

NEWS AND NOTICES

Readers are invited to submit to the Treasurer of the Institute items of interest

Personal Items

Dr. A. K. Md. Ehsanes Saleh, formerly Assistant Professor at the Carleton University in Ottawa, has been appointed Associate Professor of Statistics in the Department of Mathematics at Simon Fraser University, B. C. He has recently been elected Fellow of the Royal Statistical Society.

Professor J. Stuart Hunter of Princeton University is a Visiting Professor for the academic year of 1967-1968 and holds the position of statistician-in-residence.

Professor Henry R. Neave, from the University of Nottingham, England, is now affiliated with the University of Wisconsin Computing Center.

Professor Madan L. Puri of the Courant Institute of Mathematical Sciences, New York University, was a Visiting Associate Professor at the University of North Carolina at Chapel Hill during the summer of 1967.

Professor Joseph Putter, formerly of the Volcani Institute of Agricultural Research, Israel, now holds a joint appointment with the Wisconsin Graduate School and the Department of Agricultural Genetics, University of Wisconsin.

Professor Stephen M. Stigler, formerly of the University of California, Berkeley is now at the University of Wisconsin.

Professor Grace G. Wahba, formerly of Stanford University, is now at the University of Wisconsin.

NEW MEMBERS

Agrawal, Hanuman D., M.B.A., (City College of New York); Senior Statistician, Quantum Science Corporation, New York.

Ahmad, Munir, M.A., (Panjar University, Pakistan); Graduate Student, Iowa State University.

Archer, Claude O., M.S., (University of Oregon); Mathematician, U.S. Naval Missile Center, Point Magu, California.

Berger, Paul D. S.M., (Massachusetts Institute Technology); Massachusetts Institute Technology, Cambridge, Massachusetts.

Bloch, Daniel A., Ph.D., (The Johns Hopkins University); Research Associate, Cornell Biomathematics Department, Cornell University Graduate School of Medical Sciences.

Borch, Karl H., Ph.D., (Oslo University); Professor, Norwegian School of Economics and Business Administration, Bergen, Norway.

Burdock, Eugene I., Ph.D., (University of California, Los Angeles); Research Professor, Department of Psychiatry & Neurology, New York.

Burger, Donald Fleit, B.A., (University of Florida); Graduate Student, Department of Statistics, University of Minnesota.

- Butler, Anthony D.**, B.Sc., (University of Leicester); Research Student, Department of Statistics, University of Kent, Canterbury, England.
- Chen, Shun-Zer**, M.S., (Purdue University); Ph.D. Candidate, Department of Statistics, Purdue University.
- Van Dalen, Jan Chr.**; Student, Rykslandbouwschool, Deventer, Holland.
- Dutta, Kalyan**, M.S., (University of Calcutta); Ph.D. Candidate, Department of Statistics, University of North Carolina.
- Eyster, Janet Tolson**, M.S., (Michigan State University); Graduate Student, Michigan State University.
- Flueck, John A.**, Ph.D., (University of Chicago); Research Associate, Department of Geophysical Sciences, University of Chicago.
- Gaenssler, Peter E.**, Ph.D., (University of Heidelberg); Assistant Professor, Institute of Mathematical Statistics, University of Colobne, Koeln-Lindenthal, Germany.
- Galambos, Janos**, Ph.D., (L. Eotvos University, Budapest); Lecturer, Department of Mathematics, University of Ghana.
- Ghosh, Malay**, M.A., (University of Calcutta); Graduate Student, Department of Statistics, University of North Carolina.
- Goldstein, Jerome A.**, Ph.D., (Carnegie Institute of Technology); Member, The Institute for Advanced Study, Princeton, New Jersey.
- Gupta, Rajendra Prasad**, Ph.D., (University of Delhi, India); Assistant Professor, University of Florida.
- Hammood, Abdul W.**, M.A., (University of North Carolina); Research Assistant, Department of Statistics, Case Western Reserve University.
- Hanson, Morgan A.**, Ph.D., (University of New South Wales); Associate Professor, Queen's University, Kingston, Ontario, Canada.
- Heft, Samuel M.**, B.S., (Rensselaer Polytechnic Institute); Student, University of North Carolina, Chapel Hill, North Carolina.
- Hertz, Robert W.**, B.S., (Purdue University); Mathematician, Xerox Corporation, Rochester, New York.
- Higginson, John A.**, Ph.D., (Dartmouth College); Assistant Professor, Mathematics Department, Queen's University, Kingston, Ontario, Canada.
- Hoffman, Howard J.**, B.S., (Stanford University); Graduate Student, Department of Statistics, Princeton University.
- Kapadia, Asha Seth**, S.M., (Massachusetts Institute of Technology); Graduate Student, Harvard University, Cambridge, Massachusetts.
- Karcher, Robert H.**, B.A., (Western Reserve University); Project Scientist, Holmes & Narver, Inc., Los Angeles, California.
- Kimeldorf, George S.**, Ph.D., (University of Michigan); Visiting Assistant Professor, Mathematics Research Center, U. S. Army, University of Wisconsin.
- Krengel, Ulrich**, Ph.D., (University of Goehingen); Dozent, Department of Mathematics, University of Erlangen, Germany.
- Kuretz, Christopher A.**, B.S., (Manhattan College); Graduate Student, Department of Experimental Statistics, North Carolina State University.

- MacDonald, Peter D. M.**, M.Sc., (University of Toronto); Student, Department of Biomathematics, University of Oxford, Oxford, England.
- Makowski, Gary G.**, M.S., (University of Iowa); NDEA Fellow in Statistics, University of Iowa.
- McCabe, George P. Jr.**, B.S., (Providence College); Graduate Student, Department of Mathematical Statistics, Columbia University, New York.
- McGill, James T.**, B.S., B.A., (Oregon State University); Student, Stanford University.
- Pagano, Marcello**, M.S., (University of Florida); Graduate Student, Department of Statistics, The Johns Hopkins University, Baltimore, Maryland.
- Resnick, Sidney I.**, M.S., (Purdue University); Graduate Student, Department of Statistics, Purdue University.
- Scheld, Karl A.**, Ph.D., (State University of Iowa); Assistant Vice President, Federal Reserve Bank of Chicago, Chicago, Illinois.
- Schlesselman, James J.**, M.A., (Princeton University); Graduate Student, Department of Statistics, Princeton University.
- Smith, Furman H.**, M.A., (University of Alabama); Student, Florida State University.
- Srivastava, Shyamji**, M.Sc., (Patna University, India); Graduate Assistant, Department of Probability and Statistics, Michigan State University.
- Sukhatme, Balkrishna Vasudeo**, Ph.D., (University of California, Berkeley); Associate Professor, Department of Statistics, Iowa State University.
- Toms, William E.**, M.S., (Cornell University); Ph.D. Candidate, School of Electrical Engineering, Cornell University.
- Trout, Richard J.**, M.S., (Rutgers—The State University); Graduate Student, Rutgers—The State University.
- Yeale, James R.**, M.S., (Iowa State University); Graduate Student, Department of Statistics, Iowa State University.
- Vedula, Narayana Murty**, M.A., (Andhra University, Waltair, India); Graduate Research Instructor, Department of Statistics, Purdue University.
- Vervaat, Wim**, Ph.D., (University of Amsterdam); Professor, Instituut Voor Toepassingen van de wiskunde, University of Amsterdam, The Netherlands.
- Walker, Jeffrey**, M.Sc., (London University); Head of Operational Research, Courtaulds Ltd., Warwickshire, England.
- Warner, James E.**, M.S., (Case Institute of Technology); Graduate Student, Case Western Reserve University, Cleveland, Ohio.
- Watson, Toshiko Tanaka**, B.A., (Drew University); Graduate Assistant, Rutgers—The State University.
- Weed, Harrison D., Jr.**, M.S., (Florida State University); Graduate Student, Florida State University Tallahassee, Florida.
- Williams, George W.**, B.S., (Bucknell University); Student, Bucknell University, Lewisburg, Pa.
- Wittke, Paul H.**, Ph.D., (Queen's University); Associate Professor, Department of Electrical Engineering, Queen's University, Kingston, Ontario, Canada.

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**COMBINATORIAL MATHEMATICS AND ITS APPLICATIONS YEAR
 UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL**

The Department of Statistics of the University of North Carolina at Chapel Hill will hold a Combinatorial Mathematics and Its Applications Year from February 1, 1969 to May 31, 1970 for the purpose of stimulating research in the area of combinatorial mathematics and its applications. Several distinguished combinatorial mathematicians have been invited to spend a semester in residence during this period. A series of lectures, colloquia and conferences on combinatorial mathematics and its applications will also be held throughout the year. Some of the areas of concentration will be the Design of Experiments, Coding Theory and Combinatorial Problems in Information Theory, Graphy Theory and Finite Geometries.

Researchers and others interested in combinatorial mathematics and its applications, including persons on sabbatical or research leave and advanced graduate students, are invited to participate in this program for either all or part of the eighteen-month period. A limited number of stipends will be available for this purpose. All inquiries should be directed to the Chairman, Department of Statistics, University of North Carolina, Chapel Hill, N.C. 27514.

MINUTES OF THE 1967 COUNCIL MEETING

The meeting was called to order by Professor T. E. Harris, President at 7:30 p.m. on 27 December 1967, in the Board Room of The Shoreham Hotel, Washington, D.C. The 1967 Council members are: T. W. Anderson, D. Blackwell, R. A. Bradley, J. Cornfield, W. Hoeffding, W. Kruskal, E. L. Lehmann, F. Mosteller, R. Pyke, C. R. Rao, J. W. Tukey and M. B. Wilk. Of these, Blackwell, Bradley, Hoeffding, Kruskal, Pyke and Tukey were present; proxies were H. Levene for Anderson, S. W. Greenhouse for Cornfield, E. L. Scott for Lehmann, R. Berk for

Mosteller and J. W. Tukey for Wilk. C. R. Rao was absent. Members of the Executive Committee present were: T. E. Harris, H. Chernoff, G. J. Resnikoff, J. R. Rosenblatt and P. Meyer; proxies were L. Katz for Nicholson and Z. W. Birnbaum for Burkholder. Other members of the Institute present at the Council meeting were B. Kurkjian and D. B. Owen; Nicholson appeared later.

President Harris opened the meeting and called for the minutes of the two Council meetings held in 1966 at Rutgers. Since these had been circulated to the Council members by mail and approved, the Council voted to accept the circulated versions.

The report of the editor was presented by Birnbaum and was approved as read. Birnbaum then presented a plan for a mathematical offprint service (MOS) devised by the American Mathematical Society and for which AMS requested our consideration and cooperation; after some discussion this proposal was tabled for action by the 1968 Council. Birnbaum presented a request from the publication "Current Contents" regarding inclusion of the contents of the *Annals*; he was authorized by the Council to continue discussions on this topic.

There was no report of the Executive Secretary. The report of the Treasurer was presented by Resnikoff and discussed. The report of the Program Secretary was presented by Rosenblatt and similarly discussed. Rosenblatt also presented the schedule of meetings for 1968 and a summary of Council actions governing the conduct of sessions for contributed papers.

Harris announced that the amendment to Article 3 of the constitution to add the Managing Editor to the list of officers was adopted in a ballot by mail; consequently, the Managing Editor is a member of the Executive Committee. Meyer presented the report of the Managing Editor and discussed ways and alternative means of handling publication of the *Annals*.

Owen presented the report of the Committee on Mathematical Tables. Motion by Tukey that Council approve the committee be authorized to negotiate in the name of IMS, with sponsorship by the committee rather than by IMS. Amendment by Levene to delete the words "the committee rather than" was approved and Tukey's motion passed as amended.

The report of the Committee on Fellows was presented by Bradley and accepted. The following individuals were then elected Fellows of the Institute by the Council: Y. S. Chow, D. B. Duncan, R. Farrell, W. T. Federer, T. S. Ferguson, D. Freedman, S. Geisser, R. Gnanadesikan, F. Graybill, M. Halperin, R. V. Hogg, K. Jacobs, H. Keston, J. Neveu, J. Pfanzagl, F. Proschan, R. F. Tate, G. B. Wetherill, and M. B. Wilk. It was suggested that the incoming Council might wish to recognize the contributions of Kolmogorov by an invitation to deliver a special paper at a future meeting.

S. Gupta presented the report of the Committee on the Visiting Lecturer program; motion that the Council authorize the Treasurer and Director to guarantee IMS support of this program with or without assistance by NSF was carried.

Pyke presented the report of the Committee on Individual Members, proposing an annual mailing addressed to potential individual members, with another mailing addressed to departments requesting they urge students to become mem-

bers of IMS. A note prepared by B. Epstein and included in a general mailing to members, urging them to request action on Institutional membership by their departments or firms produced six new members in this category; the committee has also prepared a list of firms to be approached directly by a mailing in the spring.

Harris reported for the Committee on Nominations that eight names were proposed by the committee and one by petition. It was noted that the names on the ballot used were in alphabetical order; it was decided that in future the Executive Secretary would perform a simple randomization to determine the order of presentation and state on the ballot that the (hopefully) scrambled list was arrived at in this way.

Harris announced that the individual members of the Committee on Nominations for 1968 had been invited but had not yet responded. Harris announced reports of five *ad hoc* committees, only one of which required action at this time.

The *ad hoc* committee on operations made three recommendations in its report dated 14 April 1967. Since the first of these recommendations had already been effectively compiled with, Birnbaum moved adoption of recommendations *B* and *C*. Carried.

Reports of the representatives of IMS to various committees were received and discussed. Harris' motion to continue membership in the Conference Board of the Mathematical Sciences was carried.

A number of items were discussed under old and new business; they are presented serially without temporal distinction.

1. Communication from D. Wallace stated that the book by Bechhofer, Kiefer and Sobel is in press.

2. Communication from I. Olkin asks whether IMS is issuing its own directory. He suggested proposals to ASA regarding improvements which might be effected in the present directory, and also suggested the possibility of an annual supplement in each year the joint directory is not published. An *ad hoc* committee will be appointed to investigate and make recommendations.

3. Communication requesting IMS support for a Mathematics Institute to be established in Colorado on the lines of the Institute at Oberwolfach led to no Council action; Harris will so notify the committee.

4. Communication from L. Cohen to E. Begle, transmitted by the latter, regarding a possible ISI meeting in 1971 in the U. S. was discussed; Harris will write Begle for further information.

5. A communication on requests by auditors for time and effort reporting by investigators on research contracts was referred to the 1968 Council.

6. Some dissatisfaction by European members with meetings held in the European region was reported by Harris. There appears to be some feeling that IMS rules place excessive restrictions on programs and local arrangements. Further, European members feel that the IMS is, in fact, a U. S. organization, and that this leads to difficulties in arranging attendance by eastern Europeans. No action was taken.

7. Herman Chernoff proposed a vote of thanks to George E. Nicholson, Jr.

for his many years of fine service to the Institute as Executive Secretary. Carried
The meeting was adjourned at approximately 11:30 p.m.

LEO KATZ
Executive Secretary

REPORT OF THE WASHINGTON D.C. MEETING OF THE INSTITUTE OF MATHEMATICAL STATISTICS

The one-hundred-sixteenth Meeting of the Institute of Mathematical Statistics and the thirtieth Annual Meeting was held at the Shoreham Hotel in Washington, D.C., on December 27–30, 1967 in conjunction with meetings of the American Statistical Association, the Biometric Society, ENAR and WNAR, and other Allied Societies.

The Wald Lectures were delivered by Wassily Hoeffding, University of North Carolina, on "Recent Results in Parametric Large Sample Theory". The Rietz Lecture was given by W. G. Cochran, Harvard University, on "Errors of Measurement in Statistics".

An all-time high of 128 contributed papers were presented. Approximately seven hundred members of the Institute registered for the meeting.

PROGRAM

Wednesday, December 27, 1967

8:30 a.m.–10:20 a.m.—Potential Theory, Random Walk, Renewal Theory

Chairman: R. GRIEGO, University of New Mexico

1. *Contributions of Potential Theory to the Theory of Markov Chains*, J. SNELL, Dartmouth College.
2. *Non-linear Renewal Theory*, P. NEY, University of Wisconsin.
3. *Generalized Random Processes*, M. RAO, Carnegie Institute of Technology.

8:30 a.m.–10:20 a.m.—Contributed Papers I

Chairman: J. CAMERON, National Bureau of Standards

1. *Analysis of One-way Classification Variance Components Model When the Design is Unbalanced*, T. JAYACHANDRAN, Naval Postgraduate School.
2. *Estimators of Components of Variance with Small Mean Errors*, J. KLOTZ and R. MILTON, University of Wisconsin.
3. *Balanced Optimal 2^m Fractional Factorial Designs of Resolution V, m ≤ 6*, J. SRIVASTAVA, Colorado State University, D. CHOPRA, Wichita State University.
4. *Some Results Concerning Stopping Rules (Preliminary Report)*, L. GLESER and S. ZACKS, Johns Hopkins University and Kansas State University.
5. *Existence of Optimal Stopping Rules for Rewards of the Form $c_n |S_n|^\alpha$ (Preliminary Report)*, P. FEDER and G. SIMONS, Stanford University.

10:30 a.m.–11:30 a.m.—Wald Lecture I

Chairman: J. NEYMAN, University of California, Berkeley

Recent Results in Parametric Large Sample Theory I: Likelihood Processes, W. Hoeffding, University of North Carolina.

11:35 a.m.—12:30 p.m.—Contributed Papers II

Chairman: G. WATSON, The Johns Hopkins University

1. *Some Probabilistic Models of Neuron Firing (Preliminary Report)*, R. COLEMAN and J. GASTWIRTH, The Johns Hopkins University.
2. *Quiz Show Problems*, J. KADANE, Yale University.
3. *Sum of Lifetimes in Age Dependent Branching Processes, (Preliminary Report)*, H. WEINER, University of California, Davis.
4. *An Old Approach to Finite Population Sampling Theory*, R. ROYALL, The Johns Hopkins University.
5. *On a Class of Non-Parametric Tests for Regression Parameters*, M. SRIVASTAVA, University of Toronto.

2:00 p.m.—3:50 p.m.—Applied Probability

Chairman: P. NEY, University of Wisconsin

1. *An Oscillating Random Walk*, J. H. B. KEMPERMAN, University of Rochester.
2. *Approximation Methods for Stochastic Differential Equations*, H. CONNOR, Rockefeller University.
3. *Limit Theorems for a General Linear Functional on a Markov Branching Process*, K. ATHREYA, Stanford University.

2:00 p.m.—3:50 p.m.—Contributed Papers III

Chairman: S. KULLBACK, George Washington University

1. *An Approximation to the Sample Size in a Selection Procedure of Bechhofer and Its Extension to Selection From a Multivariate Normal Population (Preliminary Report)*, E. DUDEWICZ, The University of Rochester.
2. *Bayesian Zero-Mean Uniform Discrimination*, S. GEISSER and M. DESU, State University of New York, Buffalo.
3. *Inference on Discrimination Coefficients*, S. DAS GUPTA, University of Minnesota.
4. *Likelihood Intervals, 1: Introduction, and the Binominal Case*, D. HUDSON, Bell Telephone Labs, Inc.
5. *Iteration to The Mean Preference of a Multi-Normal Population Based on Successive Electron Results*, M. HINICH, Carnegie-Mellon University.
6. *Multivariate Orthogonal Polynomials*, K. KRAMER, U. S. Steel Corporation.
7. *A Test for the Homogeneity of Variances in Regression Models*, W. NURI, University of Southwestern Louisiana.
8. *Minimization of the Eigenvalues of a Matrix and Optimality of Principal Components*, M. OKAMOTO and M. KANZAWA, Iowa State University and Osaka University.
9. *Unbiasedness of Some Test Criteria for the Equality of One or Two Covariance Matrices*, N. SUGIURA, University of North Carolina and H. NAGAO, Hiroshima University.
10. *Some Tests of Independence for Stationary Multivariate Time Series*, G. WAHBA, University of Wisconsin.

4:00 p.m.—5:20 p.m.—General Methodology Lecture (ASA, Bio. Soc., IMS)

Chairman: C. BENNETT, Battelle-Northwest

Sample Survey Methodology, H. HARTLEY, Texas A&M University.

7:30 p.m.—Meeting of 1967 IMS Council

Thursday, December 28, 1967

8:30 a.m.—10:20 a.m.—Sequential Theory

Chairman: J. R. BLUM, University of New Mexico

1. *Sequential Stopping Rules*, D. SIEGMUND, Stanford University.
2. *Fixed Precision Estimation in Time Series*, JUDAH ROSENBLATT, University of New Mexico.

8:30 a.m.—10:20 a.m.—Contributed Papers IV

Chairman: R. LUNDEGARD, Office of Naval Research

1. *Estimation Through Preliminary Test Estimators*, J. ARNOLD and S. KATTI, Florida State University.
2. *Some Asymptotic Results, Based on Censored Data, for the Maximum Likelihood Estimate and the Posterior Distribution of Parameters Subject to Constraints*, (Preliminary Report). A. BASU and J. BORWANKER, University of Wisconsin, University of Minnesota.
3. *Estimation of the Larger of Two Normal Means*, S. BLUMENTHAL and A. COHEN, New York University and Rutgers—The State University.
4. *The Estimation of the Probability that $Y < X$* , P. ENIS and S. GEISSER, State University of New York, Buffalo.
5. *Investigation of Rules for Dealing with Outliers in Small Samples From the Normal Distribution I: Estimation of the Mean*, I. GUTTMAN and D. SMITH, University of Wisconsin and HRB-Singer, Inc.
6. *On Pooling Means When Variance is Unknown*, C. HAN and T. BANCROFT, Iowa State University.
7. *Combination of Unbiased Estimators of the Mean Which Consider Inequality of Unknown Variances*, J. MEHTA and J. GURLAND, University of Wisconsin.
8. *On Unbiased Density Estimators Based on One Observation*, J. PUTTER, University of Wisconsin.

10:30 a.m.—11:30 a.m.—Wald Lecture II

Chairman: H. HOTELLING, University of North Carolina

Recent Results in Parametric Large Sample Theory II: Large-Deviation Theory of Statistical Tests, W. HOEFFDING, University of North Carolina.

11:35 a.m.—12:30 p.m.—Contributed Papers V

Chairman: M. HALPERIN, National Institutes of Health

1. *On Batch Service with Balking in the Single Server Queueing Process*, R. DICK, C. W. Post College.
2. *Two Queues in Series with a Finite, Intermediate Waitingroom*, M. NEUTS, Purdue University.
3. *Some New Results in Storage Theory*, N. PRABHU, Cornell University.
4. *More Support for a Conjecture*, S. SAMUELS, Purdue University.
5. *Comparison of Rao-Hartley-Cochran Estimate in Unequal Probability Sampling with Ratio Estimate and Its Application to Sampling on Successive Occasions*, B. SUKHATME and M. AVADHANI, Iowa State University and Indian Society of Agricultural Statistics, New Delhi, (Introduced by B. Kurkjian).

2:00 p.m.—3:50 p.m.—Probability, Weak Convergence

Chairman: L. KOOPMANS, University of New Mexico

1. *Basic Ideas of Weak Convergence*, P. BILLINGSLEY, University of Chicago.
2. *Construction of a.s. Convergent Sequences of Stochastic Processes*, R. PYKE, University of Washington.

2:00 p.m.—3:50 p.m.—Non Parametric Methods (ASA, IMS)

Chairman: M. BRYSON, Duke University

1. *Non Parametric Sequential Analysis*, I. R. SAVAGE, Yale University.
2. *Randomized Non Parametric Tests for Several Hypotheses*, C. BELL, Case Western Reserve University.

Discussion: R. BRADLEY, Florida State University.

2:00 p.m.—3:50 p.m.—Contributed Papers VI

Chairman: R. BARGMANN, University of Georgia

1. *On a Test for Several Linear Relations, (Preliminary Report)*, A. BASU, University of Wisconsin.
2. *The Power of Some Tests for Uniformity of a Circular Distribution*, R. BERAN, The John Hopkins University.
3. *Asymptotic Bayes Sequential Tests of the Null Hypothesis: (Preliminary Report)*, T. BROWN, JR., Michigan State University.
4. *Asymptotic Distribution of the Sample Size for a Sequential Probability Ratio Test*, K. CHANDA, University of Florida.
5. *Starshaped Transformations and the Power of Rank Tests*, K. DOKSUM, University of California, Berkeley.
6. *On the Distribution of the Log Likelihood Ratio Test Statistic When the True Parameter is "Near" the Boundary of the Hypothesis Regions, (Preliminary Report)*, P. FEDER, Yale University.
7. *The Median Significance Level and Other Small Sample Measures of Test Efficacy*, B. JOINER, National Bureau of Standards.
8. *The Asymptotic Behavior of the Smirnov Test Compared to Standard "Optimal Procedures"*, G. KALISH and P. MIKULSKI, Howard University and University of Maryland.
9. *A Likelihood Ratio Test Paradox*, B. SHAH, Research Triangle Institute.
10. *On Choosing a Delta-Sequence, (Preliminary Report)*, M. WOODROOFE, Carnegie-Mellon University.

4:00 p.m.—5:20 p.m.—R. A. Fisher Memorial Lecture (ASA, Bio, Soc., IMS)

Chairman: GERTRUDE COX, Research Triangle Institute

Some Perspectives in Data Analysis, J. TUKEY, Princeton University**5:30 p.m.—IMS Business Meeting****7:30 p.m.—Meeting of 1968 IMS Council**

Friday, December 29, 1967

8:30 a.m.—10:20 a.m.—Non Parametric and Robust Methods

Chairman: G. NOETHER, Boston University

1. *An Example of Large Discrepancy Between Measures of Asymptotic Efficiency of Tests*, R. TSUTAKAWA, University of Chicago.
2. *Some Recent Developments in the Theory of Robust Estimation*, P. BICKEL, University of California, Berkeley.
3. *Non Parametric Multiple Comparisons*, P. K. SEN, University of North Carolina.

8:30 a.m.—10:20 a.m.—Contributed Papers VII

Chairman: J. MULLOOLY, National Institutes of Health

1. *Some Properties of the Incomplete Beta Function*, T. CACOULLOS, New York University.
2. *On the Sampling Distribution of the Multiple Correlation Coefficient*, V. HODGSON, Florida State University.
3. *Tables of Quadratic Forms in Normal Variables*, N. JOHNSON and S. KOTZ, University of North Carolina and Temple University.
4. *Distribution Free Sufficiency in Sampling from Finite Populations*, B. KALE, University of Manitoba.
5. *Sets of Three Studentized Observations*, A. LAURENT, Wayne State University.
6. *Distribution Free Procedures for Testing a Possible Change in Continuous Distribution Law at an Unknown Time Point*, S. LEE, Kansas State University.
7. *A Bivariate Distribution*, S. PATIL, Tennessee Technological University.
8. *The Modified Compound Poisson Process with Normal Compounding*, S. PRESS, University of Chicago.
9. *Linear Functions of Order Statistics*, S. STIGLER, University of Wisconsin.
10. *A Characterisation for the Linear Exponential Family*, J. WANI, Saint Mary's University.

10:30 a.m.—11:30 a.m.—Wald Lecture III

Chairman: R. BAHADUR, University of Chicago

Recent Results in Parametric Large Sample Theory III: Large-Deviation Theory of Statistical Tests (cont), W. HOEFFDING, University of North Carolina.

11:35 a.m.—12:20 p.m.—Contributed Papers VIII

Chairman: S. GEISSER, State University of New York, Buffalo

1. *A Bayesian Analysis of Pilot Surveys*, S. CHATTERJEE, New York University.
2. *Testing the Validity of a Basic Model Occurring in Optimum π ps Sampling*, T. HANURAV, Texas A&M University.
3. *A New Estimation for Sample Surveys*, H. HARTLEY and J. RAO, Texas A&M University.
4. *Inverse Cumulative Approximation to Simulation and Order Statistic Moment Evaluation*, M. TARTER, University of Michigan.
5. *Some New Conditions for the Strong Law*, H. TEICHER, Columbia University.

2:00 p.m.—3:50 p.m.—Optimal Design and Estimation

Chairman: J. SACKS, Northwestern University

1. *Optimal Designs on Chevychev Points*, W. STUDDEN, Purdue University.
2. *A Class of Estimators Asymptotically Efficient Under General Conditions*, L. WEISS, Cornell University.

2:00 p.m.—3:50 p.m.—Contributed Papers IX

Chairman: R. SYSKI, University of Maryland

1. *Stochastic Point Processes on Topological Spaces*, R. AGNEW, Northwestern University.
2. *Ergodic Theory with Recurrent Weights*, K. BERK, Northwestern University.
3. *The Two-Armed Bandit Problem with Finite Memory*, T. COVER, Stanford University.
4. *Weak Approachability in a Two Person Game*, T. HOU, University of California, Berkeley.
5. *A Monotone Binomial Analogue of Ramanujan's Equation*, K. JOGDEO, New York University and S. SAMUELS, University of California, Santa Cruz.
6. *Connectivity in Random Graphs and Digraphs*, J. NAUS and L. RABINOWITZ, The City College of New York and Rutgers-The State University.
7. *A Mathematical Setting for the Inference Problem, (Preliminary Report)*, C. RANDALL, University of Massachusetts. (Introduced by G. Oakland)
8. *On a Characterization of Symmetric Stable Processes with Finite Mean*, B. RAO, University of California, Berkeley.
9. *Toward Assumption-Free Inference in Time-Sequence Data Analysis*, R. RIFFENBURG and R. LAVOIE, University of Connecticut.
10. *Probabilities of Conditional Events, (Preliminary Report)*, G. SCHAY, JR. University of Massachusetts.

4:00 p.m.—5:50 p.m.—Decision Theory

Chairman: L. KATZ, Michigan State University

1. *Asymptotic Results in Sequential Decision Theory*, G. LORDEN, Northwestern University.
2. *Admissible Procedures in Simple Estimation and Testing Problems*, L. D. BROWN, Cornell University.

4:00 p.m.—5:50 p.m.—Contributed Papers X

Chairman: B. HARRIS, University of Wisconsin

1. *"Renewal" Limit Theorems for Excessive Functions of Semi-Markov Chains on Arbitrary Spaces*, E. ÇINLAR, Northwestern University.
2. *Stochastically Monotone Markov Chains*, D. DALEY, University of Washington.
3. *Some Non-Regular Functions of Finite Markov Chains*, S. DHARMADHIKARI, Michigan State University.
4. *Stochastic Approximation for Smooth Functions, (Preliminary Report)*, V. FABIAN, Michigan State University.
5. *Method of Images in the Plane*, R. MENSING and H. DAVID, Iowa State University.
6. *A One Dimensional Random Space-Filling Problem*, J. MULLOOLY, National Institutes of Health.
7. *Stationary Point Processes Invariant Under Superposition*, D. NEWMAN, The Boeing Company. (Preliminary Report).
8. *Non-Discounted Denumerable Markovian Decision Models*, S. ROSS, Stanford University.
9. *Optimal Stopping in a Markov Process*, H. TAYLOR, Cornell University.
10. *Admissibility and Distribution of Some Probabilistic Functions of Discrete Finite State Markov Chains*, C. TSAO, Wayne State University.

Saturday, December 30, 1967

8:30 a.m.—10:20 a.m.—Multiple Decision Theory

Chairman: P. KRISHNAIAH, Aerospace Research Labs.

1. *On Selection and Ranking Procedures for Distributions With Monotone Hazard Rate*, S. GUPTA, Purdue University.
2. *Ranking Multiply Classified Variances of Normal Populations*, R. BECHHOFER, Cornell University.

8:30 a.m.—10:20 a.m.—Contributed Papers XI

Chairman: J. WALKER, Georgia Institute of Technology

1. *Robust Estimation of Multivariate Linear Trend*, G. BHATTACHARYYA, University of Wisconsin.
2. *A New Family of Life Distributions*, Z. BIRNBAUM, S. SAUNDERS, University of Washington, The Boeing Corp.
3. *A New Approach to the Classification Problem*, H. HARTLEY and J. RAO, Texas A&M University.
4. *An Extension of Paulson's Selection Procedure*, M. MAZUMDAR, Westinghouse Research Laboratories.
5. *The Distribution of the Sample Correlation Coefficient with One Variable Fixed*, D. HOGGEN, National Bureau of Standards.
6. *A Decision Theoretic Approach to the Problem of Interval Estimation*, R. VALAND, E. R. Squibb & Sons, Inc. (Introduced by J. Hartigan)
7. *Sequential Interval Estimation for the Means of Normal Populations*, E. PAULSON, City University of New York.

8:30 a.m.—10:20 a.m.—Contributed Papers PII

Chairman: C. B. BELL, Case Institute of Technology

1. *Optimal Ranking and Selection Procedures*, Z. GOVINDARAJULU and H. HALLER, JR., Case Western Reserve University.
2. *c-Sample Rank Orders*, Z. GOVINDARAJULU and H. HALLER, JR., Case Western Reserve University.
3. *Certain Uncorrelated Nonparametric Test Statistics*, W. HOLLANDER, The Florida State University.
4. *Nonparametric Tests for Detection of Shift at an Unknown Time Point*, R. JOHNSON, University of Wisconsin.
5. *A Nonparametric Test for the Multiple Correlation*, K. PATEL, University of Georgia.
6. *Nonparametric Estimation of the Transition Distribution Function of a Markov Process*, G. ROUSSAS, University of Wisconsin.
7. *Nonparametric Two-Sample Tests for Circular Distributions*, S. SCHACH, Stanford University.
8. *Non Parametric Estimation of a Regression Function*, E. SCHUSTER, University of Arizona.
9. *Rank Order Tests for the Homogeneity of Dispersion Matrices*, P. SEN M. PURI, University of North Carolina and New York University.

10:30 a.m.—11:30 a.m.—Rietz Lecture

Chairman: P. MEIER, University of Chicago

Errors of Measurement in Statistics, W. COCHRAN, Harvard University.

11:35 a.m.—12:30 p.m.—Contributed Papers (Late Papers)

Chairman: S. GUPTA, Purdue University

1. *On Selection and Ranking Procedures and Order Statistics from the Multinomial Distribution*, S. GUPTA and K. NAGEL, Purdue University.
2. *On Conditional Rank-Order Tests for Experimental Designs*, K. L. MEHRA, Iowa State University.
3. *The Existence of Certain Stopping Times on Brownian Motion*, D. ROOT, University of Washington.
4. *An Application of Optimal Stopping Rules to Certain Problems of Allocation of Resources*, M. WALKER, and G. SWINSON, Braddock, Dunn and McDonald, and P. H. RANDOLPH, New Mexico State University.

2:00 p.m.—3:50 p.m.—Robust Estimation of Location and Regression Parameters (ASA, IMS)

Chairman: D. HOGBEN, National Bureau of Standards

1. *Optimally Robust Linear Estimation of Location*, E. LASKA, Rockland State Hospital.
 2. *Asymptotic Optimally Robust Linear Estimation of Location*, E. YHAP, New York University.
 3. *Uniformly Asymptotically Efficient Estimators of Location*, V. MIKÉ, Cornell University.
 4. *Robust Estimation and Robust Parameters*, K. TAKEUCHI, New York University.
- Discussants: C. EISENHART, National Bureau of Standards; P. HUBER, University of Zurich; P. BICKEL, University of California, Berkeley.

2:00 p.m.—3:50 p.m.—Contributed Papers XIII

Chairman: M. KUPPERMAN, National Security Agency

1. *Higher Moments of a Stopping Rule*, B. BROWN, Purdue University.
2. *Some Contributions to the Theory of Homogeneous Random Fields on Locally Compact Abelian Groups, (Preliminary Report)*, L. BRUCKNER, The Catholic University of America.
3. *Metric Spaces of Distribution Functions, (Preliminary Report)*, R. HACKLEMAN, Carnegie-Mellon University.
4. *Some Applications of the Indicator Random Variable*, E. KOUNIAS, University of Connecticut. (Introduced by R. Riffenburgh).
5. *Consistency Conditions on, and Bounds on Critical Homomorphically Aggregated Probabilities of, General Dependent Probability Systems of a Finite Number of Events Macro-Specified only by the Triple $\{m, \sum_i^m P_i, \sum_{i < j} P_{ij}\}$* , S. KWEREL, The City University of New York.
6. *Inequalities and Tolerance Limits for s-Ordered Distributions*, M. LAWRENCE, Corning Glass Works, (Introduced by B. Shah).
7. *Some Common Sharp Bounds for Many Probabilities*, G. MUDHOLKAR, University of Rochester.
8. *Bayesian Estimation of Mixing Distributions*, J. ROLPH, Columbia University.
9. *Extreme nth Moments for Distributions on [0, 1] and the Inverse of a Moment Space Map to the n-dimensional Unit Cube*, M. SKIBINSKY, Brookhaven National Laboratory.

Contributed Papers by Title

1. *On the Trace Comparison of Some Partially Balanced Arrays with 2 Symbols*, D. CHOPRA, Southern Colorado State College.
2. *Asymptotic Normality of Linear Combinations of Functions of Order Statistics I*, Z. GOVINDARAJULU, Case Western Reserve University.

3. *Asymptotic Normality of Linear Combinations of Functions of Order Statistics II*, Z. GOVINDARAJULU, Case Western Reserve University.
4. *Investigation of Rules for Dealing with Outliers in Small Samples from the Normal Distribution II: Estimation of the Variance*, I. GUTTMAN, and D. SMITH, University of Wisconsin and HRB-Singer.
5. *A New Table of Percentage Points of the Pearson Type III Distribution*, H. HARTER, Aerospace Research Laboratories.
6. *Tables of the Probability Integral of the Maximum of Two Correlated t Variates (Preliminary Report)*, P. KRISHNAIAH, J. ARMITAGE and M. BREITER, Aerospace Research Laboratories.
7. *Studentized Triplets of Observations for the Exponential and Rectangular Models, (Preliminary Report)*, A. LAURENT, Wayne State University.
8. *An Estimate of the Incomplete Gamma Distribution*, A. LAURENT, Wayne State University.
9. *On the Rate of Uniform Convergence of Estimated Probability Density Functions*, E. SCHUSTER, University of Arizona.
10. *Some Estimation Problems Related to a Geometric Distribution (Preliminary Report)*, S. SCLOVE and J. VAN RYZIN, Stanford University and University of Wisconsin—Milwaukee.
11. *Some Properties of Countable Spaces with Applications*, B. TRAWINSKI, University of Alabama in Birmingham.
12. *Power of the Lawley-Hotelling Trace Test in Multivariate Analysis is a Function of the Population Trace*, J. N. SRIVASTAVA, Colorado State University.
13. *A Bayesian Analysis of Grouped Response Times: The Exponential Distribution Case*, T. STARKS, Southern Illinois University.
14. *Multidimensional Partially Balanced Designs for Models Containing Interaction Terms (Preliminary Report)*, D. ANDERSON, University of Wyoming.
15. *Equivalent Strongly Regular Graphs and Partially Balanced Association Schemes*, R. BOSE, University of North Carolina.
16. *On Combinatorial Composition and Extension Methods in the Construction of Designs*, I. CHAKRAVARTI, University of North Carolina.
17. *Partially Balanced Arrays with $\mu_2 = 2$ and 3*, J. SRIVASTAVA, D. DHOPRA, Colorado State University and Wichita State University.
18. *Construction of β -Content-Confidence Level γ Tolerance Regions When Sampling From the k -Variate Normal and Sample Sizes are Large (Preliminary Report)*, I. GUTTMAN, University of Wisconsin.
19. *Estimating the Parameters of a Sum of Two Independent Noidentically Distributed Random Variables, (Preliminary Report)*, S. SCLOVE and J. VAN RYZIN, Stanford University and University of Wisconsin.
20. *Bayesian Estimation of Regression Parameters for a Class of Symmetric Distributions*, G. TIAO and D. LUND, University of Wisconsin and Wisconsin State University.
21. *An Optimal Ranking Procedure for M -Ordered Densities*, M. RIZVI, Stanford University.

PUBLICATIONS RECEIVED

- ALVAREZ, JOSE HERNANDEZ (1967). *Return Migration to Puerto Rico*. Population Monograph Series. No. 1, University of California Press, Berkeley. xiv + 153 pp. \$2.00.
- BABISTER, A. W. (1967). *Trans Functions Satisfying Nonhomogenous Linear Differential Equations*. The Macmillan Company. xi + 414 pp. \$14.95.