

NEWS AND NOTICES

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

Personal Items

Dr. Satya D. Dubey, formerly with the Procter and Gamble Company as Head of the Statistics Section within the Department of Professional Services, has joined the Engineering Staff of the Ford Motor Company as Principal Statistician.

Dr. Thomas A. Goldman is now Supervisor of the Logistics Analysis Group with the TechRep Division of the Philco Corporation.

Dr. A. Bruce Hoadley has accepted a position with the Applied Statistics Group at Bell Telephone Laboratories in Holmdel, New Jersey effective August 1, 1966. He formerly held a position as Assistant Professor of Statistics at the University of California, Berkeley.

Mainak Mazumdar has completed the requirements for the Ph.D. degree in the Department of Industrial Engineering and Operations Research of Cornell University, and he has joined the Mathematics Department of the Westinghouse R and D Center, Pittsburgh, as a senior statistician.

Dr. Roy C. Milton has accepted an appointment as Senior Research Scientist at the University of Wisconsin Computer Center. He was formerly with the Statistics Department, Atomic Bomb Casualty Commission, Hiroshima, Japan.

Dr. David S. Stoller, formerly with The RAND Corporation, has been appointed Director, Division of Operations Analysis, Office of Education, Department of Health, Education, and Welfare, Washington, D. C.

J. G. C. Templeton on Ontario Hydro will be at the University of Toronto for the academic year 1966-67, as Visiting Associate Professor of Industrial Engineering.

New Members

Ambar, Dan, B.Sc., (Hebrew University); Graduate Student, Department of Statistics, Hebrew University, Jerusalem.

Assakul, Kwanchai, Ph.D., (North Carolina State University); Lecturer in Statistics, Chulalongkorn University, Bangkok.

Brosius, Charles T., Jr.; Computer Programmer, U. S. Naval Command Systems Support Activity; *4409 S. Four Mile Run Drive, Arlington, Virginia 22204*.

Chakrabarty, Pinak Pani, M.Sc., (Gauhati University); Lecturer in Statistics, Assam Veterinary College, India.

Christiansen, Hanne Dalgas, Cand. act., (University of Copenhagen); Research Associate, Institute of Mathematical Statistics and/or Technical University of Denmark; *Sauntevej 28 A, Gentofte, Denmark*.

Davenport, Alan S., B.S., (University of Puget Sound); Graduate Student/Research Assistant, University of Iowa.

Frohne, Ivan V., B.S., (University of California, Berkeley); Graduate Student, Department of Biostatistics, University of California, Berkeley.

- Gupta, Arjun Kumar**, M.S., (Poona University); Graduate Student, Division of Mathematical Sciences, Purdue University.
- Harville, David A.**, Ph.D., (Cornell University); Research Mathematical Statistician, Applied Mathematics Research Laboratory, Aerospace Research Laboratory, Wright-Patterson AFB.
- Hayden, Jack J.**, Ph.D., (Northwestern University); Assistant Professor, Indiana University.
- Herzberg, Agnes M.**, Ph.D., (University of Saskatchewan); Postdoctorate Fellow, Department of Statistics, Birkbeck College, University of London.
- Kaufman, Sol**, Ph.D., (Cornell University); Head, Operations Research Department, Cornell Aeronautical Laboratory.
- Knight, Frank B.**, Ph.D., (Princeton University); Assistant Professor, Department of Mathematics, University of Illinois.
- Kushner, Harold J.**, Ph.D., (University of Wisconsin); Associate Professor, Division of Applied Mathematics, Brown University.
- Legoupil, Jean J.**, D.Sc., (Paris Université); Maitré de Conférences, Université de Rennes.
- Lohrding, Ronald K.**, M.S., (Kansas State University); Graduate Student, Department of Statistics, Kansas State University.
- Lorden, Gary A.**, B.S., (California Technical Institute); Instructor, Department of Mathematics, Northwestern University.
- McClendon, Brummett Jerald**, B.A., (Texas Technological College); Graduate Student, Kansas State University.
- Mensing, Richard W.**, M.S., (Iowa State University); Graduate Student, Iowa State University.
- Mico, George**, P.E., (Columbia University); Research Analyst, Union Carbide.
- Mirman, Leonard J.**, M.S., (New York University); NDEA Fellow, Department of Economics University of Rochester.
- Nelson, Paul I.**, M.S., (Rutgers—The State University); Graduate Student/Teaching Assistant, Rutgers—The State University.
- O'Donnell, David T.**, M.S., (Rutgers-The State University); Graduate Student/Teaching Assistant, Rutgers—The State University.
- Ôkuma, Akimichi**, B.S.; Graduate Student, Kyûshyû University.
- Robinson, Paul B.**, M.S., (New York University); Member of the Technical Staff, Bell Telephone Laboratories, Holmdel, New Jersey.
- Scalmanini, James R.**, B.S., (Brigham Young University); Graduate Student, Department of Statistics, Brigham Young University.
- Schmidt, Karsten**, M.Sc., (Technical University of Denmark); Graduate Student, Institute of Mathematical Statistics and Operations Research, Technical University of Denmark.
- Shaw, Robert M.**, M.S., (Polytechnic Institute of Brooklyn); Instructor in Mathematics, Polytechnic Institute of Brooklyn.
- Srivastava, Anand Behari Lal**, Ph.D., (Indian Institute of Technology, Kharagpur); Senior Statistician, Department of Psychological Foundations, National Institute of Education, New Delhi.
- Topkis, Donald M.**, M.S., (Stanford University); Graduate Student, Department of Statistics, Stanford University.
- Wang, Roger Hsio-Chang**, M.B.A., (New York University); Consultant of Statistics, Marketing Planning Corporation; *215 W. 98 Street, Apt. 10F, New York, New York 10025*.
- Ware, James H.**, M.A., (Stanford University); Graduate Student, Department of Statistics, Stanford University.
- Wright, Roger L.**, A.M., (University of Michigan); Graduate Student, University of Michigan.

MATHEMATICS IN BIOLOGY

A task committee representing the Committee on the Undergraduate Program in Mathematics (CUPM) and the Committee on Undergraduate Education in Biological Sciences (CUEBS) is engaged in an effort to collect examples of meaningful applications of mathematics at all levels in the solution of biological problems. This effort is stimulated by the recognition that the coming years will see a striking increase in the quantity and quality of mathematics taught to and used by biologists. The immediate objective of this effort is to place before the scientific community a collection of examples which (1) will add meaning and motivation to mathematics courses attended by biologists and (2) will be cross-referenced according to the field of biology involved for use in biology instruction. Among the long-range objectives is the stimulation of two-way research interchanges between mathematicians and biologists.

Members of the mathematical community who are interested in being kept abreast of these developments are requested to write to the Committee on the Undergraduate Program in Mathematics, P. O. Box 1024, Berkeley, California 94701. Names of other persons who are interested in this information will be welcomed.

REPORT OF THE BROOKHAVEN, NEW YORK MEETING OF THE INSTITUTE OF MATHEMATICAL STATISTICS

The one-hundred-ninth meeting of the Institute of Mathematical Statistics was held at Brookhaven National Laboratory, Upton, Long Island, New York on April 27-29, 1966, in conjunction with the Biometric Society, Eastern North American Region and the American Statistical Association, Section on Physical and Engineering Sciences.

A total of 346 persons registered for the meetings. Of this number, 198 were members of the Institute.

Program

Wednesday, April 27, 1966

10:00 a.m.-12:00 p.m.—Contributed Papers I

Chairman: J. PINCUS, Brookhaven National Laboratory

1. *Wilcoxon's Signed Rank Test as a Large Sample Competitor of Wilcoxon's Rank Sum Test*, M. HOLLANDER, The Florida State University.
2. *On a Class of Multivariate Multisample Rank-Order Tests*, M. L. PURI, New York University and P. K. SENN, University of North Carolina.
3. *Detecting Outliers in a Two-Way Table*, J. F. MUNK and M. B. WILK, Bell Telephone Laboratories.
4. *A Multivariate Sign Test*, K. M. PATEL, Clemson University.

5. *On a Class of Rank Order Estimators of Contrasts in MANOVA*, M. L. PURI, New York University and P. K. SEN, University of North Carolina.
6. *Easy Distribution-Free Symmetry Tests, and Power Against Non-Symmetrical Alternatives*, R. THOMPSON, Massachusetts Institute of Technology.

10:00 a.m.—12:00 p.m.—Probability Theory

Chairman: M. SKIBINSKY, Brookhaven National Laboratory

1. *On a Conjecture of J. F. C. Kingman Concerning Waiting-Time Distributions*, J. TH. RUNNENBURG, Mathematisch Instituut and University of North Carolina.
2. *Measures Equivalent to Wiener Measure*, L. A. SHEPP, Bell Telephone Laboratories.

Discussant: S. VARADAN, New York University.

10:00 a.m.—12:00 p.m.—Design and Analysis of Surveys

Chairman: W. H. WILLIAMS, Bell Telephone Laboratories

1. *Pseudo-Replication: Half Samples*, P. J. MCCARTHY, Cornell University.
2. *Multi Factor Analytical Surveys*, J. SEDRANSK, Iowa State University.
3. *Optimal Sampling for Non-Respondents*, W. A. ERICSON, University of Michigan.

Discussants: C. H. PROCTOR, North Carolina State University at Raleigh;
B. J. TEPPIG, Bureau of the Census.

2:00 p.m.—4:00 p.m.—Contributed Papers II

Chairman: S. P. GHOSH, International Business Machines

1. *A Bayesian Study of the Multinomial Distribution*, D. A. BLOCH and G. S. WATSON, Johns Hopkins University.
2. *On the Queue Length Distribution with Balking in a Single Server Queueing Process*, R. S. DICK, C. W. Post College.
3. *Some Tchebycheff Type Inequalities for Matrix Valued Random Variables*, G. S. MUDHOLKAR, University of Rochester.
4. *Monte Carlo Analysis of the Rate of Convergence of Some Empirical Bayes Point Estimators* (Preliminary Report), J. R. RUTHERFORD, Royal Military College of Canada.
5. *Maximization with Respect to Partition of an Interval and Its Application to the Best Systematic Estimators of the Exponential Distribution*, M. SIBUYA, University of Western Ontario.
6. *Statistics Connected with the Uniform Distribution; Percentage Points and Application to Testing for Randomness of Directions*, M. A. STEPHENS, McGill University.
7. *Bayesian Analysis of a Hierarchical Design Model*, G. C. TIAO, Harvard University and University of Wisconsin.
8. *On Multivariate Exponential-Type Distributions*, S. BILDIKAR, McGill University and G. P. PATIL, Pennsylvania State University.

2:00 p.m.—4:00 p.m.—Applied Regression Analysis

Chairman: C. DANIEL, Private Consultant

1. *Currently Used Methods for Selecting Variables in Regression*, H. SMITH, JR., Procter and Gamble Company.
2. *Step-Wise Regression: A Backward and Forward Look*, M. A. EFROYMSON, Esso Research and Engineering Company.

Discussant: C. L. MALLOWS, Bell Telephone Laboratories.

4:15 p.m.—5:45 p.m.—Data Analysis

Chairman: W. G. COCHRAN, Harvard University

Data Analysis & Statistics: Principles & Practice, J. W. TUKEY, Princeton University and M. B. WILK, Bell Telephone Laboratories.

Discussant: G. A. BARNARD, Imperial College and Princeton University.

Thursday, April 28, 1966

8:30 a.m.—10:30 a.m.—Informative Methods of Data Analysis

Chairman: D. A. GARDINER, Oak Ridge National Laboratories

1. *Statistical Problems and Techniques in Talker Identification*, M. B. WILK and R. GNA-NADESIKAN, Bell Telephone Laboratories.
2. *Empirical Time Series Analysis*, C. L. MALLOWS, Bell Telephone Laboratories.
3. *A Study of Two Methods for Analysis of Non-Linear Structures*, J. D. CARROLL, New York University and R. N. SHEPARD, Bell Telephone Laboratories.

8:30 a.m.—10:30 a.m.—Problems in Discrete Distributions

Chairman: S. K. KATTI, Florida State University

1. *Weibull Distribution and Estimation of Its Parameters*, S. D. DUBEY, Procter and Gamble Company.
2. *Inference for Some Incompletely Specified Models*, R. KALE, and T. A. BANCROFT, Iowa State University.
3. *Some Relatively Simple Methods for Estimating Parameters in Some Contagious Distributions*, J. GURLAND and P. HINZ, University of Wisconsin.

Discussant: H. A. DAVID, University of North Carolina.

10:40 a.m.—12:40 p.m.—Time Series Regression

Chairman: F. J. ANSCOMBE, Yale University

1. *Serial Correlation in Least Squares Regression*, G. S. WATSON, Johns Hopkins University.
2. *Testing for Serial Correlation in Least Squares Regression*, J. DURBIN, London School of Economics and Johns Hopkins University.

Discussant: L. D. TAYLOR, Harvard University.

10:40 a.m.—12:40 p.m.—Survey and Large Scale Data Handling

Chairman: M. HALPERIN, National Institutes of Health

1. *Storage, Retrieval and Reduction of Large Scale Numerical Files*, R. C. MENDELSSOHN, Bureau of Labor Statistics.
2. *Follow-Up Statistics from Linked Personal Records*, H. B. NEWCOMBE, Atomic Energy of Canada Ltd.

Discussant: J. F. DALY, Bureau of the Census

2:30 p.m.—4:30 p.m.—Contributed Papers III

Chairman: D. WALLACE, University of Chicago and Princeton University

1. *Subminimax Estimation of the Mean of a Normal Random Variable*, A. J. BARANCHIK, Columbia University.

2. *Method of Maximum Empirical Likelihood for the Two-Sample Location Parameter Problem*, P. K. BHATTACHARYA, University of Arizona.
3. *Estimation Associated with Linear Discriminants*, S. GEISSER, State University of New York at Buffalo.
4. *A Monte Carlo Study of the Estimators of the Parameters of a Quantal Response Curve*, M. GNANADESIKAN, Bell Telephone Laboratories.
5. *Least Squares Estimation of the Components of a Symmetric Matrix*, H. J. LARSON, U. S. Naval Postgraduate School.
6. *Minimax Property of the Maximum Likelihood Estimators for Normal Multivariate Regression*, S. L. SCLOVE, Columbia University.
7. *Linear Minimax Estimation for Linear Regression Models*, S. ZAHL, University of Connecticut.

2:30 p.m.—4:30 p.m.—Statistical Computing Systems

Chairman: J. M. CHAMBERS, Harvard University

1. *Organization of Machine Independent Statistical Computer Systems*, R. T. BUHLER, Princeton University.
2. *Statistical Concepts and the Design of Statistical Computing Languages*, W. K. HASTINGS, Bell Telephone Laboratories.

Discussant: M. SCHATZOFF, International Business Machines

Friday, April 29, 1966

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

Chairman: J. DALY, Bureau of the Census

1. *A Dictionary of Distributions*, E. A. BLAKE and E. B. FOWLKES, Bell Telephone Laboratories (Introduced by M. Snyder).
2. *On Multivariate Edgeworth Expansions*, J. M. CHAMBERS, Harvard University and Bell Telephone Laboratories.
3. *On a Multivariate Generalization of the Behrens-Fisher Distributions*, J. M. DICKEY, YALE UNIVERSITY.
4. *On Characterizing Dependence in Joint Distributions*, W. J. HALL, University of North Carolina at Chapel Hill.
5. *The Distributions and Moments of Some Variance Components Estimators* (Preliminary Report), Y. Y. WANG, Cornell University.
6. *Moment Relations for Some Discrete Distributions*, J. K. WANI, McGill University and Lethbridge Junior College.
7. *The Effect of Rounding on a Derived Distribution*, J. L. WARNER, Bell Telephone Laboratories and R. G. KRUTCHKOFF, Virginia Polytechnic Institute.

8:30 a.m.—10:30 a.m.—Stochastic Models and Methods in the Physical Sciences

Chairman: W. M. GENTLEMAN, Bell Telephone Laboratories

1. *Simulation of Random Motions of Lattice-Model Polymer Chains*, P. H. VERDIER, National Bureau of Standards.
2. *Computer Studies of the Molecular Dynamics in Liquids and the Liquid-Solid Transformation*, A. PASKIN, Brookhaven National Laboratory.

Discussant: G. WEISS, National Cancer Institute

10:40 a.m.—12:40 p.m.—Contributed Papers V

Chairman: J. W. WILKINSON, Rensselaer Polytechnic Institute

1. *Tolerance Setting in Multivariate Surveys*, S. CHATTERJEE, Harvard University.
2. *A Stratification Approach for Estimating Nonresponses without Recall*, S. P. GHOSH, International Business Machines.

3. *Bayes and Empirical Bayes Estimation in Sampling Finite Populations*, V. P. GODAMBE, Johns Hopkins University.
4. *Exact Moments of the Order Statistics of the Geometric Distribution and Their Application to a Stage-Dependent Binomial Sampling Scheme*, B. H. MARGOLIN and H. S. WINOKUR, JR., Harvard University.

10:40 a.m.—12:40 p.m.—Numerical Methods in Statistical Computations

Chairman: R. E. BARGMANN, University of Georgia

1. *Matrix Methods in Statistical Computations*, G. H. GOLUB, Stanford University and Courant Institute of Mathematical Sciences.
2. *Applications and Techniques of Nonlinear Programming*, W. S. DORN, International Business Machines.

Contributed Papers by Title

1. *Estimation of the Parameters of the Pareto Distribution*, H. J. MALIK, Western Reserve University.
2. *Distribution of Product Statistics from a Pareto Population*, H. J. MALIK, Western Reserve University.
3. *Exact Moments of Order Statistics from the Pareto Distribution*, H. J. MALIK, Western Reserve University.
4. *On Sampling a Universe by Overlapping Clusters of Units with Unequal Probabilities*, J. C. KOOP, North Carolina State University.
5. *Multi-Stage Sampling on Successive Occasions Where First-Stage Units are Drawn with Unequal Probabilities and with Replacement*, J. C. KOOP, North Carolina State University and N. PURAKAM, Central Statistical Office, Thailand.
6. *The Lattice of Ordered Partitions and its Relation to Generalized Symmetric Means and Generalized Polykays*, E. J. CARNEY, Iowa State University.
7. *K-Sample Nonparametric Life Tests (Preliminary Report)*, A. P. BASU, University of Minnesota.
8. *Ratio and Regression Estimators as Minimax Procedures for Estimating the Mean of a Population*, O. AGGARWAL, Iowa State University.
9. *Asymptotic Distributions for a Generalized Banach Matchbox Problem*, T. CACOULLOS, New York University at University Heights.

SAMUEL W. GREENHOUSE
Associate Secretary

PUBLICATIONS RECEIVED

- ABBOTT, M. B. (1966). *An Introduction to the Method of Characteristics*. American Elsevier Publishing Company, New York. ix + 243 pp. \$15.00.
- BENDAT, JULIUS S. and PIERSOL, ALLAN G. (1966). *Measurement and Analysis of Random Data*. John Wiley and Sons, New York. xvi + 390 pp. \$17.75.
- BENNETT, B. M. and HORST, C. (1966). *Supplement to Tables for Testing Significance in a 2×2 Contingency Table*. Cambridge University Press. iv + 28 pp. \$1.00.
- COX, D. R. and LEWIS, P. A. W. (1966). *The Statistical Analysis of Series Events*.