 2003. Speakers not registered for the meeting by the end of April may be replaced. Speakers in technical sessions not selected for presentation will be encouraged to submit their papers for presentation in the Contributed Poster sessions.

➤ Call for student papers

The conference scientific program will include a number of sessions dedicated to the presentation of student papers. The Scientific Committee expects to select approximately 9 papers for 30-minute oral presentation at the meeting, but the number could be increased depending on the number and the quality of the submissions.

To be considered students should submit an extended abstract of up to three A4 or American letter size pages, in 10pt font or larger. The abstract must be submitted on or before NOVEMBER 15, 2003. Only electronic submissions (in PDF format) will be accepted. Abstracts should be submitted using the conference web site `http://isba.mat.puc.cl`

A list of possible topics is included below but this is not intended to limit submissions in any way. The Scientific Committee will choose papers for inclusion in the program based on scientific content, originality, degree of completeness, and overall merit. Authors of papers to be presented orally will be notified by DECEMBER 31, 2003. Authors of papers not selected for presentation will be encouraged to submit their papers for presentation in the Contributed Poster sessions.

➤ Call for contributed poster

Direct submission of contributed posters is also encouraged. Title, authors, a contact e-mail address and a brief abstract of up to 250 words should be submitted using the conference web site `http://isba.mat.puc.cl` before APRIL 1, 2004.

At least one author must also have registered for the meeting by that date. All posters meeting these conditions and approved by the Scientific Committee will be scheduled on the program. The space available for display will be about 1 square meter per poster.

➤ Publication of papers

We are glad to inform prospective participants at ISBA 2004 that selected papers presented at the conference (both oral and poster presentations) will be published in the new electronic ISBA journal, *Bayesian Analysis*, following a review process to be established by the editorial board of the journal.

➤ A non-exhaustive list of topics

1. Foundations – prior distributions, utilities, decision theory and decision analysis, causality
2. Teaching Bayesian statistics
3. Inference – probability and distribution theory, optimality, robustness, finite population inference and survey samples
4. Generalized linear models (and variations), hierarchical models, nonlinear models
5. Model selection/diagnostics/averaging
6. Time/Space modeling – stochastic processes, time series, dynamical systems, spatial and spatio-temporal modeling
7. Multivariate methods – clustering, mixture models, classification, discrimination, visualization
8. Non-parametric and semi-parametric methods
9. Computational methods, algorithms, convergence, software
10. Machine learning, probabilistic expert systems, data mining
11. Medical/Biological applications (not bioinformatics) – biostatistics and epidemiology, medical statistics, animal and plant sciences
12. Genetics/Bioinformatics - gene expression data, proteomics, phylogenetics
13. Physical science applications – engineering, physics, astronomy
14. Industrial applications – quality control, experimental design, reliability
15. Social science applications – economics, psychology, education, law, history, archeology

➤ Registration fee and accomodation

Details on the registration fee and the accomodation will be available shortly on the conference web site `http://isba.mat.puc.cl`

➤ Contacts

For any information please contact the Chairs of the ISBA 2004 Committees:

Scientific: Fabrizio Ruggeri `fabrizio@mi.imati.cnr.it`
Finance: Alicia Carriquiry `alicia@iastate.edu`
Local: Pilar Iglesias `pliz@mat.puc.cl`

ISBA 2004

by Fabrizio Ruggeri
`fabrizio@mi.imati.cnr.it`

I have the pleasure of inviting all of you to ISBA 2004 which will be held in Chile, in Viña del Mar, May, 23-27, 2004. In the current issue of the Bulletin you can see the Call for papers. As you might notice looking at the Call, the Scientific Committee has decided that a relevant role will be played by young researchers and students. We are planning to organise sessions where students will be the speakers and we encourage them to submit papers (and the help by the advisors is appreciated!). Furthermore, we invite session organisers to include young researchers among the speakers. We are planning some tutorials at both introductory and advanced level to be held on May, 23rd; therefore, plan to come in Chile in time for them! We will have an opening lecture and a closing one, with two leading researchers whose names will be disclosed shortly. We have thought of organising one or two debates where leading Bayesians will discuss on some "hot" and/or controversial topics. The idea of the debate (and others) came after receiving many suggestions after a message I sent to bayes-news. I wish to thank all those who gave their advice. Finally, we have the posters: most of you know the lively atmosphere during these sessions at the Bayesian meetings; for those of you who never attended one before, it's time to come and try! We are working together with the new electronic ISBA journal, Bayesian Analysis, to publish a selection of papers presented at ISBA 2004: one more reason to come to Chile (and be an ISBA member, as well).

Along with the other members of the Scientific Committee (Alicia Carriquiry, Dipak Dey, Carmen Fernandez, Pilar Iglesias, Kerrie Mengersen, David Rios Insua and Hal Stern) we have been working to prepare the structure of the conference, whereas Pilar Iglesias and the other members are doing a terrific job in organising the conference (and Alicia Carriquiry has the tough duty of getting funds ...). Now it is your turn to contribute to a successful conference by submitting papers, organising sessions and coming to Chile next May. See you there!

Contents

LEONARD J. SAVAGE DISSERTATION AWARDS

by Wes Johnson
johnson@wald.ucdavis.edu

The International Society for Bayesian Analysis (ISBA) is pleased to announce two L. S. Savage Awards of $750 each for 2003:

Theory and Methods Savage Award for a dissertation that makes important original contributions to the foundations, theoretical developments, and/or general methodology of Bayesian analysis.

Applied Methodology Savage Award for a dissertation that makes outstanding contributions with novel Bayesian analysis of a substantive problem that has potential to impact statistical practice in a field of application.

The Savage Awards are cosponsored by the American Statistical Association Section on Bayesian Statistical Science (SBSS), the Trustees of the L. J. Savage Memorial Fund, and NBER/NSF Seminars on Bayesian Inference in Econometrics.

A dissertation may be nominated by the author, by the advisor or other reader, by the department chair or professor, or by any ISBA member. A dissertation may be nominated for only a single award year. Nomination is made by submission of the dissertation and a letter that describes the main theoretical, methodological, and/or applied contributions of the thesis and specifies that the thesis is being nominated for either the Theory and Methods award or the Applied Methodology award.

The nomination letter and thesis should be sent as e-mail attachments to: Wes Johnson, wojohnson@ucdavis.edu. The files containing the nomination letter and actual thesis should use the following formats: "`nominatorname_candidatename.ps`" (or pdf); "`candidatename_t.ps`" (or pdf) for the Theory Methods Award; "`candidatename_a.ps`" (or pdf) for the Application Methodology Award.

Hard copy submission will be accepted only under exceptional circumstances. In this instance, please send two hard copies of the dissertation to: Wesley Johnson, Department of Statistics, University of California, Davis, CA. 95616.

Deadline for receiving nominations for the 2003 Savage Awards is September 30, 2003.

The theses will be evaluated by the Savage Thesis Evaluation Committee. A pool of these will be selected from the submissions and individuals selected will be invited to give presentations based on their dissertations in the SBSS organized Topic Contributed Savage Award Session at the August 2004 Joint Statistical Meetings (JSM) in Toronto. Winners will be selected from this pool and announced at the SBSS reception at the JSM.

The winners of 2002 Theory and Methods Savage Award are:

Theory and Methods Award: Nicolas Chopin, Applications des Mithodes de Monte Carlo Siquentielles la Statistique Bayisienne. Thesis Adviser, Christian Robert, Universite Paris Dauphine.

Application Methodology Award: Marc Suchard, Model Building and Selection in Bayesian Phylogenetic Reconstruction. Thesis Adviser, Robert Weiss, UCLA.

Members of the 2002 Savage Thesis Evaluation Committee were: Siddhartha Chib (Chair), Washington University, St. Louis, Petros Dellaportas, Athens University of Economics, Mike Evans, University of Toronto, Peter Mueller, M.D. Anderson Cancer Center, Gareth Roberts, Lancaster University, and Hal Stern, University of California, Irvine.

SUGGESTIONS

PLEASE, FEEL COMPLETELY FREE TO SEND US SUGGESTIONS THAT MIGHT IMPROVE THE QUALITY OF THE BULLETIN

hedibert.lopes@gsb.uchicago.edu

THE 2004 DEGROOT PRIZE

by Stephen Fienberg
fienberg@stat.cmu.edu

The DeGroot Prize is awarded to the author or authors of a published book in Statistical Science. The Prize is named for Morris ("Morrie") H DeGroot, and recognizes the impact and importance of his work in Statistics and Decision Theory, and his marked influence on the evolution of the discipline over several decades through his personal scholarship, educational and professional leadership. The prize in particular recognizes DeGroot's authorship and editorship of major books that had marked impact on the development of the field and the value he placed on the role of books generally. Award winning books will be textbooks or monographs concerned with fundamental issues of statistical inference, decision theory and/or statistical applications, and will be chosen based on their novelty, thoroughness, timeliness, and importance of their intellectual scope.

The Prize, awarded every second year, is administered by the International Society for Bayesian Analysis and consists of $1500 and a plaque. The first Prize was awarded in 2002 to Robert G. Cowell, A. Philip Dawid, Steffen Lauritzen, and David J. Spiegelhalter (1999). *Probabilistic Networks and Expert Systems.* Springer-Verlag, New York.

Nominations for the 2004 award must be received by December 31, 2003. Only books published during the 5 year period ending December 31, 2002 are eligible for consideration for the prize this year. There is no restriction on publisher or country of publication. Books authored or co-authored by members of the selection committee are ineligible for consideration. The winner of the 2004 DeGroot Prize will be announced at the ISBA International Meeting in Chile in May 2004.

Letters of nomination should be submitted electronically to the chair of the selection committee, *Professor Stephen E. Fienberg, Carnegie Mellon University,* at fienberg@stat.cmu.edu. Nominations should include the name of the author(s) and the book, the date of publication, and a very brief 1-2 sentence supporting statement. If the book does not include any biographical information on the author(s), then a brief 1-paragraph biographical statement for each author would be helpful.

Copies of the nomination letter and the book should be sent directly to each of the committee members. A full list of the committee members and their addresses appear at the end of this announcement.

Morris ("Morrie") H. DeGroot

Morris ("Morrie") H. DeGroot was born on June 8, 1931 in Scranton,Pennsylvania. He graduated from Roosevelt University in mathematics,and then studied statistics at the University of Chicago. He came to Carnegie Mellon in 1957 and was appointed founding Head of the Department of Statistics in 1966. Morrie spent the rest of his career as a member of the department. He died on November 2, 1989.

Morrie led an unusually active and productive academic life. He wrote three books, edited four volumes (three as a member of the Valencia Meeting organizing committee), and authored over one hundred papers. He served as Theory and Methods Editor of the Journal of the American Statistical Association, and was the recipient of several awards. But Morrie's influence in statistics went far beyond what any list of accomplishments and recognitions might indicate.

All who came in contact with Morrie were affected not only by his wisdom and the force of his arguments, but also by his diligence, thoroughness, integrity and good humor. His quick wit could equally well deliver an illuminating insight or a well-timed joke. He was greatly admired and respected within the profession, and many who worked with him or studied under his guidance were inspired by his ingenious, imaginative, persistent and passionate intellect.

Morrie's first book, *Optimal Statistical Decisions*, helped educate a generation of statisticians and is one of the great books in the field. Published in 1970 and subsequently translated into both Russian and Polish, it provided an elegant and comprehensive treatment of a subject that has since come to be recognized as an essential part of statistics and of science as a whole. In 1975, his undergraduate text, *Probability and Statistics*, was published. A model of what a textbook should be, it played an important role in mathematical statistics curricula throughout the country. These books served as the inspiration for the creation of the DeGroot Prize.

The 2004 DeGroot Prize Selection Committee

Professor Stephen E. Fienberg
Laboratoire de Statistique, CREST
Timbre J340, INSEE
75675 Paris cedex 14
FRANCE

Professor Kathryn Chaloner
Department of Biostatistics C22 GH
The University of Iowa
College of Public Health
200 Hawkins Drive
Iowa City IA 52242
USA

Professor Edward I. George
The Wharton School
Statistics Department, 446 JMHH
3730 Walnut Street
Philadelphia, PA 19104-6340
USA

Professor Steffen L. Lauritzen
Department of Mathematical Sciences
Aalborg University
Fredrik Bajers Vej 7G
DK-9220 Aalborg
Denmark

Professor Sylvia Richardson
Department of Epidemiology and Public Health
Imperial School of Medicine
St. Mary's Campus
Norfolk Place, London W2 1PG
UK

BAYESIAN STATISTICS IN THE ATMOSPHERIC SCIENCES

by Christopher K. Wikle
wikle@stat.missouri.edu

The earth-atmosphere system is complicated, replete with non-linear spatio-temporal interactions of many state processes, non-stationary forcings, and large, but incomplete, data sets. Although by no means complete or without controversy, the scientific basis for the study of these systems is relatively mature, based on well-known physical laws governing fluid flow. Nevertheless, there is still substantial uncertainty regarding how processes interact and how different scales interact within processes. Furthermore, there are sampling, change of resolution, and measurement error issues related to the various observational platforms that make up the atmosphere observing system.

Given the prevalence of uncertainty in the earth-atmosphere system, it is not surprising that Bayesian approaches can be very beneficial. However, it might be a bit surprising that Bayesian ideas, although not new to this discipline, are not particularly prevalent. A survey of the American Meteorological Society journals (some of the most prominent in the field) finds that there have only been 58 articles published in the last 50 years that have the word "Bayes" or "Bayesian" in the title or abstract! Not surprisingly, most of these have been published over the last ten years or so. One of the early advocates of Bayesian methods in atmospheric science was Edward Epstein, who was considering Bayesian approaches for decision making in applied meteorology in the early 1960's.

Historically, one of the areas of atmospheric science that featured interactions between statisticians and meteorologists was in the area of weather modification research. That is, investigations into whether activities such as cloud seeding significantly affect precipitation. Indeed, there were several papers written in the early 1970s in this area that featured Bayesian ideas, led in part by Joanne Simpson, Anthony Olsen and colleagues. However, federal funding of weather modification research wained about that time and so did the potential to influence the larger meteorological community concerning Bayesian analysis. One consequence of this work was the use of Bayesian probabilistic ideas in the assessment of forecast accuracy as championed by the late Allan Murphy. Many of these ideas, particularly those related to skill scores, crossed back into the general statistics literature. Although there were sporadic uses of Bayesian ideas elsewhere, it was not until Epstein's (1985) monograph that there was a definitive general discussion of Bayesian issues specifically related to meteorology and climatology. However, for practical reasons related to the complexity of the science and data sets, the larger community of meteorologists did not adopt these ideas.

As with most scientific disciplines, an increase in the use of Bayesian methods in atmospheric science was preceded by the popularization of MCMC approaches. Thus, in the last 10-15 years, there have been several specialties in this discipline that have adopted the Bayesian paradigm, at least in principle. The two foremost have been climate change detection/attribution and data assimilation.

The study of climate change is necessarily a study of uncertainty, for the reasons mentioned above regarding the complexity of the climate system and data, as well as the uncertainty related to the (largely) deterministic climate models used to carry out "experiments" related to possible anthro-

pogenic forcings (i.e.,the climate response to the introduction of increasing amounts of CO_2). In fact, the most recent report by the Intergovernmental Panel on Climate Change (IPCC) specifically mentions the need to account for the various uncertainties before concrete public policy recommendations can be put forth. Starting in the late 1980's with a paper by Andrew Solow, there has been increasing interest in the Bayesian approach to the problem of climate change detection and attribution. Recent papers by Stephen Leroy, Mark Berliner, Richard Levine and others have discussed comprehensive Bayesian strategies to address the uncertainty issues associated with assessing climate change and associated impacts. Indeed, several groups are currently working on this problem.

The data assimilation problem in meteorology (and oceanography) seeks to combine the relatively sparse observations of the atmospheric (oceanic) state with deterministic dynamical models that follow the laws of fluid behavior. The assimilated fields are developed primarily to be used as initial conditions for the deterministic forecast models that are used operationally by the world's major weather forecast centers. Kriging methods have long been used to produce these "optimal interpolations". (In fact, "kriging" was independently developed by Gandin in the 1960's to solve this assimilation problem). As the need for better initializations increased, more complicated variational and Kalman filter approaches to the assimilation problem were adopted. Given the sensitivity of the nonlinear deterministic forecasts to initial conditions, in recent years the forecast community has started to address the need to explicitly account for the this source of uncertainty. The primary approach to deal with this is through the use of "ensemble forecasts". That is, one simply runs the deterministic forecast model several times, with different initial conditions.

It was noted by Lorenc in the mid 1980s that the standard assimilation approaches could all be written in terms of a Bayesian framework. In that regard, the monograph on probabilistic inverse theory by Albert Tarantola in 1987 has made a substantial impact on the assimilation community. Not surprisingly, it has recently been recognized as well that sequential Monte Carlo methods could be used to produce ensemble forecasts (through the use of "ensemble particle filters" for example). These methods, championed to a large degree by the Geir Evensen, essentially utilize importance sampling algorithms. Given the extreme high-dimensionality of the state vectors in these systems, significant effort has gone into designing efficient computational procedures and covariance parameterizations. This is a very active area of research today. Furthermore, the academic statistical approach to these sequential Monte Carlo problems is benefiting from the experience and development of the application-oriented approaches considered in data assimilation.

Two of the fundamental problems with the traditional approach for combining deterministic models and data (e.g., assimilation as mentioned above) have been the difficulty in specifying realistic space-time covariance structures and the difficulty in accounting for model error. Thus, there has been increasing interest in combining physical knowledge with observations from a hierarchical perspective in problems related to the atmosphere and ocean. The foundation for this work was formulated by Mark Berliner during his tenure as the director of the Geophysical Statistics Project at the National Center for Atmospheric Research. The essence of this approach is that one can use physically-based priors and less-complicated spatio-temporal dependence structures in conditional specifications within the hierarchical framework. These ideas have been applied successfully to the long-lead forecast of Pacific sea surface temperature (i.e., El Niño), the prediction of high-resolution winds over oceanic areas, and the coupling of atmospheric and oceanic systems.

Scientists are now beginning to utilize Bayesian approaches in the analysis of climate data and short-term forecasting as well. For example, James Elsner and colleagues are using Bayesian analysis to study the climate of U.S. hurricanes. Bruno Sansó and colleagues have used hierarchical Bayesian models to understand climatological features of precipitation. Other groups are analyzing the climatological spatio-temporal behavior of tornado counts and their relationship to large-scale climate features. In this respect, the ideas championed by Epstein 40 years ago are now being implemented in the climatological analysis of very complicated atmospheric phenomena. Given the importance of atmospheric processes to the personal and economic aspects of society, and the inherent uncertainties in our understanding and measurement of these processes, the future for Bayesian analysis in the atmospheric sciences is very bright indeed.

Selected References:

Berliner, L., Royle, J., Wikle, C., and R.Milliff, 1999: Bayesian Methods in the Atmospheric Sciences. *Bayesian Statistics 6*, Oxford University Press, 83-100.

Berliner, L., Levine, R., and D. Shea, 2000: Bayesian climate change assessment. *Journal of Climate*, **13**, 3805-3820.

Berliner, L., Wikle, C., and N. Cressie, 2000: Long-lead prediction of Pacific SSTs via Bayesian Dynamic Modeling. *Journal of Climate*, **13**, 3953-3968.

Elsner, J. and B. Bossak, 2001: Bayesian analysis of U.S. Hurricane Climate. *Journal of Climate*, **14**, 4341-4350.

Epstein, 1962: A Bayesian approach to decision making in Applied Meteorology. *Journal of Applied Meteorology*, **1**, 169-177.

Epstein, 1985: *Statistical Inference and Prediction in Climatology: A Bayesian Approach*, Meteorological Monographs, **42**, American Meteorological Society.

Evensen, 2002: Sequential data assimilation for nonlinear dynamics: The ensemble Kalman filter. In *Ocean Forecasting: Conceptual basis and applications*, eds. N. Pinardi and J.D. Woods, Springer-Verlag, Berlin, 2002.

Leroy, S., 1998: Detecting climate signals: Some Bayesian aspects. *Journal of Climate*, **11**, 640-651.

Lorenc, A.C., 1986: Analysis methods for numerical weather prediction. *Quarterly Journal of the Royal Meteorological Society*, **112**, 1177-1194.

Sansó, B. and L. Guenni, 1999: Venezuelan rainfall data analyzed using a Bayesian space-time model. *Applied Statistics*, **48**, 345-362.

Simpson, J. Woodley, W., Olsen, A., and J.Eden, 1973: Bayesian statistics applied to dynamic modification experiments on Florida cumulus clouds. *Journal of the Atmospheric Sciences*, **30**, 1178-1190.

Wikle, C., Milliff, R., Nychka, D., and L.Berliner, 2001: Spatiotemporal hierarchical Bayesian modeling: Tropical ocean surface winds, *Journal of the American Statistical Association*, **96**, 382-397.

NEWS FROM THE WORLD

by Gabriel Huerta
ghuerta@stat.unm.edu

IX Latin American Congress on Probability and Mathematical Statistics, *Punta del Este, Uruguay, March 22-26, 2004*

The Latin American Region of the Bernoulli Society and the Universidad de la Republica (Montevideo, Uruguay) are pleased to announce the IX CLAPEM, to be held in Punta del Este, Uruguay. Planned academic activities include short courses, invited speakers, contributed talks and contributed posters.

The conference will take place in the Hotel San Rafael in Punta del Este. A conference package that includes room and breakfast for conference participants has been arranged. See the hotel website at `http://www.hotelsanrafael.com.uy`

You can find out more information about the IX CLAPEM from the website at http://imerl.fing.edu.uy/clapem or e-mail to the local committee Andrea Rivero, Secretary (`arivero@fing.edu.uy`) or Ernesto Mordecki, Chairman (`mordecki@cmat.edu.uy`)

ISBA/SBSS ARCHIVE FOR ABSTRACTS

All authors of statistics papers and speakers giving conference presentations with substantial Bayesian content should consider submitting an abstract of the paper or talk to the ISBA/SBSS Bayesian Abstract Archive. Links to e-prints are encouraged. To submit an abstract, or to search existing abstracts by author, title, or keywords, follow the instructions at the abstract's web site,

`www.isds.duke.edu/isba-sbss/`

NETWORK SAMPLING

by Mosuk Chow and Steven Thompson
mchow@stat.psu.edu and skt@stat.psu.edu

Social network data include measurements on the relationships between people or other social entities as well as measurements on entities themselves. Collecting network data on entire networks requires a great deal of time and effort, especially when networks are large. It is thus important to be able to estimate network properties from samples. In link-tracing designs, social links are followed from one respondent to another to obtain the sample. For hidden and hard-to-access human populations, such sampling designs are often the only practical way to obtain a sample large enough for an effective study. Inferences from the sample to the population can be affected by the link-tracing designs. There is a large literature on network sampling, both applied and theoretical. Recently, there has been increasing interest in using Bayesian approach to network sampling.

Network Sampling: general approach

• Erickson, B. (1978). Some problems of inference from chain data. In Schuessler, K.F. (ed.), *Sociological Methodology.* 1979, pages 276-302. San Francisco: Jossey-Bass.

This paper reviews snowball sampling designs with the goal of understanding how other "chain methods" can be used in practice.

• Frank, O. (1971). *Statistical Inference in Graphs*. Stockholm: Försvarets forskningsanstalt.

This classic book presents basic solutions for estimating graph quantities from the sample data.

• Frank, O and Strauss, D. (1986). Markov graphs. *Journal of American Statistical Association.* 81, 832-842.

In this paper, log-linear statistical models are used to characterize random graphs with general dependence structure and with Markov dependence. The inference methodology for some simple Markov graphs are discussed.

• Frank, O., and Harary, F. (1982). Cluster inference by using transitivity indices in empirical graphs. *Journal of American Statistical Association.* 77, 835-840.

Some stochastic settings models, such as the transitive graph models, have been proposed in this paper. Various properties of the stochastic blockmodel have been studied by this paper.

• Frank, O., and Snijders, T. (1994). Estimating the size of hidden populations using snowball sampling. *Journal of Official Statistics.* 10, 53-67.

In this paper, the authors consider model- and design-based estimation of a hidden population size, that is, the number of nodes in the graph, based on snowball samples.

• Goodman, L.A. (1961). Snowball sampling. *Annals of Mathematical Statistics.* 20, 572-579.

Snowball sampling, one type of link-tracing sampling design in which individuals in an initial sample were asked to identify acquaintances, who in turn were asked to identify acquaintances, and so on for a fixed number of stages or waves was first termed in this paper.

• Holland, P.W. and Leinhardt, S. (1981). An exponential family of probability distributions for directed graphs. *Journal of the American Statistical Association*. 76, 33-65.

The authors describe an exponential family of distributions that can be used for analyzing directed graph data.

• Spreen, M. and Zwaagstra, R. (1994). Personal network sampling, outdegree analysis and multilevel analysis: introducing the network concept in studies of hidden population. *International Sociology*. 9, 475-491.

In this article a practical approach to these populations is described that can be used simultaneously not only as a tool for locating a reasonable number of members of a hidden population but also as a tool for analysing aspects of network structure. This approach is illustrated by data from a cocaine users project in the Dutch city of Rotterdam.

• Thompson, S.K. and Collins, L.M. (2001). Adaptive sampling in research on risk-related behaviors *Drug and Alcohol Dependence.* 68, S57-S67.

Adaptive sampling, which can be formulated in the graph setting as well as the spatial setting, is described in this paper on risk-related behaviors.

• Thompson, S.K., and Frank, O. (2000). Model-based estimation with link-tracing sampling designs. *Survey Methodology*. 26, 87-98.

The authors use a model-based approach to inference with link-tracing designs. In their paper, maximum likelihood estimators of population graph parameters and predictors of realized population graph quantities were described and compared to conventional estimates or data summary statistics.

• Wasserman, S. and K. Faust (1994). Social Network Analysis: Methods and Applications. Cambridge: Cambridge University Press.

This book provides comprehensive reviews and discussion of methods for the analysis of social networks with a focus on application of these methods to many substantive examples.

Network Sampling with a Bayesian approach

• Chow, M. and Thompson, S. K.(to appear). Estimation with Link-Tracing Sampling Design- A Bayesian Approach. *Survey Methodology*.

The authors use a Bayesian approach for the estimation and prediction problems when the population with its social network structure is modeled as a stochastic graph with a joint distribution of node values representing characteristics of individuals and arc indicators representing social relationships between individuals.

• Hoff, P.D., Raftery, A.E., and Handcock, M.S. (2002). Latent space approaches to social network analysis. *Journal of the American Statistical Association*. 97, 1090-1098.

The authors develop a class of models where the probability of a relation between actors depends on the positions of individuals in an unobserved "social space". They make inference for the social space within maximum likelihood and Bayesian frameworks, and propose Markov chain Monte Carlo procedures for making inference on latent positions and the effects of observed covariates.

• Nowicki, K. and Snijders, T.A.B. (2001). Estimation and prediction for stochastic block-structures. *Journal of the American Statistical Association*. 96, 1077-1087.

The authors propose a statistical approach to a posteriori blockmodeling for digraphs and valued digraphs. The probability model assumes that the vertices of the digraph are partitioned into serveral unobserved classes and that the probability distribution of the relation between two vertices depends only on the classes to which they belong. A Bayesian estimator based on Gibbs sampling is proposed in the paper.

• Snijders, T.A.B. and Nowicki, K. (1997). Estimation and prediction for stochastic blockmodels for graphs with latent block structure. *Journal of Classification*. 14, 75-100.

The authors propose various statistical approaches, including a Bayesian approach, for estimation and prediction with stochastic blockmodels for graphs with latent block structure.

• Wong, G.Y. (1987). Bayesian models for directed graphs. *Journal of the American Statistical Association*. 82, 140-148.

The author considers the p_1 model proposed by Holland and Leinhardt (1981) for analyzing digraphs that arise in studies of networks. In this paper, a Bayesian approach, using an exchangeable normal prior on the parameters representing the attractiveness and expansiveness characteristics of the nodes, is proposed.

• Zacks, S. (1969). Bayes sequential designs of fixed size samples from finite populations. *Journal of the American Statistical Association*. 64, 1342–1349.

The author considers the problem of choosing a sample of fixed size from a finite population in the framework of Bayes designs. The conjectured non-randomized character of Bayes designs is verified. Bayes designs are shown to be without replacement selections, which are generally sequential ones. Sufficient conditions are provided for the optimality of single-phase designs.

Empirical Study and Data

• Bernard, H., Killworth, P., and Sailer, L. (1980). Informant accuracy in social network data IV. *Social Networks 2*, 191-218.

The authors study the interaction among 58 students living in a fraternity at a West Virginia college for at least 3 months.

• Neaigus, A., Friedman, S.R., Jose, B., Goldstein, M.F., Curtis, R., Ildefonso, G., and Des Jarlais, D.C. (1996). High-risk personal networks and syringe sharing as risk factors for HIV infection among new drug injectors. *Journal of Acquired Immune Deficiency Syndromes and Human Retrovirology* 11, 499-509.

The authors describe a study of injection drug use in relation to the spread of the HIV infection. In the study, social leads from initial respondents may be traced and the linked individual added to the sample.

• Potterat, J. J., Woodhouse, D. E., Rothenberg, R. B., Muth, S. Q., Darrow, W. W., Muth, J. B. and Reynolds, J. U. (1993). AIDS in Colorado Springs: Is there an epidemic? *AIDS* 7, 1517-1521.

The authors analyze trends and patterns of HIV infection in a medium-sized community in the United States. In the study, HIV-positive individuals were contacted and asked to refer their sex and injection partners for HIV-antibody testing. Prostitutes, injecting drug users and their sex partners were studied.

WinBUGS Development Interface (WBDev)

by Dave Lunn
d.lunn@imperial.ac.uk

Version 1.4 of WinBUGS was released in January 2003 and contains some major new features, in particular the long-awaited scripting facility, which allows the software to be run in 'batch-mode' and, also, to be called remotely from within other packages. The software can be downloaded from `http://www.mrc-bsu.cam.ac.uk/bugs/` (currently, new registrations are coming in at a rate of around 500 per month). However, this is intended to be the last major release of WinBUGS (in its current packaged, stand-alone form) for some time. Development work is now focused instead in two main areas: (i) decoupling and documenting of core components to make them more accessible/deployable from within other software/programming environments, e.g. R (Ihaka and Gentleman, 1996, R: A language for data analysis and graphics. *Journal of Computational and Graphical Statistics*, 5, 299-314); and (ii) peripheral extensions such as specialized interfaces for complex models. We believe that the peripheral areas of the software's source code have now reached a point where they can be considered more or less static; that is, we do not envisage any significant changes to 'top-level' components over the coming years. Hence, we are now at a stage where we can *safely* allow users of the software access to those peripheral areas of code. The idea is to empower the user to facilitate and/or expedite their own research by implementing specialized labour- and/or computation-saving devices. Some of these new software components will undoubtedly be of use to other WinBUGS users working in similar areas. By encouraging new authors to share their work across the user-community we hope to foster within that community a desire to contribute to (and eventually take responsibility for) the overall evolution of the software.

The release of the *WinBUGS Development Interface* (WBDev) represents our first step towards establishing a community of contributors to the software. The interface is designed to allow restricted access to areas of the WinBUGS source that have been used for defining elements of the BUGS language, i.e. the various distributions and functions that are available for specifying statistical models. Hence, users may implement their own specialized functions and distributions, 'hard-wiring' them into the WinBUGS framework via compiled Pascal code. There are three main advantages to doing this: first, function evaluations associated with 'hard-wired' components can be computed much more quickly than with their BUGS-language counterparts; second, the full flexibility of a general-purpose computer language is available for specifying each new component, and so piecewise functions, for example, can be specified straightforwardly whereas their specification via the BUGS language (using the `step(.)` function) can be somewhat awkward; finally, the practice of hiding the details of complex entities within 'hard-wired' components can lead to vastly simplified WinBUGS code for the required statistical model, which reduces the likelihood of coding errors occurring and is easier both to read and to modify.

As mentioned above, access to the source code is currently restricted. Most importantly, this has allowed us to hide, from the budding WinBUGS developer, much of the complex detail that is required in order to implement any new distributions or functions; thus the implementation process is, we believe, as simple as it could possibly be for the user. Also, restricted access makes the project more manageable and allows us time to gauge the amount of effort/documentation that might be required to get people writing even more ambitious extensions to the software, such as new MCMC samplers, or specialized user-interfaces for model specification and/or graphical diagnostics. Depending on the success of these initiatives, we plan, eventually, to release a full version of WinBUGS as 'open-source'.

A copy of WBDev can be obtained by following relevant links from the WinBUGS Development home-page:

`http://homepages.tesco.net/~creeping_death/`

At the time of writing this article, the interface supports the implementation of new functions only, but the facility to incorporate new distributions into the BUGS language should be available very soon. A set of 'shared components' can also be downloaded from the above web-site; these are new distributions and functions that have been written by WinBUGS users, using WBDev, and then submitted for public release. *ISBA Bulletin* readers are invited to visit the WBDev web-site and have a go at writing their own WinBUGS functions and distributions – any feedback and/or suggestions would be very welcome! (Note that the interface comes with its own step-by-step, tutorial-style documentation.)

This is our first step towards opening up the WinBUGS software to the user community; the success of this venture and, ultimately, the long-term survival of the software will depend very much on the active participation of the software's users.

ISBA
INTERNATIONAL SOCIETY FOR BAYESIAN ANALYSIS

Executive Committee

President: Ed George
Past President: David Draper
President Elect: Jim Berger
Treasurer: Peter Müller
Executive Secretary:
Cindy L. Christiansen

Program Council

Chair: Alan Gelfand
Vice Chair: José Bernardo
Past Chair: Luis Pericchi
Web page: *www.bayesian.org*

Board Members

Nicky Best, Michael Goldstein, Eduardo Gutiérrez-Peña, Pilar Iglesias, Jun Liu, Anthony O'Hagan, Sonia Petrone, Raquel Prado, Christian Robert, Fabrizio Ruggeri, Marina Vannucci, Robert Wolpert

EDITORIAL BOARD

Editor

Hedibert Lopes <hedibert.lopes@gsb.uchicago.edu>

Associate Editors

Annotated Bibliography
Duncan Fong <i2v@psu.edu>

Applications
Bruno Sansó <bruno@ams.ucsc.edu>

Interviews
Brunero Liseo<brunero.liseo@uniroma1.it>

News from the World
Gabriel Huerta < ghuerta@stat.unm.edu>

Software Review
Viridiana Lourdes <vlourdes@itam.mx>

Student's Corner
Lilla Di Scala <lilla@dimat.unipv.it>
Luca La Rocca <luca@dimat.unipv.it>

Bayesian History
Sérgio Weschler <sw@ime.usp.br>