# UNIVERSITY OF TENNESSEE KNOXVILLE
# DEPARTMENT OF STATISTICS
## ANNUAL REPORT
### August 1, 1998 – July 31, 1999

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACULTY, STAFF, AND STUDENTS</td>
</tr>
<tr>
<td>Opening Letter</td>
</tr>
<tr>
<td>Faculty</td>
</tr>
<tr>
<td>Staff</td>
</tr>
<tr>
<td>Students</td>
</tr>
<tr>
<td>IGSP</td>
</tr>
<tr>
<td>SCHOLARY ACTIVITIES</td>
</tr>
<tr>
<td>Publications</td>
</tr>
<tr>
<td>Papers and Reports</td>
</tr>
<tr>
<td>Thesis and Independent Projects</td>
</tr>
<tr>
<td>Presentations</td>
</tr>
<tr>
<td>Grants and Contracts</td>
</tr>
<tr>
<td>HONORS AND AWARDS</td>
</tr>
<tr>
<td>STUDENT ACTIVITIES</td>
</tr>
<tr>
<td>FACULTY SERVICE</td>
</tr>
<tr>
<td>Service to the University</td>
</tr>
<tr>
<td>Service to the Department</td>
</tr>
<tr>
<td>Service to the Profession</td>
</tr>
<tr>
<td>COURSE OFFERINGS</td>
</tr>
<tr>
<td>CONSULTING AND CONTINUING EDUCATION</td>
</tr>
<tr>
<td>UT Medical Center</td>
</tr>
<tr>
<td>Center for Executive Education</td>
</tr>
<tr>
<td>Blue Cross Blue Shield</td>
</tr>
</tbody>
</table>
November 1, 1999

Dear Friends of the Statistics Department,

This report will help you be more acquainted with some of the recent activities and accomplishments of our Statistics alumni, faculty and current students. I will begin with our newest alumni. Eight M.S. students and seven BS students graduated during 1999. This included three M.S. graduates (Chris McCall, Lu Su, and Tim Wilson) who accepted employment with Capital One in Virginia, and two BS graduates who accepted positions at Milliken (Eric Porter) and Nestle (Paul Tanaka). Several other graduates chose to stay in this area, beginning or continuing employment with Aspen Systems (Sam Davis), ORNL (Randy Palmer and Tim Ruescher), TVA (Jennifer Higgins), and UT (Becky Stephens). In spite of the strong job market, five May graduates have delayed employment and begun graduate programs: Barry Eggleston (UNC), Chris Holloman (Duke), Chris Krohn (UTK), Madeline McNeeley (UMD), and Karolina Pyda (UCF). We expect great things from each of our graduates.

We have had frequent visits this year from alumni, including Rodney Bates, Arika Blankenship, Doug Fair, Chad Hoffman and Chuck Morrelo. Whether it is because of the beautiful spring and fall seasons in Knoxville, or a national championship in football, or to recruit our students, it is a delight to have previous students here for a day. Rufus Gomez even chose to leave General Electric and accept a position with ABS here in Knoxville.

The year just completed was eventful for our faculty. First, Ham Bozdogan was named the McKenzie Professor in Business, in Information Complexity and Model Selection. This is fitting recognition of Ham’s successful collaboration and research. Also, two long-time faculty members in the department retired. Richard Sanders retired in January, more than 33 years after arriving in Knoxville as an assistant professor. Then John Philpot retired at the end of May - even though we tried to keep him to teach one more multivariate class - after 28 years of service. These two colleagues made monumental contributions to the UTK and our department during their many years of service. Our best wishes both to Richard, John, and their families. Enjoy your new and well-earned freedom.

In light of this loss of faculty, the department is currently searching for an assistant professor of statistics who has a background in business. Bill Parr is leading our search committee. God willing, we will describe the successful culmination of that search in next year’s report.

Sincerely,

Robert Mee
Professor and Head
The Faculty, Staff, and Students

Professors

Hamparsum Bozdogan, Ph.D., University of Illinois at Chicago

Frank M. Guess, Ph.D., Florida State University

Robert A. McLean, Emeritus, Ph.D., Purdue University

Robert Mee, Department Head, Ph.D., Iowa State

William C. Parr, Ph.D., Southern Methodist University

John W. Philpot, Emeritus, Ph.D., Virginia Tech

Richard Sanders, Emeritus, Ph.D., University of Texas, Austin

David Sylwester, Ph.D., Stanford University

Charles C. Thigpen, Emeritus, Ph.D., Virginia Tech

Associate Professors

Mary G. Leitnaker, Ph.D., University of Kentucky

Ramón León, Ph.D., Florida State University

William L. Seaver, Ph.D., Texas A&M

Esteban Walker, Ph.D., Virginia Tech

Mary Sue Younger, Ph.D., Virginia Tech

Lecturer

James L. Schmidhammer, Ph.D., Pittsburgh

Instructors

Charles M. Cwiek, M.S., University of Tennessee, Knoxville

Sharon R. Neidert, M.S., Miami University, Ohio

S. Paul Wright, M.S., University of Tennessee, Knoxville

Adjunct and Part-time Faculty

Kimiko O. Bowman, Ph.D., Virginia Polytechnic Institute & State University, Adjunct Professor

Edward L. Frome, Ph.D., Emory University, Adjunct Professor

Stephen A. McGuire, Ph.D., Kansas State University, Part-time Assistant Professor, Adjunct Professor
Intercollegiate Graduate Statistics Program Faculty

Charles H. Aikens, Industrial Engineering
Ben Bates, College of Communication
Dewey L. Bunting, Professor Ecology
Hui Chang, Professor of Economics
Arun Chatterjee, Professor of Civil and Environmental Engineering
Don Dessart, Professor of Education in Sciences, Mathematics, and Research And Technology
Carl Dyer, Associate Professor of Textiles, Retailing, and Interior Design
David Eastwood, College of Agriculture
Ben G. Fitzpatrick, Assistant Professor of Mathematics
Henry A. Fribourg, Professor of Plant and Soil Science
Michael M. Gant, Associate Professor of Political Science
Charles A. Glisson, Professor of Social Work
Louis J. Gross, Associate Professor of Mathematics
Schuyler Huck, College of Education
Larry James, Professor of Management Science
Robert T. Ladd, Associate Professor of Management, Industrial/Organizational Psychology Program
John Lounsbury, Professor of Psychology

William Lyons, Professor of Political Science
Dan L. McLemore, Associate Professor of Agricultural Economics
Mark Miller, Professor of Journalism
John Orme, Associate Professor of Social Work
Balram S. Rajput, Professor of Mathematics
Lillard Richardson, Assistant Professor of Political Science
Jan Rosinski, Associate Professor of Mathematics
Fumiko Samejina, Professor of Psychology
Arnold Saxton, Professor of Animal Science
Jim Schmidhammer, Department of Statistics
Michael W. Singletary, Professor of Mathematics
Julius Smith, Professor of Mathematics
Carl G. Wagner, Professor of Mathematics
Jie Xiong, Department of Mathematics
Mary Sue Younger, Professor of Statistics, Chair, IGSP Executive Committee

Support Staff

Gina Keeling, Office Supervisor
Karen Poland, Principal Secretary
Graduate Students

2nd Year Graduate Students

Barry Eggleston
Eden, North Carolina
The University of North Carolina
BS in Mathematics
1998 Internship: NN Ball & Roller, Irwin, TN
Now Pursuing Ph.D. in Biostatistics at UNC.

Jennifer Higgins
Knoxville, TN
Furman University
BS in Mathematics
1998 Internship: TVA, Knoxville, TN
Employment: TVA, Knoxville, TN

Cedric King
Oak Ridge, TN
The University of Tennessee
BS in Statistics
Employed full-time at BTR Sealing Systems, Maryville, TN

Chris McCall
San Jose, CA
California Polytechnic State University
BS in Statistics
1998 Internship: Pratt & Whitney, West Palm Beach, FL
Employment: Capital One, Washington, DC

Tim Reuscher
Knoxville, TN
The University of Tennessee
BS in General Business
1998 Internship: UT EERC, Knoxville, TN
Employment: Oak Ridge National Labs, Oak Ridge, TN

Rebecca Stephens
Knoxville, TN
The University of Tennessee
M.S. in Mathematics
Employed full-time at The University of Tennessee, College of Agriculture

Lu Su
China
Peoples University of China
BS Finance
Employment: Capital One, Richmond, VA

Tim Wilson
Oneida, TN
Cumberland College
BS in Mathematics
1998 Internship: Hallmark, Kansas City, MO
Employment: Capital One, Richmond, VA

1st Year Graduate Students

Dana Aeschliman
Indianapolis, IN
Vanderbilt University
BS in Mathematics
1999 Internship: Compliance Solutions, Knoxville, TN

Sean Groer
Knoxville, TN
Fairfield University
BS in Economics
1999 Internship: Tamko, Knoxville, TN

Aimee Hughes
Abingdon, VA
The University of Tennessee
MS in Mathematics
1999 Internship: Capsugel, Greenwood, SC
Adraine Jordan
Birmingham, AL
The University of South Alabama
BS in Statistics
1999 Internship: Capital One, Richmond, VA

Julijana Magda
Knoxville, TN
University of Novi Sad
BS Education
1999 Internship: Breed Technologies, Knoxville, TN

Angelica Mendoza
Mexico City, Mexico
University of Mexico
BS in Actuary

Junghun Nam
Korea
Korea University
BS in Statistics
1999 Internship: BC/BS Consulting Project

Kit Pun
Beijing, China
Beijing Polytechnic University
BS in Mechanical Engineering

Don Watkins
Oak Ridge, TN
Purdue University
BS in Mechanical Engineering

Hank Wells
Hixson, TN
The University of Tennessee, Chattanooga
BS in Mathematics
1999 Internship: Blue Cross Blue Shield, Chattanooga, TN

Intercollegiate Graduate Statistics Program

Enrolled Intercollegiate Graduate Statistics Program Students

Candidates for Minor in Statistics
Bana Bagwell, MS in Communications
Marianne Bradford, Ph.D. in Accounting
Mary Ellen Cox, Social Work
Ravindra Edirisooriya, MS in Mathematics
Michael Janis, Wildlife & Fisheries Science
Michael Menzel, Ph.D. in Ecology
Jeremy Mitchell, MS in Mathematics
Christopher Morris, Entomology and Plant Pathology
Tracey Murray, MS in Mathematics
Aaron Peacock, MS in Agri & Biosys Engineering
Kristi Nelms, Ph.D. in Leadership Studies
Mohammad Qureshi, Civil Engineering
Chris Sellers, MS in Industrial Engineering
Doug Roberts, Ph.D. in Accounting

Candidates for MS in Statistics
Carol Bruce, Human Ecology
Richard Cox, Economics
Tracey Dwight, Communications
James Lebreton, IO Psychology
Jung Hoon Lee, Food Science
Huo Li, Biochemistry
Chen-Chun Shao, Food Science
Hong Yin, Textile Science

Bachelor of Science Graduates

College of Business
Christopher Krohn
Eric Porter
Karolina Pyda
Paul Tanaka

College of Arts and Sciences
Christopher Holloman
Madeline McNeeley
Elizabeth Parlier

Enrolled Undergraduate Students

Keith Beauford
Matthew Brown
Todd Daniel
Billy Davis
Milena Dydak
Beth Godsey
Tamaki Haba
Robert Kirsch
Tracy Kline
Mei Sin Kong
David Kreyling
Hiromi Magami
Pamela Mandrell
Takako Mimura
Murizal Mohamed
Chad Moore
Romesh Patel
Angela Phillips
Lok Hang Wan
Martha Whitehead
Thomas Whittingham
Pao-ju Wu
Angela Yau

SCHOLARLY ACTIVITIES

PUBLICATIONS

Refereed Publications


In this paper we briefly study the basic idea of Akaike’s (1973) information criterion (AIC). Then, we present some recent developments on a new entropic or informational complexity (ICOMP) criterion of Bozdogan (1988a,b, 1990, 1994d, 1996, 1998a, b) for model selection. A rational for ICOMP as a model selection criterion is that it combines a badness-of-fit term (such as minus twice the maximum log likelihood) with a measure of complexity of a model differently than AIC, or its variants, by taking into account the interdependencies of the parameter estimates as well as the dependencies of the model residuals. We operationalize the general form of ICOMP based on the quantification of the concept of overall model complexity in terms of the estimated inverse-Fisher information matrix (IFIM). This approach results in an approximation to the sum of two Kullback-Leibler distances. Using the correlational form of the complexity, we further provide yet another form of ICOMP to take into account the interdependencies (i.e., correlation’s) among the parameter estimates of the model. Later, we illustrate the practical utility and the importance of this new model selection criterion by providing several real as well as Monte Carlo simulation examples and compare its performance against AIC, or its variants.

We develop a new information theoretic approach for detecting influential observations in Dynamic Linear models of multivariate time series known as Vector Autoregressions (VARs). Our approach builds on recent advances in information theoretic model selection (Bozdogan, 1988,1990, 1994) and globalizing strategies for optimal predictor selection in subset VAR modeling (Bearse and Bozdogan, 1998). In the first stage, we use the Genetic Algorithm (GA) with information complexity (ICOMP) criterion as the fitness function to select a near optimal subset VAR model. In the second stage, given the subset VAR model chosen by our GA, we develop ICOMP} and generalize Cook's (1977) measure of influence to detect the influential observations using the case-deletion, or leave-one-out method. Our approach yields an intuitive, practical and rigorous two dimensional graphical representation of influential observations in multivariate time series data by taking into account the lack-of-fit and model complexity simultaneously in one criterion function while eliminating the need for arbitrarily chosen levels of significance and statistical table look-up. We demonstrate our new approach using quarterly US macroeconomic data on the civilian unemployment rate, the consumer price index, the federal funds rate, and the M2 money supply between 1960:Q1-1996:Q4. Our results suggest that the influential observations detected in fixed coefficient VAR models could be indicative of the need for more general VAR approaches (e.g., Markov-Switching Vector Autoregressions--MS-VARs).

Parr, W.C., Editor, Michael J. Stahl. "Process Management and Process Reengineering." Chapter in Perspective in Total Quality, pp. 183-209, 1999. This article gives an overview of both process management and process reengineering. I look at the most common strategies in process reengineering, discussing how to determine which strategy is most appropriate, and offer insights on obstacles to success and strategies employed by companies who succeed at reengineering.

Parr, W.C., Stahl, Michael J. Barnes, William R., Gardial, Sarah F., and Woodruff, Robert B., "Customer Value Strategy: Best Consequences to Target Customers or Attributes of Your Products and Services." Quality Progress, pp. 53-58, April 1999. This article defines customer value based strategy, and provides examples of organizations pursuing such strategies and the consequences of such pursuit.


Pedro Del Corral, Renan Sampedro, Mike Hartsell, Edward T. Howley, Younger, M.S., Muhammad Ashraf, Hugo Eiler, Bill Law Jr., and Dicie L. Thompson, Metabolism, Volume 48, Number 3, pp. 390-394. "Reduced cortisol potentiates the exercised-induced increase in corticotropin to a greater extent in trained compared with untrained men." An examination of the effect of acute exercise and reduced cortisol on pituitary and adrenal responsiveness and the impact of reduced plasma cortisol on maximal oxygen consumption in eight trained and eight untrained males.

Refereed Publications in Press

Guess, F., Bowen, Paul, Fuhrer, David, "Continuously Improving Data Quality In Persistent Databases." Data quality problems have led to bad decisions, monetary losses, and negative consequences for stakeholders. This paper discusses ways to use quality techniques to continuously improve data quality in persistent databases such as fixed assets, inventory, accounts receivable, and customer information. Statistical process improvement techniques are applied and related to the concept of a data quality service objective. After describing the relationship between the statistical process management of transaction processing, a procedure is presented that can be used to test whether or not the data quality service objective for a persistent database is being met. An approach is discussed to show how organizations can anticipate and prevent data problems and continuously improve data quality. An inventory database is used to illustrate how the concepts and procedures can be applied to both transaction processing and to persistent databases themselves. Other types of persistent databases can use this approach for continuously improving data quality. Implementing the strategies described in this paper can help management develop a culture of data quality improvement. Data quality improvements in persistent databases will yield many natural benefits including better decision-making. Data Quality (To appear).


León, R., Mee, R., "Blocking Multiple Sources of Error in Small Analytic Studies." Quality Engineering (To appear).


Papers and Reports


In this paper, we develop novel statistical modeling and model selection techniques in multivariate regression models for nonnormal data under the general class of elliptically contoured (EC) distributions by broadening the usual multivariate normal assumption on the random errors. This is achieved by introducing and developing a new informational complexity (ICOMP) criterion of the estimated inverse-Fisher information matrix (IFIM) of Bozdogan (1990, 1994) for model evaluation in EC
multivariate regression models for nonnormal data.


Theses and Independent Projects of Graduate Students

Eggleston, E., Using JMP ver. 3.2 to Perform Survival Analysis with both Voltage and Temperature Stress"

Please go to: http://web.utk.edu/~leon/eggleston/tutorial1/index.htm to view full report.

Advisor: Dr. Ramon Leon

Higgins, J., “The Integration of Multivariate Control Charts in an Evaluation System”

In 1994, a large southeastern utility company created a corporate university. The evaluation system provides feedback for the monitoring, insurance and improvement of program quality and effectiveness. Current standard analyses include the use of univariate (X-bar) control charts on a few items, usually 6 variables, to identify courses that are rated significantly high or low from a relevant norm. Only the significant departures of the "Recommendation" item mean from the overall average are noted, resulting in traditional quality management procedures such as: 1. Investigation and modification/cessation of "low" rated courses. 2. Use of characteristics of "high rated courses as templates/models for design and delivery. The intention of this project is to introduce multivariate control charts into this evaluation system based on the vector of six (X-bar) values for each class in a course. Because the university's database contains multiple correlated variables, the use of multivariate control charts can be very beneficial. Not only will this reduce six univariate control charts to an analogous single chart, but the results are impacted by each of the items and will reflect their simultaneous effect on course recommendation. This approach introduces a method for analyzing the within subgroup variability (analogous to a univariate R-chart or s-chart) and two different methods for comparing group mean vectors to the overall mean vector, one which makes use of the pooled covariance matrix and one that uses individual sample covariance matrices. Both methods used in conjunction provide optimal results in detecting both extremely high and extremely low class means. Overall, there is generally good agreement between the univariate and multivariate methodologies, with the multivariate results providing a more refined focus. Some classes where the univariate and multivariate approaches differ are a result of the systematic evaluation of the entire set of variables by the multivariate approach. The process can be applied to any course offered at the corporate university.

Advisor: Dr. John Philpot
2nd Advisor: Dr. William Seaver

McCall, C., "Follow-up Designs for Plackett Burman Experiments"

The Plackett-Burman non-geometric experimental design allows experimenters to experiment with up to \( k = n-1 \) factors, where \( n \) is a multiple of 4. Our research has focused on follow-up designs for the 12-run design when
the initial Plackett-Burman experiment yields inconclusive results.

A common follow-up to a Plackett-Burman design is a foldover where the signs of all factors are reversed. This creates a resolution IV design when combined with the original 12 run design. The results of these 24 runs can be projected into 5 or fewer dimensions to create a resolution V array in the projected factors. While effective, the foldover is as large as the original design. Because a motivating purpose for using a Plackett-Burman design is often to minimize the number of experimental runs, we would like to have a follow-up design which is smaller than the initial design. The designs suggested for projection into 4 or 5 factors have nice bias and precision properties.

Advisor: Dr. Robert W. Mee

Palmer, R.
Advisor, Dr. John Philpot

Reuscher, T., "BlueCare Multivariate Analysis Uninsured Segment"

This project focuses on a multivariate analysis of survey data. Problems investigated include whether those customers who did not respond to surveys can be represented by those who returned surveys negatively, or those who returned surveys without the last page of tracking information. Methods utilized include principal component and principal variable analyses to summarize variation and identify important factors. K-Means cluster analysis was then performed to divide customers into those with positive and negative tendencies of responses, with discriminant analysis being performed to predict those groups. Finally, customer profiles based on cluster membership were produced, with various relationships between clusters and other survey information explored. Conclusions and recommendations on future courses of action were then based upon these relationships.

Advisor: Dr. William L. Seaver


The State of Tennessee sells approximately 1.2 million hunting and fishing licenses to out-of-state residents annually, but little information is known about those people. In the spring of 1998, the Human Dimensions Research Lab at The University of Tennessee interviewed 998 nonresident anglers by telephone. Information was gathered about the anglers' fishing activities in Tennessee and questions asked about their motivation or reasons for coming to Tennessee to fish. The data consists of mixed variable types, including binary, nominal, ordinal, and continuous. Issues to be addressed would include the creation of the dissimilarity or similarity matrix, outliers, appropriate clustering techniques, and most importantly hard versus fuzzy clustering methods. With the aid of cluster analysis and other multivariate techniques, this paper will attempt to identify customer profiles of the out-of-state residents fishing in Tennessee. It is expected that these profiles overlap, and thus the fuzzy approach will be more appropriate. Identifiable clusters will aid the Tennessee Wildlife Resources Agency in their marketing and communication efforts. From a tourism and business aspect, this information is also of value to the direct marketing by the small business owners who sell out-of-state licenses and to assessing economic impacts in the state.

Advisor: Dr. William L. Seaver
Su, L., "Multi-Sample Cluster Analysis of Seemingly Unrelated Regression Models"

This project deals with statistical modeling of the Seemingly Unrelated Regressions (SUR) model, where cross-sectional correlation should be taken into consideration by estimating regression equations simultaneously. The classical SUR setup views each group as heterogeneous hence estimates an unrestricted model. However, based upon the Informational Complexity (ICOMP and ICOMP(IFIM)) criteria, I can test the homogeneity of the groups in the model, which will greatly simplify the model structure. A combinatorial grouping algorithm is used to perform the FGLS regression analysis. To determine whether the pooling of data sets is appropriate, I apply ICOMP and ICOMP(IFIM) scores to each set of regression estimates. The main purpose of this project is to develop a Matlab routine that provides an automated procedure of constructing the super X matrix and the error covariance matrix, according to all possible grouping combinations of various groups. Then I will utilize the information criteria to evaluate the performance of each grouping scheme and decide the best grouping model.

Advisor: Dr. Hamparsum Bozdogan

Wilson, T., "Transforming Skewed Data into Simpler Quality Control Methods"

The control chart constants for Shewhart X-bar, R charts are based on a normal distribution. However, it is sometimes known that if a process is in control, it will likely have a skewed distribution. This means that control charts (especially the R chart) may indicate an "out of control" condition as a result of the skewed nature of the data. To address this issue, this paper proposes development of a simple technique to chart processes that may produce skewed data. Much of the research in this area has been focused on unique situation, therefore the results often do not hold in the generalized state. However, there are two possibilities that stand out, the weighted variance method and a simple natural logarithmic transformation. These techniques are chosen for their overall simplicity and possible application to various instances. Unfortunately, it is found through this study that there is no simple solution and that both techniques have serious issues that need to be resolved. The weighted variance technique seems to out-perform the transformation in most instances; however it still has many limitations.

Presentations

Bozdogan, H., "Information Complexity Criteria for Detecting Influential Observations in Dynamic Multivariate Linear Models Using the Genetic Algorithm." Invited paper presented at the 23rd Conference of the German Classification Society, University of Bielefeld, March 10-12, 1999, Bielefeld, Germany.


Algorithms and Information Complexity at the CSNA-99 Annual Meeting at the University of Pittsburgh, June 10-13, 1999, Pittsburgh, PA.


Grants and Contracts


Bozdogan, H., Principal Investigator of project: Dynamic Linear Models for Forecasting Using the Genetic Algorithm and Informational Complexity as the Fitness Function. Sponsored by the National Science Foundation (NSF), Statistics & Probability Program. Project Period: 5/1/2000 to 2/28/2003, proposed amount $356,829. In submission. (Dr. Peter M. Bearse & Dr. Michael Vose Co-PI's.)


**HONORS AND AWARDS**

Faculty

Bozdogan, H., Invited to visit the prestigious Center for Economic Research, Tilburg University, Tilburg, the Netherlands, May 10-30, 1999.


Bozdogan, H., Small Grant award, Office of Research, College of Business Administration, and the Department of Statistics. To present the results of "*Multivariate Regression Models for Nonnormal Data: A New Model Selection Approach.*" 52nd Session of ISI in Helsinki, Finland during August 10-18, 1999. Amount, $1,600.00

Mee, R., 1999-2001 Hal and Alma Reagan Scholar Sponsoring Agency: College of Business Administration Date awarded: April 1999

Mee, R., “Honorable Mention Presentation Award” for the 1998 Joint Statistical Meeting presentation "Non-Central Composite Designs." Sponsoring Agency: A.S.A.’s Section on Physical and Engineering Sciences

Sylwester, D., Nominated for Outstanding Teaching Award in spring, 1999.

**Graduate Scholarships**

Sean Groer
Aimee Hughes
Adraine Jordan
Julijana Magda
Kit Pun

**Undergraduate Scholarships**

Christopher Holloman
Christopher Krohn
Madeline McNeeley
Eric Porter
Carolina Pyda
Paul Tanaka

**STUDENT ACTIVITIES**

Sigma Mu Alpha

*President:* Tim Wilson
*Faculty Advisor:* David Sylwester

Student Seminar Series

April 9, 1999
Doug Fair, Pinnacle Group, Inc.

April 21, 1999
Mike McMillan, Selectron

March 29, 1999
Arika Blankenship, Federal Express

November 12, 1998
Stan Rice, Hallmark Cards, Inc.
FACULTY SERVICE TO THE UNIVERSITY

University and College Committees

Hamparsum Bozdogan

• CBA Promotion and Tenure Committee, 1997-2000.
• CBA Faculty Research Council, 1998-.
• Co-Chair of Research Infrastructure Committee, UTK Research Council, 1998-2001. Appointed by the Chair of the Research Council.
• APEC Focus Area: Computational and Informational Science Advisory Committee of the Vice Chancellor for Academic Affairs, The University of Tennessee, 1998-1999.
• High Performance Computing Committee of the Vice Chancellor for Division of Information Infrastructure (DII), The University of Tennessee, 1998-.
• Chancellor's Search Committee for the Vice Chancellor for Division of Information Infrastructure (DII), The University of Tennessee, 1999-.

Robert Mee
• Chair, Industrial Engineering Department Head Search.

Thesis and Dissertation Committees

Hamparsum Bozdogan
• Carol Bruce, Child & Family Studies, The University of Tennessee, Ph.D., Spring, 1999.

David Sylwester
• Kevin James, Department of Accounting and Business Law
• Meiling Shih, College of Communications
• Wesley White

Esteban Walker
• Huo Li, Biochemical/cellular/molecular Biology

Mary Sue Younger
• Dana Bagwell, MS, College of Communications
• Greg Casalenuovo, Ph.D., Nursing
• Xiao Gao, MS, Textile Science
• Sam Howard, Ph.D., Civil and Environmental Engineering
• Michael Janis, MS, Wildlife Sciences
• Catherine Mayhew, MS, Agricultural and Biosystems Engineering Technology
• Andy Milligan, Ph.D., Civil Engineering
• Kristi Nelms, Ph.D., Edd Leadership Studies in Education

Other Activities

Hamparsum Bozdogan
• Dr. Hamparsum Bozdogan, McKenzie Professor in Business, in Information Complexity and Model Selection of the Department of Statistics at UTK together with Dr. Jan Magnus, Distinguished Professor in Econometrics at the Center for Economic Research at Tilburg University in Tilburg, the
Netherlands, in May of 1999, developed a new methodology to model the long standing problem of model misspecification in high dimensional linear models. Model misspecification issues arise when a researcher or a practitioner misspecifies their underlying probability model in analyzing their data sets. Often misspecification occurs when the data have many collinear predictors, when data have high skewness and kurtosis present, when data have autocorrelation and heteroscedascity in the disturbances. In such situations, the usual normal theory linear model is no longer adequate to achieve the best fit. Bozdogan/Magnus technique is also applicable to nonlinear models and structures. Their work is taken seriously by the community of statistical modelers as a new result on a long standing problem with applications in economics, econometric modeling, social and behavioral research, financial computations, market research, and in engineering applications.

- Ham was invited to the prestigious Center for Economic Research at the University of Tilburg in Tilburg, the Netherlands to give lectures on information complexity criteria and its general applications to the econometric modeling and forecasting problems during May 7-31, 1999. The resolution to the model misspecification problem has been the result of such a visit.
- John Wiley & Sons of England, extended a contract to Ham for a Workshop/Conference Proceedings on "Applications of Matrix Differential Calculus in Multivariate Modeling: A Computational Approach" which is planned to take place here at UTK.
- Dr. Ham Bozdogan has been named "The Toby and Brenda McKenzie Professor in Business, in Information Complexity and Model Selection" on April 6, 1999. Duties include to help facilitate significant activity in integrated, cross-functional research. To bring together the most current statistical science with the demands and needs of today's business management activity. To transcend the theoretical work of statistics to the arena of functional discipline work in business.

Charles M. Cwiek
- Manager for graphics used in the Center for Executive Education seminars.
- Faculty Advisor for the University of Tennessee Ultimate Frisbee Club.

David Sylwester
- Taught a one credit statistics course to students in the UT Honors Program in spring, 1999.
- Taught in the 1998-99 offerings of the regular UT MBA program. **Statistics 320: Regression**
  Prepared materials and successfully taught undergraduate regression course, including use of JMP data analysis package.
- Taught in the 1999 UT Taiwan Executive MBA program in Taipei, Taiwan.
- Continued to teach in the MDC course "Practical Strategies for Process Improvement."

Esteban Walker
- Instructor in the Professional MBA program.

M.S. Younger
- Summer, 99: Taught the Department’s first Web course: Stat 571 (Statistical Methods). Used Centra software, which is interactive
two-way live audio. Students’ view
prepared lecture slides and
demonstrations of software in real
time. Course was enthusiastically
received by 12 students. Eventually,
Stat 571, 572, and 573 will be
offered online in summer, fall, and
spring semesters, respectively.

Service to the Department

Graduate Program

Hamparsum Bozdogan
Mary Leitnaker
David Sylwester (Chair)
William Parr
Esteban Walker (MS Recruiting)

Ph.D. Program

Frank Guess, (Chair)

IGSP Program

Mary Sue Younger, (Chair)

Undergraduate Student Affairs

Sharon Neidert (Chair)
John Philpot
Paul Wright
William Seaver

Technology

Ramón V. León (Chair)
Hamparsum Bozdogan
Jim Schmidhammer
Esteban Walker

Paul Wright

SMCL Director

Hamparsum Bozdogan

Distance Learning (ad hoc)

Hamparsum Bozdogan
Ramón León
Robert Mee
David Sylwester
Mary Sue Younger

Statistics 201 Coordinator

John Philpot

Service to the Profession

Hamparsum Bozdogan

• Member, American Statistical
  Association
• Member, The Classification
  Society of North America
  (CSNA)
• Member, Research
  Association of Statistical
  Sciences (RASS) Kyushu,
  University, Fukuoka, Japan
• Member, Japan Statistical
  Society (JSS) elected
  member
• Member, International
  Society for Bayesian
  Analysis (ISBA)
• Referee for:
  • Journal of the American
    Statistical Association
    (JASA)
  • Statistics and Probability
    Letters
• Annals of the Institute of Statistical Mathematics (AISM)
• Computational Statistics and Data Analysis
• Journal of the Japan Statistical Society (JJSS)
• Multivariate Behavioral Research (MBR)
• Psychometrika
• Psychological Bulletin
• Journal of Applied Stochastic Models and Data Analysis
• Journal of Royal Statistical Society
• Journal of Statistical Computation and Simulation and Inference

Ramón León
• Webmaster for ASA’s Quality and Productivity Section

Robert Mee
• Associate Editor for Technometrics, second term.
• Member, American Statistical Association
• Member, American Society for Quality
  Referee for:
  • The American Statistician (three times)
  • Journal of American Statistical Association
  • Journal of Quality Technology
  • Journal of Statistical Planning and Inference (twice)

William C. Parr
• Member, American Society for Quality
• Member, American Statistical Association
• Chair, Deming Lecture Committee, American Statistical Association, 1998–2000

David L. Sylwester
  Referee for:
  Journal of Statistical Education

Esteban Walker
• Quality and Productivity Section of ASA Newsletter Associate Editor

Paul Wright
Referee for:
• Journal of Computational and Graphical Statistics
• Technometrics

M.S. Younger
• Member, American Statistical Association and East Tennessee Chapter
## 1998 - 1999 COURSE OFFERINGS

### Undergraduate Courses

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course</th>
<th>Sections Offered</th>
<th>Enrollment</th>
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<td>Regression and Correlation Methods</td>
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<td>461</td>
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<td>463</td>
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<td>483</td>
<td>Special Topics</td>
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<td>485</td>
<td>Principles of Statistical Process Management (Non-Lecture)</td>
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<td>492</td>
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<td>493</td>
<td>Independent Study (Non-Lecture)</td>
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TOTAL: 15 17 10 42 994 Fall 947 Spring 312 Summer 2253

### Graduate Courses

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CONTINUING EDUCATION AND STATISTICAL CONSULTING

UT Hospital and Medical Research Center (E. Walker)

The Statistics Department continues to provide statistical consulting for the medical community at UTMC.

The projects in which we were involved are

- Bacterial contamination rate of two feed formulations.
- Comparison of regiments for pain management.

Center for Executive Education

The University of Tennessee's Institutes for Productivity through Quality began in 1981, in response to an outcry from industry for help in responding to the challenges presented by their international competitors. One goal of these Institutes, as they have now evolved, is to offer organizations a comprehensive set of integrated courses in managing. These courses revolve around a set of central themes:

- Management of strategic organizational supra-systems
- Customer value
- Managing in the presence of variation

The first course, the Three-week Institute for Productivity through Quality, has been in operation since 1981, with participants from operational levels in organizations from virtually all segments of the U.S. economy. Courses currently offered are:

- Basics of Multifactor Experimentation: A one-week course providing a strategy for planning effective experiments, with an emphasis on two-level factorial and fractional factorial designs.

- Black Belt Certification: Black Belt Certification is a two-step process that includes coursework and demonstration of mastery. The coursework is completed at UT's Center for Executive Education and mastery is demonstrated at each candidate's work site. Coursework: Practical Strategies for Process Improvement. (Three-week course completed at UT. See "Black B Certification Vital Statistics" for dates.) Basics of Multifactor Experimentation. (One-week course completed at UT. See "Black Belt Certification Vital Statistics" for dates.)
• **Lean Enterprise Systems**: A one-week course teaching the concepts and principles needed to improve product delivery, process design and performance.

• **Management Development Program**: The program is designed for mid-level managers from any functional area who want to broaden and improve their managerial skills. It is appropriate for both the experienced manager and the individual being developed for a mid-level position. There are no formal educational requirements for admission, but participants should have an understanding and appreciation of basic management concepts as well as some previous managerial experience.

• **Practical Strategies for Process Improvement**: (Previously Three Week Institute for Productivity through Quality). A three-week course focused on sub-grouping plans for data collection, operational definitions, measurement, capability and design experiments, and control charts.

• **Response Surface Methodology**: A one-week course teaching statistical methods for optimizing the performance of product and process through designed experimentation.

• **The Service Institute**: A two-week course covering philosophy and tools of continuous improvement for mid-level managers from service organizations.

• **The Cost Management Institute**: A one-week program providing an understanding of the changing responsibilities of managers of accounting and financial information in the operating environment of today’s globally competitive firms.

These programs have had a profound impact on the curriculum offered to students in the Department of Statistics. Numerous students have the opportunity to be exposed to these programs, and the participants in these programs, as part of their work for financial support. This gives them valuable exposure to organizational reality. Statistics 566 involves coverage of an extensive collection of cases, which are used in the Institutes for Productivity through Quality, and is taken by virtually all M.S. students in Statistics. Statistics 365 also involves several cases from the Institutes, and is taken by all undergraduate Statistics Majors.

The following Statistics faculty participated in teaching these programs:

<table>
<thead>
<tr>
<th>Charles Cwiek</th>
<th>Robert Mee</th>
<th>Richard Sanders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mary Leitnaker</td>
<td>Sharon Neidert</td>
<td>David Sylwester</td>
</tr>
<tr>
<td>Ramon Leon</td>
<td>Bill Parr</td>
<td>Jim Schmidhammer</td>
</tr>
<tr>
<td>Robert McLean</td>
<td>John Philpot</td>
<td>Esteban Walker</td>
</tr>
</tbody>
</table>
Blue Cross Blue Shield

Dr. Bill Seaver has obtained a $170,000 contract with Blue Cross/Blue Shield to enable them to monitor, analyze, and continuously improve customer satisfaction for four eligibility groups in five regions of Tennessee. This research work is a collaborative effort between the Statistics Department and the Office for Customer/Responsiveness Studies within the Department of Marketing, Logistics, and Transportation. Once a customer satisfaction measurement system is established for the four eligibility groups (true Medicaid, blind/disabled, dual originals, and the uninsurable), there will be a statistical analysis of the eligibility groups individually and by region. This particular research work involves sampling issues, parametric and non-parametric methods, multivariate analysis, and SPC.