Statistical Laboratory & Department of Statistics

Annual Report

July 1, 2002 to June 30, 2003

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

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DEPARTMENT OVERVIEW
2002-03

I assumed the positions of Interim Chair of the Department of Statistics and Director of the Statistical Laboratory in November, 2002. Dean Isaacson stepped down after eighteen years of extremely fruitful leadership. Under Dean's direction, the program remained solidly in the upper quarter of the NRC ranking of statistics programs. Faculty participation in sponsored research grew from about $2 million annually in the mid 90's to over $12 million in 2002. The graduate program grew from 90 graduate students in 1985 to 146 on-campus graduate students in 2002. The adjective "on-campus" is now needed, because Dean was the driving force in establishing cooperative agreements with General Motors Corporation and the Mayo Clinic that were the springboard for offering our M.S. degree in Statistics to off-campus students. Twelve students have received M.S. degrees in Statistics since this program was initiated in 1995 and we currently have 32 active students in this program. In summer 2002, the Department of Statistics, General Motors and the Mayo Clinic were honored with the first national award for Statistical Partnership among Academe, Industry and Government (SPAIG) given by the American Statistical Association.

Dean Isaacson and Mark Kaiser were instrumental in garnering a National Science Foundation (NSF) grant for Vertical Integration of Research and Education (VIGRE) in the Mathematical Sciences. This is a five-year program that supports graduate students and post doctoral fellows, who are U.S. citizens, through scholarships, stipends and professional development money, and it supports summer research experiences for undergraduate students. It has inspired a department wide effort that has profoundly affected both our graduate and undergraduate programs, and resulting innovations and activities are reviewed in this report. We will have our three-year review in the fall of 2003.

Dean Isaacson will remain on our faculty as a Professor of Statistics and the Director of Graduate Education. As co-Principal Investigator for two NSF sponsored programs, he continues to lead ISU's efforts to encourage minority students to pursue graduate study in statistics and other mathematical sciences. Iowa State will host eleven minority students for undergraduate summer research experiences in Science, Mathematics and Engineering in the summer of 2003. Iowa State University will also provide up to five AGEP Fellowships for Ph.D. students. The Alliance for the production of African American Ph.D.'s in the Mathematical Sciences has established partnerships with Florida A & M Univ., Alabama A & M Univ., Jackson State Univ., Benedict College, the Univ. of Iowa, Iowa State Univ., and the Univ. of Northern Iowa. Derrick Rollins, serves as a mentor for Jackson State Univ.

The biggest challenge facing our program is replacing retiring faculty. We have had seven retirements during the last five years: David F. Cox (University Professor 1997), Herbert T. David (University Professor 1998), Paul Hinz (University Professor 1999), Richard Groeneveld (University Professor 2000), Edward Pollak (Full Professor 2000), S. Sukhatme (Associate Professor 2000), Wayne A. Fuller (Distinguished Professor Emeritus 2001), and several resignations. After serving three years as an NSF Program Director, John Stufken resigned to become Chair of the Department of Statistics at the University of Georgia. After a two-year visit to the IBM Watson Research Institute, Yasuo Amemiya accepted a permanent position as a research program manager. Kirk Wolter decided to return to the National Opinion Research Center in Chicago. All three will be dearly missed. It has been a struggle to replace so many excellent people in such a short time period, but we have made some excellent hires in the last few years and two more associate professors and two new assistant professors will join us in fall 2003. We have received strong support from the University administration in this effort.

During this transition our program remains strong and highly productive. Led by fourteen Fellows of the American Statistical Association and four fellows of the Institute of Mathematical Statistics, we continue to make significant contributions to statistical research, service to the profession, and statistical education. We have very strong programs in engineering statistics, survey sampling, biological and environmental statistics and an excellent core of theoretical statisticians. We are rebuilding and expanding strength in statistical computing, genomics and bioinformatics. We continue to recruit and train outstanding graduate students. Our future is extremely bright. This report reviews some of our accomplishments during the past academic year.

PERSONNEL

Visiting Faculty

Bandyopadhyay, Tathagata, (1/2003-5/2003). Associate Professor, University of Calcutta, India. Bandyopadhyay worked with Taps Maiti. His interests are generalized linear model, generalized linear mixed model and analysis of count data. Dr. Bandyopadhyay received his Ph.D. from University of Calcutta, India.

Kang, Shin-Soo, (1/2003-9/2003). Associate Professor, Department of Information and Statistics, KwanDong University, Kangwon-Do, South Korea. He organized a series of seminars on missing data issues and worked with Fred Lorenz and Ken Koehler on imputation procedures for the analysis of categorical data and structural equation models. Dr. Kang received his Ph.D. from ISU in 1994.

Oh, Jong Chul, (7/2002-7/2003). Associate Professor, Seoul National University, Korea. Oh worked with Yuhong Yang. His interests are in the areas of nonparametric density estimation, Bayesian theory and experimental design. Dr. Oh received his Ph.D. from KAIST, Daejon, Korea.

Zerom, Dawit (David), (1/2003-3/2003). Assistant Research Professor, University of Amsterdam, Netherlands. Zerom worked with Yuhong Yang. His interests are forecasting, time series analysis, financial data analysis. Dr. Zerom received his Ph.D. from the University of Amsterdam, Netherlands.

Emeritus Faculty

Cox, C. Philip, Emeritus Professor

Cox, David F., Emeritus University Professor

David, Herbert A., Emeritus Distinguished Professor

David, Herbert T., Emeritus University Professor

Fuller, Wayne A., Emeritus Distinguished Professor, CSSM

Groeneveld, Richard, Emeritus University Professor

Harville, David A., Emeritus Professor

Hickman, Roy D., Emeritus Professor

Hinz, Paul, Emeritus University Professor

Hotchkiss, Donald K., Emeritus Professor

Pollak, Edward, Emeritus Professor

Strahan, Robert F., Emeritus Professor

Sukhatme, Shashikala, Emeritus Associate Professor

Wolins, LeRoy, Emeritus Professor

Professors

Amemiya, Yasuo, (on leave)

Athreya, Krishna B., Distinguished Professor, Joint appointment with the Dept. of Mathematics (on leave)

Bailey, **Theodore B.**

Bonett, Douglas G., Joint appointment with the Dept. of Psychology

Brendel, Volker, Courtesy appointment through the Dept. of Zoology and Genetics

Carriquiry, Alicia L.

Dixon, Philip M.

Isaacson, Dean L., Chair of the Department, Director of the Statistical Laboratory (-11/6/2002)

Kennedy, William J., Jr.

Koehler, Kenneth J., University Professor, Interim Chair of the Department, Interim Director of the Statistical Laboratory (11/6/2002-6/30/2003)

Lahiri, Soumendra N.

Lorenz, Frederick O., University Professor, Joint appointment with the Dept. of Sociology

Meeker, William Q., Jr., Distinguished Professor

Morris, Max D., Joint appointment with the Dept. of Industrial and Manufacturing Systems Engineering

Shelley, Mack C., II, Joint appointment with the Dept. of Educational Leadership and Policy Studies

Stephenson, W. Robert, University Professor

Stufken, John, Professor (on leave)

Vardeman, Stephen B., Joint appointment with the Dept. of Industrial and Manufacturing Systems Engineering

Wolter, Kirk, Director of IRISS

Associate Professors

Cook, Dianne

Kaiser, Mark S.

Marasinghe, Mervyn G.

Nettleton, Daniel S.

Nusser, Sarah M., CSSM Director

Opsomer, Jean D., CSSM

Roberts, Carl W., Joint appointment with the Dept. of Sociology

Rollins, Derrick K., Joint appointment with the Dept. of Chemical Engineering

Sherman, Peter J., Joint appointment with the Dept. of Aerospace Engineering & Engineering Mechanics

Yang, Yuhong

Assistant Professors

Adams, Dean C., Courtesy appointment through the Dept. of Zoology and Genetics

Dorman, Karin S., Joint appointment with the Dept. of Zoology and Genetics

Duckworth, William M., II

Evans, Richard, Courtesy appointment through the College of Veterinary Medicine

Froelich, Amy G.

Hofmann, Heike

Huang, Tzee Ming

Maiti, Tapabrata (Taps), CSSM

Wu, Huaiqing

Instructors/Lecturers

Bhattacharya, Jahnabimala, Lecturer

Faculty Collaborators

Therneau, Terry M., Mayo Clinic

Sargent, Dan, Mayo Clinic

Sloan, Jeff, Mayo Clinic

USDA Collaborators

Dayton, **Bob**, USDA Natural Resources Conservation Service

Thompson, Dean, USDA Natural Resources Conservation Service

Wilson, Herb, USDA Natural Resources Conservation Service

Postdoctoral Research Associate

Henderson, David, DNA
Theus, Martin, University of Augsburg, Germany

Professional and Scientific Staff

Anderson, Dianne, Program Coordinator III, Center for Survey Statistics & Methodology (CSSM)
Anderson, Linda, Systems Analyst I, CSSM
Bell, Andrew, Systems Analyst III, CSSM
Butler, Howard, Systems Analyst II, CSSM
Dorsch, Richard, Systems Analyst III, CSSM
Fliehler, Karen, Program Assistant II, CSSM
Hoffman, Russ, Systems Support Specialist IV, CSSM
Kazemi, Masoud, Systems Analyst III, CSSM
Kienzler, Jim, Associate Scientist, CSSM
Krueger, Todd, Systems Analyst III, CSSM
Landin, Edith, Administrative Specialist, Statistical Laboratory and Statistics Department
Larson, Jan, Program Coordinator I, CSSM
Peterson, Ted, Systems Analyst II, Statistical Laboratory and CSSM,
Reed-Margetan, **Deborah**, Systems Analyst II, CSSM
Rogers, Marc, Systems Analyst II, CSSM
Shelley, Kathy, Systems Analyst
Smith, Sandie, Administrative Specialist I, CSSM
Terpstra, Harvey, Systems Analyst III, CSSM
Tyler, Allison, Program Assistant II, CSSM
Vardeman, Andrew, Systems Analyst I, CSSM
Weiser, Beth, Program Assistant II, Statistical Laboratory and CSSM

Support Staff

Ashley, Glenda, Key Entry Operator II, CSSM
Elwick, Norma, Secretary II
Gupta, Vemi, Key Entry Operator II, CSSM
Heathman, Nancy, Account Specialist, CSSM
Hewitt, Brenda, Clerk Typist III
La Grange, Jeanette, Clerk Typist III
Martinez, Sherri C., Clerk Typist III
Miller, Denise L., Clerk Typist III
Reinertson, Kathie, Data Tech III, CSSM
Riker, Denise, Secretary II
Shepard, Sharon, Clerk Typist III
Tjernagel, Marlene, Account Clerk

STUDENTS

Graduates

Ph.D. Graduates

Name	Graduation
Chen, Peiqi (co-major with Animal Science)	Summer 2002
Dietz, Zachariah Espe	Spring 2003
Eickhoff, Jens C.	Summer 2002
Nordman, Daniel John	Summer 2002
Park, Mingue	Summer 2002
Qu, Yongming	Summer 2002
Wright, James Hollis, Jr.	Fall 2002
Zhang, Yao	Summer 2002
Zhao, Yan	Summer 2002

M.S. Graduates

Name	Graduation
Barbosa, Denize Araujo	Fall 2002
Benson, Tammy Jean	Fall 2002
Cai, Wenzheng	Spring 2003
Czuprynski, Jennifer Sue	Spring 2003
DeCook, Rhonda Renae	Fall 2002
Foster, Nathan Royce	Summer 2002
Furth, Alfred Franklin	Summer 2002
Gonzalez, Luis Cuauhtemoc	Fall 2002
Gu, Jianying	Fall 2002
Hu, Zhenya	Summer 2002
Hulting, Sandra Malou	Summer 2002
Jiang, Qi	Fall 2002
Kies-Bokenkroger, C. D.	Spring 2003
Legg, Jason Colin	Fall 2002
Li, Dong	Fall 2002
Li, Xiao-Lan	Spring 2003
Liu, Feng	Summer 2002
Liu, Tao	Summer 2002
Lou, Xiaoxia	Summer 2002
Love, Tanzy Mae Tallapoosa	Fall 2002
Lu, Yun	Summer 2002
Ma, Haiming	Spring 2003
Minkov, Ivaylo Petrov	Spring 2003
Ott, Ellis Michael	Summer 2002
Qiao, Wei	Spring 2003
Qu, Lixin	Spring 2003
Shi, Weiping	Spring 2003
Shi, Zhengxue	Summer 2002
Sinnwell, Jason Paul	Summer 2002
Suarez, Manuel J.	Fall 2002
Wang, Renwei	Spring 2003.
Williams, Matthew T.	Fall 2002
Xiong, Cuilin	Fall 2002
Yuan, Zheng	Summer 2002
Zhai, Dongmei	Fall 2002
Zhang, Hongling	Fall 2002

Zhang, Wuyan	Fall 2002
Zhang, Yan	Spring 2003
Zhao, Hua-Liang	Spring 2003
Zuo, Jianying (Angela) (double degree: Business Admin.)	Summer 2002

B.S. Graduates

Name	Graduation
Alfred, Arthur Bruce, III	Spring 2003
Brei, Elizabeth Marie (dbl major: Finance)	Spring 2003
Caruth, Bradley Russell (dbl major: Econ)	Spring 2003
Lin, Tsu-Ting (Tim) (majors also in Math & Econ)	Spring 2003
Liu, Yan-Jung (Tina)	Spring 2003
McIllece, Justin Jon	Spring 2003

Current Students

Ph.D. Students

BOTTS, Carsten (USA)

CAMANO-GARCIA, Gabriel (Uruguay)

CHEN, Lihua (China)

DECOCK, Dean (USA)

DECOOK, Rhonda Renae (USA)

DRIGNEI, Dorin (Romania)

ERAAS, Michael (USA)

ESKER, Paul (USA)
co-major: Plant Pathology

FERRAZ, Cristiano (Brazil)

FRIDLEY, Brooke (USA)

FURUKAWA, Kyoji (Japan)

HEILMANN, Cory (USA)

HUARNG, Shiaau-Er (Taiwan)

ILK, Ozlem (Turkey)

JIANG, Qi (China)
co-major: Industrial Education & Tech.

JOVAAG, Kari (USA)
co-major: Ecol. & Evolutionary Biology

KIES-BOKENKROGER, Courtney (USA)

KIM, Ji-Yeon (Korea)

LANDES, Reid (USA)

LEE, EunKyung (Korea)

LEGG, Jason (USA)

LEYVA-ESTRADA, Norma (Mexico)

LI, Xiao Xi (China)

LI, Yunfeng (China)

LOVE, Tanzy (USA)

MILLER, Curtis (USA)

MONTEIRO, Carla (Brazil)

MONTGOMERY, Samantha (USA)

NGIGI, Bernard (Kenya)

O'BRIEN, Robert C. (USA)

OTT, Ellis (USA)
co-major: Higher Education

RECKNOR, Justin (USA)
co-major: Bioinform. & Comp. Biology

SILVA, Damiao Nobrega da (Brazil)

STAGGS, Vincent S. (USA)

SUN, Shuxia (China)

TESSIN, Dale (USA)
co-major: Ecol. & Evolutionary Biology

VILLANUEVA-MORALES, Antonio (Mexico)

WANG, Jing (China)
co-major: Animal Science

WU, Han (China)

YODER, Jill (USA)

ZHAI, Dongmei (China)
co-major: Chemical Engeneering

ZHANG, Hongmei (China)

ZHANG, Wuyan (China)

ZHANG, Xiaohong (Alicia) (China)

ZHANG, Zhongqi (China)
co-major: Bioinform. & Comp. Biology

ZHOU, Zhigang (China)

ZUO, Jianying (Angela) (China)

M.S. Students

AU, Pui-Shan (Angela) (China)
BALAZS, Andrew (USA)
BONITZ, Erin (USA)
BROWN, Tamara (USA)
BURGER, Jude (USA)
BURKART, Christopher (USA)
CHEN, Ying-Chi (Taiwan)
CHIN, Swee-Teng (Malaysia)
CHIN, William Hawk-Lee (Australia)
DEMIRKALE, Cumhur Yusuf (Turkey)
DIAO, Lixia (China)
DU, Guodong (China)
EKE, Alp (Turkey)
ELCI, Okan Umit (Turkey)
FAN, Peng (China)
FANG, Cheng (Canada)
FANG, Shu-Ann (Taiwan)
FENG, Hongli (China)
GAO, Xiang (China)
GRAY, Nicole (USA)
GUAN, Jie (Jack) (China)
GUO, Can (China)
GUO, Rong (China)
GUO, Yan (China)
GUO, Yao (China)
HARDJASAMUDRA, Aulia (Indonesia)
HAYES, Brian L. (USA)
HOEKSTRA, Peter N. (USA)
HUANG, Ling (China)
HUCKETT, Jennifer (USA)
JENSEN, Kathryn M. (USA)
JIA, Hongwu (China)
LARSON, Gabrielle (USA)
LI, Tianyu (China)
LI, Yan (China)
LIU, Hongjun (China)
LIU, Xiaopeng (Ruth) (China)
LU, Pengcheng (China)
LU, Zheng (China)
LUO, Yangyang (China)
MA, Haijun (China)
MACKE, Patrick (USA)
MAXSON, Melanie (USA)
MEI, Qiang (China)
MUKHOPADHYAY, Pushpal (India)
OZAWA, Haishin (Japan)
PAIK, Min Hui (Korea)
PAN, Tiana Ying-Hsuan (Taiwan)
PAN, Yijiang (China)
PREW, Paul (USA)
QAMHIEH, Hekmat (Jordan)
QI, Lanying (China)
QIU, Fang (China)
RAMBLER, Ivan (USA)
REISING, Monica (USA)
SCHROEDER, Paul (USA)
SKALLAND, Benjamin (USA)
SOLANKI, Aparna (India)
SUN, Donglin (China)
VACA TRIGO, Iliana (Ecuador)
VAN WETTERING, Jill (USA)
WANG, Changxue (China)
WANG, Mingjuan (China)
WANG, Yaqin (China)
WANG, Yong (China)
WANG, Yongyi (China)
WANG, Yurong (China)
WEN, Li (Cathy) (China)
WHITE, Emile (USA)
WILLIS, Luke (USA)
WU, Yu (China)
WU, Yufang (Christina) (China)
XI, Peiyi (Peggy) (China)
XIANG, Qun (China)
XU, Xia (China)
YAN, Jun (China)
YANG, Hao (China)
YOU, Lifeng (China)
ZHANG, Bin (China)
ZHANG, LingHong (China)
ZHANG-MURRAY, Yanan (China)
ZHAO, Honghua (China)
ZHAO, Huiyan (China)
ZHENG, Yan (China)
ZHOU, Ai-Hua (China)
ZHOU, Hua (China)
ZHU, Wenxiang (China)
ZHUANG, Weihong (China)

B.S. Students

BRIAR, Jessica Sue
BROWN, Megan Ann
CHOI, Hyun (Ken)
DARBYSHIRE, Megan A. (dbl major: Psych)
DRIES, Brandi Malia
ESLICK, Andrea Nicole (dbl major: Psych)
FICK, Karl Donald (dbl major: Math)
FRANCK, Veronica Jean (dbl major: Psych)
HAGEN, Randi Marie
HOBBS, Jonathan Michael (dbl major: Meteor)
HUMMER, Patrick J. (dbl major: Math)
MARTIN, Robert Thomas
MARTIN, Ryan Thomas
MCCLUNG, Lindsay Lorene
MCFADDEN, Lisa Marie
NUCKOLLS, Jill Elizabeth
PARRA, Stephanie L. (dbl major: Math)
ROUPE, Katie A.
SWANSON, Jessica
TAN, Han-Huan
WROBEL, Brian David
ZALETEL, Justin Edward

DEPARTMENTAL NEWS 2002-03

Conference on Topics in Linear Algebra

The Department of Statistics was one of four sponsors that held the Topics in Linear Algebra Conference on September 13-14, 2002 in the Pioneer Room at Memorial Union. The other three sponsors were: Institute for Mathematics and Its Applications (IMA), International Linear Algebra Society (ILAS), and the Iowa State University Department of Mathematics. Huaiqing Wu and Dean Isaacson attended the conference.

Huaiqing Wu spoke on *"Optimal designs for first-order trigonometric regression on a partial cycle*".

Group picture of attendees at the Topics in Linear Algebra Conference

Miller Faculty Fellowship Award

Engaging Students in Statistical Discovery

This award was used to develop materials including enhanced lectures, in-class demonstrations, group activities and laboratory experiences for use in a special section of STAT 101 aimed at mathematically-adept students. One of the goals of the new materials was to engage students in discovery using the ideas and methods of statistics. Materials developed for this special section that prove to be successful will be adapted for use in regular sections of Statistics 101.

Bob Stephenson, Amy Froelich, Bill Duckworth

The work done under this award will be used in a future National Science Foundation grant proposal.

Stat-ers

Officers for 2002-03:

Tammy Brown..... President
Jen Huckett..... Vice President
Gabriel Camano..... Treasurer
Tanzy Love..... Secretary
Katy Jensen..... Social Committee
Holly Kleinmeyer..... Social Committee
Nichole Gray..... Social Committee
Ben Jones..... Social Committee
Norma Leyva-Estrada..... International Committee
Alicia Zhang..... International Committee
Emile White..... Intramural Coordinator
Ivan Ramler..... Webmaster
Curtis Miller..... Recycling Coordinator
Tanzy Love..... Service Coordinator
Melanie Maxson..... Birthday Coordinator
Pat Macke..... First Year Representative
Kira Barclay..... First Year Representative
Dr. Max Morris..... Faculty Advisor
Dr. Amy Froelich..... Faculty Advisor

Stat-ers Seminars:

This years STAT-ers seminars included presentations by recruiters, professors and grad students:

John Deere, Eli Lilly and Corning Inc. visited the department to interview and give students an idea about what professionals do in their organizations.

Dr. Mack Shelley discussed political science and statistics, using methods such as structural equation models, factor analysis, logistic regression, multiple regression/analysis of covariance, and general loglinear models.

Dr. Fred Lorenz discussed ISU's Institute for Social & Behavioral Research (ISBR) illustrating his research with an example that he is currently working on.

Reid Landes and **Justin Recknor** (graduate students) gave a seminar entitled "Clients, Consulting, and Collaborating". **Reid Landes**, Peter Loutzenhiser, and Dr. **Stephen Vardeman** gave a seminar on Hierarchical Bayes Statistical Analyses for a Calibration Experiment.

Resignations

Professor John Stufken left the Department in 2003 to become Chair of the Department of Statistics at the University of Georgia. He was on the faculty at the University of Georgia before joining our program in August 1988. Dr. Stufken made major contributions to our program and the statistical profession in the areas of linear models, design of experiments, optimal designs and crossover experiments. He is an outstanding instructor, and our graduate students elected him "Teacher of the Year" in Spring 2000. He completed three very fruitful years as a Program Director in the Statistics and Probability division at the National Science Foundation prior to moving back to Georgia.

Professor Yasuo Amemiya left the department in June 2003 to become Manager, Statistical Analysis and Forecasting, at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York. Dr. Amemiya received his Ph.D. in Statistics from ISU in 1982, and accepted a position as Assistant Professor with the Department that same year. He was promoted to Associate Professor in 1987 and to Professor in 1993. He was a very active contributor to our program and could teach almost any course we had to offer. Dr. Amemiya won the College of Liberal Arts and Sciences Outstanding Teaching Award in 1999. His research includes significant contributions to multivariate and non-linear errors-in-variables models, multivariate mixed model analysis, latent variable analysis with spatially correlated variables, and non-linear factor analysis. He directed 18 M.S. and 12 Ph.D. students.

Professor Kirk Wolter resigned in June 2003 to return to the National Opinion Research Center in Chicago. Dr. Wolter received his Ph.D. in Statistics from ISU in 1972. He served as Chief of the Statistical Research Division at the U.S. Bureau of Census from 1983-1988, and held Vice President positions at A.C. Nielson and the National Opinion Research Center before returning to ISU in fall 2002 to develop and direct a new research institute for the survey, social and educational sciences. The new Center for Survey Statistics and Methodology (CSSM) was created as part of this endeavor. Dr. Wolter's work fostered a new level of collaboration between survey sample researchers and research centers in the social sciences and education at ISU. CSSM is a very active center with an extremely bright future.

We wish these professors all the best in their new endeavors.

Renovation

The Department of Statistics was successful to obtaining money from the College of Liberal Arts and Sciences to remodel one of our instructional computer labs. New tables and chairs were installed and older workstations were placed. We will also install ceiling-mounted projection equipment in both of our instructional computer labs. These will greatly improve the quality of visual demonstration of statistical concepts and the use of statistics and graphics software.

AWARDS, RECOGNITIONS AND SCHOLARSHIPS

International/National Awards

Statistical Partnerships among Academe, Industry, and Govern-ment (SPAIG), American Statistical Association. 2002.

The Department of Statistics was recognized for significant distance education and degree opportunities for General Motors and the Mayo Clinic employees, the partnerships also provided consulting and research opportunities for Iowa State faculty. It improved statistical practice at General Motors and the Mayo Clinic and resulted in improvements in the Iowa State curriculum for training students for industry and biostatistical careers. ..... *Department of Statistics*

Jerome Sacks Award for Cross-Disciplinary Research, National Institute of Sciences ..... *Max D. Morris*

Marvin Zeler Leadership Award in Statistical Science, presented by the Harvard School of Public Health .....*Wayne A. Fuller*

Outstanding Statistical Application, American Statistical Association ..... *William Q. Meeker, Jr.*

Wakesberg Award, Survey Methodology Invited Paper, **"**Regression Estimation for Survey Samples" .....*Wayne A. Fuller*

Elected a Fellow, American Statistical Association ..... *Soumendra N. Lahiri*

University Awards

Award for Early Excellence in Research, College of Liberal Arts and Sciences .....*Yuhong Yang*

Faculty Development Grant .....*Karin S. Dorman*

ISU Foundation Award for Outstanding Graduate Teaching ..... *Kenneth J. Koehler*

Miller Faculty Fellowship Award ..... *W. Duckworth, A. Froelich, W. R. Stephenson*

2002 Regents Award for Faculty Excellence ..... *Mack C. Shelley, II*

Promotions

University Professor .....*Frederick O. Lorenz*

Graduate Awards & Scholarships

Bancroft Award

Zhongqi Zhang

Charlie Sampson Legacy Fund for Excellence in Statistics

Courtney Kies-Bokenkroger

Dan Mowrey Consulting Excellence Award

Cory Heilmann

Reid Landes

Alumni Sponsored Scholarships

Nichole Gray

Brian L. Hayes

Peter N. Hoekstra

Kathryn M. Jensen

Tanzy Love

Eli Lilly Scholarship

Nichole Gray

Emil Jebe Graduate Fellowship in Statistics Award

Jude J. Burger

Reid Landes

Luke Willis

George W. Snedecor Award in Statistics

Hongmei Zhang

Glaxo-Smith-Kline Industrial Scholarship

Ivan Ramler

Holly C. & E. Beth Fryer Award in Statistics

Cory Heilmann

Norma Leyva-Estrada

Oscar Kempthorne Award

Reid Landes

Procter and Gamble Scholarship

Emile V. White

Quintiles Scholarship

Jennifer Huckett

Rebecca J. Klemm Fellowship in Statistical Communication

Ellis Ott

Richard Kleber-St. Olaf Scholarship

Kathryn M. Jensen

Teaching Excellence Award

Tamara Brown

Tanzy Love

Luke Willis

Team Stat Scholarship

Erin Bonitz

Jennifer Czuprynski

Vera David Graduate Fellowship in Statistics

Yaqin Wang

Haijun Ma

Vince Sposito Award

Benjamin J. Skalland

Vince Sposito Computing Excellence Award

Hongmei Zhang

Undergraduate Scholarships & Awards

Charlie Sampson Legacy Fund for Excellence in Statistics

Elizabeth Brei

George W. Snedecor Undergraduate Statistics Award

Tsu-Ting (Tim) Lin

Yan-Jung (Tina) Liu

Herta & H.T. David Scholarship

Megan Brown

National Merit Scholar

Justin J. McIllece

Procter and Gamble Undergraduate Statistics Scholarship

Jonathan Hobbs

Schillmoeller Family Scholarship in Statistics

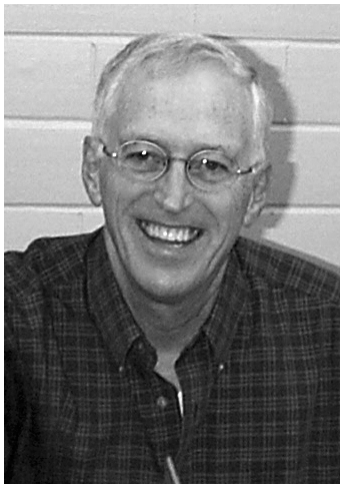
Elizabeth Brei

Megan Brown

Scott Kongable Statistics Scholarship

Brandi Dries

GRADUATE PROGRAM



Dean Isaacson, Director of Graduate Studies

In 2002-03 we had 134 graduate students on campus and another 24 students working on an M.S. degree in Statistics through our distance education program. We awarded 43 M.S. degrees and nine Ph.D. degrees in Statistics. Four of the M.S. degrees were awarded to distance students. Twenty-one of the M.S. graduates continued into the Ph.D. programs at ISU and five entered Ph.D. programs at other Universities. Thirteen took jobs within the U.S. in industry, government or non-profit research centers. One student returned to a government research position in Columbia. Four of the nine Ph.D. recipients accepted jobs at pharmaceutical companies and the others accepted positions at the University of Wisconsin, University of Nebraska, Bucknell University, the University of Dortmund and Iowa State University.

Outreach: We will continue to offer distance education courses for our M.S. degree program in Statistics. We also provide distance courses in statistics for graduate programs in the Colleges of Agriculture, Education and Engineering. Professor Meeker taught a short course in reliability to engineers at General Motors in February 2003.

VIGRE: Year 3 - Blending Disciplines

With the support of the NSF VIGRE (Vertical Integration of Research and Education) grant, there has been a significant increase in the integration of research and education in the Department of Statistics. It has provided rich experiences for gradute and undergraduate students, post doctoral fellows, and faculty. The VIGRE initiative has also inspired some changes in our Ph.D. program. It has also been a factor in the creation of an honors section of our introductory statistic course that provides exciting challenges for highly motivated students. The number of undergraduate statistics majors and the number of U.S. citizens in our Ph.D. program have steadily increased as the VIGRE program has developed.

WORKING GROUPS

The working groups created by the VIGRE initiative have continued to develop. Faculty leaders of the working groups are as follows:

Bioinformatics and Genetic Statistics ..... Dan Nettleton
Ecological and Environmental Statistics ..... Philip Dixon / Mark Kaiser
Engineering Statistics ..... Max Morris
Graphical and Computational Statistics ..... Dianne Cook
Probability and Mathematical Statistics ..... Soumendra N. Lahiri
Statistics in the Social Sciences ..... Fred Lorenz
Survey Statistics ..... Taps Maiti / Sarah Nusser

All of these groups met on a weekly basis to discuss faculty and student research and explore new topics and initiatives. These groups also provide new graduate students with opportunities to become better acquainted with faculty and potential research opportunities.

VIGRE UNDERGRADUATE SUMMER RESEARCH EXPERIENCE

Summer Conference Day

A major benefit of the VIGRE grant was the introduction of a Summer Research Experience for undergraduates. We recruited eight undergraduates for the summer of 2003 and they did exciting research over the eight-week program. Their research involved statistics and another discipline so they saw statistics in action. Each student made an oral presentation and wrote a paper related to their research. Graduate students in the VIGRE program also worked with these students. The students and their faculty mentors for the summer of 2003 are:

Jonathan Hobbs ..... Mark Kaiser and Gene Takle

Yuan Li ..... Dan Nettleton

Daniel Karney ..... Rick Gibbons

Lark Lewis ..... Mack Shelley and Don Whalen

Tina Liu ..... Sarah Nusser

Brandi Logan ..... Fred Lorenz

Carrie Temm ..... Mack Shelley and Don Whalen

Andrew Halvorsen ..... Karin Dorman

VIGRE GRADUATE STUDENTS

The VIGRE program provided support for seven graduate students during the 2002-03 academic year. Two of our VIGRE Fellows started their graduate studies outside of statistics, in Animal Ecology and Plant Pathology. The VIGRE program has broadened and deepended their understanding of statistics, and enabled them to bring their expertise into the teaching of introductory statistics courses for undergraduates in the College of Agriculture. All of the VIGRE graduate fellows participated in mentoring undergraduates in the summer research programs. VIGRE support allows graduate students to spend more time on research. It also broadens educational experiences through the working groups and with support for travel to conferences. The VIGRE scholars for 2002-03:

Rhonda DeCook

Paul Esker

Brook Fridley

Jason Legg

Samantha Montgomery

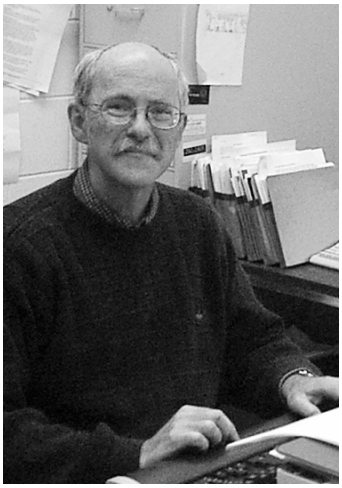
Vincent Staggs

Dale Tessin

Ph.D. PROGRAM

The statistics faculty spent the entire year working on revisions to the Ph.D. program in statistics. Required courses have been reorganized to enable students to take the written preliminary Ph.D. exam after two semesters of study in the Ph.D. program, instead of during their fourth semester in the Ph.D. program. A new required course in statistical methods, Stat 601, has been created and will be part of the written Ph.D. preliminary examination. Ph.D. students will also be required to attend weekly research seminars presented by the VIGRE working groups early in the Ph.D. program. These changes will encourage earlier involvement in research and promote awareness of faculty research interests. We will begin to implement these changes during the 2003-04 academic year.

UNDERGRADUATE PROGRAM



Bob Stephenson, Director of Undergraduate Studies

There were 24 undergraduate majors in statistics in Fall 2002 and 28 in Spring 2003. We were able to award scholarships to four undergraduate students. Five of the six May 2003 graduates will attend graduate school. The sixth student has accepted a position as an actuary at a company in St. Louis.

Participation in Summer 2003 Internships and Programs:

- Elizabeth Brei and Brandi Dries were actuarial interns with CIGNA Insurance Co. in Bloomfield, CT.
- Randi Hagen worked as a summer intern at the USDA National Agriculture Statistics Service in Des Moines, IA
- Tsu Ting (Tim) Lin was an actuarial intern at Watson Wyatt in Minneapolis, MN
- Yan-Jung (Tina) Liu was a summer intern at SprintPCS in Overland Park, KS
- Jonathan Hobbs and Jill Nuckolls participated in the ISU VIGRE Undergraduate Summer Research Experience

Stat 101L

This spring the Department of Statistics offered a special section of Stat 101. This was open by invitation only to freshmen and sophomores with high mathematics ability. There were 25 students enrolled. We hope to use this section to attract more students to a major, or a minor, in statistics. The special section will be offered every spring and will play an important role in the NSF funded project "Conceptual Statistics: Engaging Students in Statistical Discovery."

Service Teaching:

The Undergraduate Committee approved the texts authored by faculty members in the Department for use in the following courses:

- Stat 105 and Stat 305; *Basic Engineering Data Collection and Analysis* by **Stephen B. Vardeman** and Jobe, Duxbury/Thomson Learning.
- Stat 226/326; *Introduction to Practice of Business Statistics* by Moore, McCabe and **Duckworth**, W. H. Freeman Publishers.
- Stat/IMSE 361; *Statistical QualityAssurance Methods for Engineers* by **Stephen B. Vardeman** and Jobe, John Wiley & Sons, Inc.

THE AGEP & ALLIANCE PROGRAMS

Iowa State participated in two NSF grants that support diversity programs. The grants, "Alliance for Graduate Education and the Professoriate" (AGEP) and "The Alliance for the Production of African American Ph.D.s in the Mathematical Sciences" (Alliance), administered by Professor Kutzko at the University of Iowa. Dean Isaacson served as the coordinator at Iowa State University. Both grants bring members of underrepresented groups to Iowa State and Iowa in the summer for a research experience.

As part of the AGEP program, Dr. Koehler and Dr. Lorenz co-advised summer research opportunities for Frederic Douglas and Lance McPherson, undergraduate students at Florida A & M University. These two students, along with Brandi Logan, an undergraduate from Cornell College in the Vertical Integration of Research and Education (VIGRE) sponsored program for undergraduate research opportunities, formed a research team to review statistical methods and analyze longitudinal data linking chronic stress experienced by panel families in the early 1990s to emotional health outcomes reported in 2001. Each student worked on a different aspect of the basic model. Tragically, Lance was killed in an automobile accident while visiting his mother in Chicago during the 4th of July weekend. Frederic was injured in the same accident and could not complete the program. He returned to Florida where he has recovered and is completing his final year at Florida A & M. Ms. Logan completed a paper where depressive symptoms in 2001 were predicted by chronic marital stress, problem-solving skills and the interaction between them. Brandi has returned to Cornell College where she is pursuing majors in mathematics and sociology.

In addition to providing research opportunities for summer research, the AGEP Grant continues the educational process by providing opportunities for graduate study. There are AGEP Fellowships available at all three Regents institutions. Students wanting to earn a MS first can start at the University of Northern Iowa. Iowa State will support six AGEP Fellows, one in Statistics, in 2003-2004.

CENTER FOR SURVEY STATISTICS AND METHODOLOGY (CSSM)

The Survey Section of the Statistical Laboratory officially became the Center for Survey Statistics and Methodology (CSSM) in November 2002. Under the direction of Sarah M. Nusser, CSSM continues to provide consultation and direct operational assistance to researchers in sample design and the planning and execution of sample surveys and censuses. Center faculty and staff also conduct research and teach courses in the areas of sampling, survey design, and statistical methods; research is covered elsewhere in this report. CSSM's Survey Research Services group collaborated with a number of researchers on a wide variety of subject areas over the last year. Research topics included agriculture, economics, veterinary medicine, medicine, education, political science, and economics. CSSM also conducted surveys and evaluations for ISU administrators and non-research entities.

Surveys focusing on the agricultural sector investigated pork production practices, land ownership, odor pollution and the need for large animal veterinarians in the state. The ISU Department of Economics and the Iowa Pork Producers Association contracted with CSSM to gather information about pork production practices used within the state and evaluate the impact those practices had on the environment. CSSM also collaborated with researchers from the Department of Economics for the Iowa Farmland Ownership Survey, which was conducted for the fifth time since 1988. Area samples of land were selected across the state to identify landowners to be included in the study, and over 600 landowners within and outside of Iowa were interviewed about the ownership and use of their Iowa farmland. The information gathered for the study provided the basis for the state's Legislative Report on Farmland Ownership Trends. An agricultural study was conducted for researchers from the Department of Natural Resources and Ecology Management. This project focused on evaluating the use of shelterbelts in mitigating odor pollution associated with animal production. Telephone survey and focus group materials were developed for producers and consumers in the states of Iowa, Washington, and North Carolina. Focus groups with Iowa producers and consumers were also conducted to

evaluate developed survey instruments during this second year of a three-year project. The Iowa Association of Veterinarians and the ISU Department of Veterinary, Diagnostic and Production Animal Medicine collaborated with the CSSM to survey Iowa veterinarians. Because of declining numbers of newly graduating large animal veterinarians, there has been a concern that a shortage of large animal veterinarians will occur. A sample of 400 association member veterinarians was surveyed to evaluate this problem.

CSSM collaborated on an assortment of other research studies as well. A survey in Iowa, Colorado and Pennsylvania assessed technology literacy and digital citizenry in general populations. This research was conducted for the faculty from the Department of Educational Leadership and Policy Studies at ISU and Drake University, and was funded by the National Science Foundation. CSSM also collaborated with University of Minnesota faculty to conduct a high school educational evaluation for the National Endowment for Financial Education. A sample of secondary schools using educational materials provided by the Endowment was selected to be included in the evaluation. Teachers and students from those schools will be contacted to participate in a national three phase evaluation. A statistician salary survey conducted using mail and web methodology was completed for the American Statistical Association, and a youth alcohol telephone survey to learn more about drinking and driving behaviors of young Iowa drivers was conducted for the ISU Department of Public Safety. The Center also collaborated with the University of Nebraska, the University of Maryland, the Mayo Clinic, and Emory University to conduct Random Digit Dial screening interviews to locate over 700 control subjects in seven states for studies on cancer, stroke and Parkinson's disease. The annual Faculty Activity Survey was conducted for the State Board of Regents. This mail/web survey contacted a stratified sample of ISU faculty to determine the average number of hours worked per week during the 2002-03 academic year. A satisfaction survey was conducted to assess publication formats for the "Inside Iowa State" publication for staff and faculty and a satisfaction survey was conducted to assist ISU Recreation Services in evaluating student participation and preferences.

CSSM Reports

CSSM conducted a survey and provided a fully weighted dataset to the client, as well as the methodology report for each of the following reports:

Anderson, L. L., D. A. Anderson, and J. D. Opsomer (2002), "Methodology Report for ISU Recreation Services Survey."

Opsomer, J. D., D. A. Anderson, and L. L. Anderson (2002), "Methodology Report for Iowa Young Driver Survey."

Opsomer, J. D., D. A. Anderson, and L. L. Anderson (2002), "Methodology Report for Mayo Clinic Parkinson's Disease Case-Control Recruitment Project."

Opsomer, J. D., J. Czuprynski, D. A. Anderson, and L. L. Anderson (2003), "Methodology Report for Iowa Land Ownership Survey."

Opsomer, J. D., H. H. Jensen, S. M. Nusser, D. Drignei, and Y. Amemiya (2002), "Statistical Considerations for the USDA Food Insecurity Index."

Timm, S. and J. D. Opsomer (2002), "A Study of the Relationship Between Target and Sampled Locations in the 1999 NRI Special Study."

CONSULTING AND COOPERATIVE RESEARCH

Agriculture and Home Economics Experiment Station

BAILEY, THEADORE B. Worked with Agronomy researchers in a study designed to evaluate the efficacy of Marker-Assisted Selection (MAS) for Iron-Deficiency Chlorosis (IDC) in a soybean population. Results clearly indicate that the effects associated with specific markers, and marker combinations, are dependent on environment.

Bailey also applied hierarchical statistical procedures to help with researchers in the Dept. of Veterinary Pathology analyze immunoreactivity associated with the distribution of a 'P Receptor (Neurokinin-1 Receptor)' in ovine lung tissue. A second objective was to test the distribution of immunoreactivity of three rabbit polyclonal antibodies generated against a synthetic NK-1R peptide.

DIXON, PHILIP M. Provided extensive statistical consulting with graduate students and faculty associated with the Agriculture Experiment Station. In addition, he supervised and provided support to the Agricultural Experiment Station student consultants. Dixon also provided consulting support for the research conducted by the Research Center for Botanical Products.

KAISER, MARK S. (AES). Consulted with numerous graduate students on spatial problems in agriculture and the environmental sciences including distribution of soybean cyst nematodes, limnology, and general disease mapping. Most of these sessions arose after the students had completed Stat 406 which was first offered in spring 2002.

KOEHLER, KENNETH J. Collaborated with Dr. Jack Dekkers, Professor of Animal Science, and his students on the use of proportional hazards models in genetic selection. As co-major professors for Jing Wang, Koehler and Dekkers worked on the development of statistical procedures for predicting the location of genes in chickens and cattle, using pooled DNA from selected animals. Koehler consulted with Dr. Don Bietz, Distinguished Professor of Animal Science, and some of his students in the design and analysis of studies of the effects of glucagon on reducing risk of fatty liver disease in dairy cows. Koehler consulted with Dr. Jeffery Berger, Dept. of Animal Science, and his students on the use of logistic regression models with random effects in analyzing the risk factors for stillbirth and calving difficulty in dairy cows. He also consulted with Dr. Jun Zhang and Dr. Blackmer in the Dept. of Agronomy on the construction of models for predicting yield response in corn to increased application of nitrogen, using data from aerial photographs, soil maps, and global positioning information. These studies have led to dramatic changes in recommendations for the profitable application of nitrogen.

OPSOMER, JEAN D. Provided consulting advice to researchers on campus who needed help in designing surveys or analyzing survey data. Opsomer consulted with researchers in Agronomy, Animal Ecology, Economics and Veterinary Diagnostics and Production Animal Medicine.

VARDEMAN, STEPHEN B. Student:

Advised Peiyi Xion a quality control procedure for ELISA plates with a biotech company (Pioneer).

Education

KAISER, MARK S. Consulted (Engineering Sciences) on a project for assessing effectiveness of special intervention programs on academic performance of college students.

SHELLEY, MACK C., II. Students:

Advised Ken Stone and Georgeanne Artz (ISU--Dept. of Economics, professor and graduate student, respectively) on the analysis of data from a study of the impact of Wal Mart stores on the local economy in counties in the state of Mississippi.

Advised Mary Delagardelle (Iowa Association of School Boards, board leadership director) on the use of statistical and other research methods for an analysis of Iowa school board data.

Advised Shirley Stow and Frances Kayona (ISU--School Improvement Model) on the preparation of a grant proposal to the National Board for Professional Teaching Standards.

Advised Larry Booth (ISU--Dept. of Veterinary Clinical Sciences, associate professor) on an assessment of the content of courses offered in the College of Veterinary Medicine.

Advised Phillip Walters (ISU--Dept. of Hotel, Restaurant, and Institution Management, graduate student)

on the analysis of data from a survey of customer satisfaction with restaurants and their likelihood of returning.

Advised Sue Crull and Chiu-Hui Lan (ISU--Dept. of Human Development and Family Studies, associate professor and graduate student, respectively) on the analysis of data from housing secondary mortgage market lending practices by Fannie Mae and Freddie Mac.

Advised Shari Ellertson (ISU--Dept. of Educational Leadership and Policy Studies, graduate student) on survey design and the analysis of data from a study of the effects on self-esteem among students participating in a mentoring program with the Carrie Chapman Catt Center for Women and Politics.

Advised Jill Johnson (ISU--Dept. of Curriculum and Instruction, temporary instructor and doctoral student at the University of Minnesota) on the analysis of data from a study comparing the impact on student achievement of different teaching methods in two Minneapolis schools.

Advised Jan Stone and Jihyun Kim (ISU--Dept. of Apparel, Educational Studies, and Hospitality Management, professor and graduate student, respectively) on the analysis of data from a study of the ability of washing to provide fabrics with the ability to filter out harmful ultraviolet radiation.

Advised Yvonne Nilles (ISU--Dept. of Horticulture and Agricultural Education, graduate student) on the analysis of data from a study comparing survey responses of students in both on-line and Iowa Communication Network sections of horticulture classes.

Advised Jamie Swift (ISU--Dept. of Curriculum and Instruction, undergraduate student) (with Steffen Schmidt) in the analysis of qualitative data from her Honors project on multiculturalism in the classroom in Italy and Iowa.

Advised Yun-Jung Choi (ISU--Dept. of Apparel, Educational Studies, and Hospitality Management, graduate student) on the use of factor analysis and other multivariate statistical methods in the study of consumer and customer orientation among apparel manufacturers.

Advised Seongyeon Auh (ISU--Dept. of Human Development and Family Studies, graduate student) on the use of LISREL structural equation models to analyze data on the effects of satisfaction with quality of relationships on family interaction patterns.

Advised Hyun-Mee Joung (ISU--Dept. of Textiles and Clothing, graduate student) on the analysis of data from a study of older female apparel shopping and life satisfaction. [She won the International Textiles and Apparel Association's best dissertation-based paper award for 2002.]

Advised David Wright (Ankeny Community School District drug and alcohol, education counselor) on the analysis of data from a survey of district 7th, 9th, and 11th grade students' risk behaviors and assets.

Advised Madhumita Banerjee (ISU--Dept. of Apparel, Educational Studies, and Hospitality Management, graduate student) on the use and interpretation of logistic regression in the analysis of data from a study of satisfaction among Iowa ISU retirees.

Advised Carol Kenton (ISU--Dept. of Educational Leadership and Policy Studies, graduate student) on the analysis of data from the Integrated Postsecondary Education Data System on revenue sources for community colleges in the Great Lakes and Plains regions.

Advised Beth Ann Nichols (ISU--Dept. of Food Science and Human Nutrition, graduate student) on the analysis of data from a study of human nutrition.

Advised De Zhang (ISU--Dept. of Curriculum and Instruction, graduate student) on the design and analysis of data from a study of instructional technology.

Advised Ann Gansemer-Topf and John Schuh (ISU--Dept. of Educational Leadership and Policy Studies) on the analysis of data from a study using IPEDS data of correlates of undergraduate persistence and graduation rates among bachelor's degree-granting higher education institutions in the United States.

Advised Brian Hand and Murat Gunel (ISU--Dept. of Curriculum and Instruction, professor and graduate student, respectively) on the analysis of data from a meta-analysis of multiple studies on the impact of structured writing assignments on secondary students' learning of science material.

Advised Jeri Gustafson and Alecia Rahn-Blakeslee (Area Education Agency 11--Johnston, Iowa) on the use of SPSS statistical software to analyze data for education research.

Assisted Joy Kozar (ISU--Dept. of Apparel Educational Studies and Hospitality Management) on the analysis of data from a study of gender and age differences in consumer preferences for clothing.

Assisted Kathy David (Iowa Dept. of Education and Area Education Agency 11 specialist) on the analysis of data from the 2001 statewide Iowa data on physical therapy for special education students in Iowa.

Advised Monica Bruning (ISU--College of Engineering, outreach and recruitment program coordinator) on the analysis of data from a study of recruitment needs of Iowa companies for engineering graduates.

Advised Lee Honeycutt (ISU-- Dept. of English, assistant professor) on the analysis of data from an experimental design study of voice recognition writing software.

Advised Ronald T. Wakeham (Nova Southeastern University--School of Business and Entrepreneurship, graduate student) on the analysis of data from a national survey of fire department mentoring practices and heir impact on career outcomes of chief executive fire officers.

Advised Shu-Huei Lin (ISU--Dept. of Industrial Education and Technology, graduate student) on the design and analysis of data, using structural equation modeling from a study of constructivist undergraduate education at ISU.

Advised Eun-Mi Yang (ISU--Dept. of Curriculum and Instruction, graduate student) on the use and interpretation of AMOS structural equation models in a study of differences in teacher effectiveness and student learning in the United States and the Czech Republic.

Advised David Huff (Iowa Division of Criminal & Juvenile Justice Planning) on the analysis of data from a study to develop statistical models for predicting the likelihood of recidivism among incarcerated criminal offenders in Iowa.

Advised Laura Friesenborg (Waldorf College--Director of Career Planning; and Iowa State University--Department of Psychology, graduate student) on the analysis of the effect of internship experiences on career commitment among Waldorf College, Iowa undergraduates.

Advised Mark Gronemeyer (Jefferson-Scranton High School principal, Jefferson, Iowa) on statistical analysis to ascertain whether the high school is grade inflation.

Advised Rita Sue Penney Martens (ISU--Educational Leadership and Policy Studies, graduate student) on the content analysis of data from Iowa Dept. of Education assessments of school districts' Comprehensive School Improvement Plans.

Advised Thessalenuere Hinnant-Bernard (ISU--Dept. of Human Development and Family Studies, graduate student) on the analysis of data from a study of reverse redlining predatory lending practices by sub-prime lenders.

Advised Tim Radloff (ISU--Sociology, graduate student) on the analysis of data from a study of the impact of exposure to diversity courses on support for societal diversity among ISU undergraduates.

Advised Erin Pedersen (ISU--Dept. of Psychology, graduate student) on the analysis of data from a study of the impact of gender on behavior.

Consulted with Steve Nagel (ISU--Dept. of Industrial Education and Technology, graduate student) on the use of graphical and advanced correlational methods to evaluate predictors of the incidence of home heater fires.

Consulted with Melody Carroll (ISU--Dept. of Industrial Education and Technology, academic advisor) on the design and analysis of data for a study designed to make academic advising more effective.

Advised Brian Hand, Tom Andre, and Irena Grimberg (ISU--Dept. of Curriculum and Instruction Professor, professor and chair, and graduate student, respectively) on the analysis of data from a study of the impact of science writing heuristic on elementary, middle school, and high school student performance.

Advised Kevin Saunders (ISU--Dept. of Educational Leadership and Policy Studies, graduate student) on the use of structural equation models and other multivariate statistical procedures in the analysis of national survey data for a study of predictors of undergraduate graduation rates.

Advised Bin Zhang (ISU--Dept. of Statistics, graduate student) on the use of linear models for the analysis of data from a study of the effectiveness of learning community teams on undergraduate graduation rates.

Advised David Russell and Oksana Hlyva (ISU--Dept. of English, professor and graduate student, respectively) on the design and analysis of data for a study of undergraduate students' and faculty perceptions of university-wide efforts to support written, oral, visual, and electronic communication across the curriculum.

Advised Dianne Bystron (ISU--Carrie Chapman Catt Center for Women and Politics, director) and Aarthi Parthasarathy (ISU, Dept. of Industrial and Manufacturing Systems Engineering, graduate student) on the analysis of data from a survey of the impact of gender and partisanship on perceptions of political candidates.

Advised Richard Freeman (ISU--Dept. of Electrical and Computer Engineering, engineering undergraduate programs lecturer) on the analysis of data from a survey of students participating in three Engineering learning communities.

Advised Corly Brooke (ISU--Center for Teaching Excellence, director) and Shari Ellertson (ISU--Learning Communities, administrative graduate assistant) on the analysis of data from a survey of faculty interests in and attitudes toward learning communities.

Advised Carolyn Clawson and Alice Thieman (ISU--Dept. of Human Development and Family Studies, graduate student and assistant professor, respectively) on the use of block regression to analyze data from a study of child literacy.

Advised Brenda Kutz (ISU--Dept. of Electrical and Computer Engineering, academic advisor) on the analysis of data from a study of student recruitment and retention.

Advised David Wright (Ankeny Community School District, drug and alcohol education counselor) on the comparative analysis of data from the 2002 Ankeny youth survey and data from the state of Iowa and the Centers for Disease Control and Prevention.

Advised John Littrell (ISU--Dept. of Educational Leadership and Policy Studies, professor) on the analysis of data from a statewide survey of the impact of counselors' attitudes and demographic characteristics on their professional behavior.

Advised Ingrid Adams (ISU--Dept. of Food Science and Human Nutrition, graduate student) on the analysis of data from a study of the effects of different nutrition education treatments on mothers' care of their young children.

Advised Ann Marie Perkins (ISU--Dept. of Human Development and Family Studies, graduate student) on the analysis of data from the Baccalaureate and Beyond NCES database on student loan debt repayment.

Advised Jane Rose Njue (ISU--Dept. of Human Development and Family Studies, graduate student) on the analysis of data from a study of poverty and family resources.

Advised Doug McCue (ISU--Dept. of Industrial Education and Technology, graduate student) on methods for establishing criteria for success on a certification exam.

Provided statistical advice for SFS Center for Coastal Studies, Apartado Postal 15, Puerto San Carlos, Baja California Sur, México (Mary Fontana, Summer Laws, Lucina Iñiguez, Raimundo Espinoza) on the use of logistic regression for the results of a tourist survey on the economic benefit and socioeconomic analysis of whale watching activities in Bahia Magdalena, Baja California Sur, Mexico.

Advised Aarthi Parthasarathy (ISU--Dept. of Industrial and Manufacturing Systems Engineering, graduate student) on the analysis of data from a study of the condition of machinery used by Alliant Energy as a consequence of on-the-job usage.

Advised Dongmei Zhai (ISU--Dept. of Chemical Engineering and Dept. of Statistics, graduate student) on the analysis of data from a study of academic performance among Chemical Engineering undergraduates.

Advised Alton Kornegay (ISU--Dept. of Industrial Education and Technology, graduate student) on the interpretation of statistical analysis using the beta binomial distribution of data on differences in academic achievement of students with and without an intervention.

Advised Amy Vybral (ISU--Dept. of Educational Leadership and Policy Studies) on the use of chi-square statistics for analyzing the consequences for student use of academic counseling services of participating in a special tutorial.

Advised Tom Alsbury (ISU--Dept. of Educational Leadership and Policy Studies, assistant professor) on data analysis related to a study of the relationship between school board membership turnover and student achievement outcomes.

Advised Julie Snyder-Yuly (ISU--College of Liberal Arts and Sciences staff) on the analysis of data from a study of participation by Associates of the Carrie Chapman Catt Center for Women and Politics.

Engineering Sciences

SHERMAN, PETER J. Mechanical Engineering. Worked with Professor A. Chandra on statistical issues associated with chemical mechanical polishing of materials, including surface roughness properties of the polishing pad, the work piece, and their interaction with the slurry.

VARDEMAN, STEPHEN B. Students:

Melanie Maxson worked with a heavy equipment manufacturer (Deere) on a project for estimating probability of conformance to multiple emission standards.

Monica Reising worked with a tire manufacturer (Bandag) on the analysis of a complicated tread wear experiment.

Erin Bonitz worked on a project concerned with assessing between-rater and within-rater consistency of judging the quality of metal casting by inspection of radiographs. (IMSE research)

Reid Landes worked on a problem of batch calibration of multiple resistance temperature devices against a single standard thermometer. (ME research)

Other

HOFMANN, HEIKE. Student:

Lifeng You worked as an RA on a data analysis of microarray data. The data has been collected by Carol Foster in Eve Wurtele's lab (Botany).

KAISER, MARK S**.** Consulting work with researchers involved in the Center for Research on Botanical Supplements, funded by the National Institutes of Health, D. Birt Principal Investigator.

Worked with limnologists at the University of Missouri on development of a model for potential of Microcystin growth in reservoirs. Microcystin is a toxic algal form that can cause human health problems. The model developed was formulated on what is known in ecology as Shelford's Law of Tolerance and estimates an upper boundary for the abundance of Microcystin as a function of water chemistry input variables.

MEEKER, WILLIAM Q., JR. Students:

Huaqing Wu worked on the development of an algorithm for the efficient estimation of statistics for recurrence data.

Angela Zou worked on the development of better methods of predicting warranty costs.

Luis Escobar worked on the development of accelerated test plans for destructive degradation tests.

Luis Escobar and Huaqing Wu worked on the development of statistical methods to use accelerated test data to predict field reliability.

Tao Liu and Yurong Wang worked with scientists at the ISU Center for Nondestructive evaluation on several funded research projects.

a) Construction of probability of detection curves for ultrasonic inspection of titanium billets, based on limited field inspection data.

b) Development of statistical methods for detection of cracks using the newly developed thermal acoustics nondestructive evaluation method.

Meeker worked with scientists at NIST on the development of statistical methods for service life predictions of outdoor paints and coatings.

Social & Behavioral Science & Humanities

BONETT, DOUGLAS G. Provided an average of about six hrs/week during the fall and spring semesters and about three hrs/week during summer of statistical consulting to students and faculty in the social and behavioral sciences.

LORENZ, FREDERICK O. Continued to serve as a statistical consultant for a number of research projects, both on campus and as a member of the Institute for Social & Behavioral Research (ISBR). Worked primarily with faculty in Sociology, Psychology, and Human Development & Family Studies (HDFS) on campus.

THESIS ABSTRACTS (PH.D.)

Chen, Peiqi

Genetic improvement of lean growth rate and reproductive traits in pigs. (2002)

Breed-specific genetic parameters for lean growth rate (LGR) and reproductive traits were estimated for the U.S. Yorkshire, Duroc, Hampshire, and Landrace populations. Parameters were estimated using an animal model by REML method. Estimates of heritabilities were 0.44, 0.44, 0.46, and 0.39 for LGR; 0.10, 0.09, 0.08, and 0.08 for number born alive; 0.08, 0.07, 0.08, and 0.09 for litter weight at 21 d; and 0.05, 0.07, 0.05, and 0.05 for number weaned in the Yorkshire, Duroc, Hampshire, and Landrace breeds, respectively. Most genetic correlation estimates between lean growth and litter traits were small but unfavorable across breeds. Backfat thickness had the largest genetic correlations with number born alive (0.18 to 0.20) and litter weight at 21 d (–0.27 to –0.30). A four-generation selection experiment was conducted to investigate the effectiveness of selection for LGR and evaluate the correlated responses in litter traits in a synthetic line of pigs based on a Meishan-Yorkshire cross. The estimate of response to selection per generation was 9.6 ± 0.95 g/d for LGR. Correlated responses in litter traits were regressed on generation. The regression coefficients were negative but not significant ($P > 0.05$) for number alive at birth, at 21d, and at 42 d. A significant positive correlated response occurred only for 42-d litter weight ($P < 0.05$). Five strategies for selection on LGR in pigs that maximize average LGR at the last generation with a planning horizon based on a non-linear biological function were evaluated through simulation over five generations. A linear index with updating index weights yielded the highest LGR at the last generation. The non-linear index performed almost as well as the linear index with updating. Direct selection on single-trait EBV for LGR yielded the lowest responses at generation 5. Direct selection on multi-trait EBV for LGR yielded 3.1% higher responses in LGR than selection on single-trait EBV for LGR ($P < 0.05$). It was concluded that simultaneous genetic improvement in LGR and reproductive traits is possible by using breed-specific genetic parameter estimates or creating a synthetic line through selection for LGR based on a appropriate selection criteria.

Dietz, Zachariah Espe

Large deviations of a class of non-homogeneous Markov chains. (2003)

Following the existence results of Seppalainen (1994) and Baxter, Jain, and Seppalainen (1993), this research considers the large deviations of a family of induced distributions of a given additive functional, where the underlying process belongs to a class of non-homogeneous chains. The class of chains studied are those such that the transition kernels converge pointwise to a given target transition kernel. This class is of practical interest as it plays a central role in simulated annealing, and in addition, permits substantial computation. Within this class, the large deviation behaviour of the induced distributions has been completely characterized by a rate function that may be represented in a closed form, thereby superceeding an existence result. It is shown that for the inhomogeneous chain under consideration, the induced distributions of our additive functional possesses 3 types of large deviation behaviour. As might be expected, this behaviour depends both upon the form of the target transition kernel, and the rate at which the transition kernels converge to this target kernel. Specifically, if the rate of convergence is too fast, then the large deviation behaviour mimics that of the stationary chain with the target transition kernel. If convergence is too slow, then, again, the large deviation behaviour is independent of the rate of convergence, and in addition, this behaviour is "uninformative," that is, trivial. Finally, when the rate of convergence is properly chosen, then both the target kernel and the rate of convergence influence the large deviation behaviour in a non-trivial manner. Moreover, these behaviors are characterized in terms of an explicit rate functions which illustrates that among all paths which lead to a deviation those which minimize certain "routing" and "resting" costs are selected.

Eickhoff, Jens C.

Generalized linear latent variable modeling analysis for multi-group studies. (2002)

Latent variable modeling is commonly used in the behavioral, medical and social sciences. The models used in such analysis relate all observed variables to latent common factors. In many applications, the observed variables are in polytomous form. The existing procedures for models with polytomous outcomes can be considered lacking in several aspects, especially for multi-sample situations. We incorporate a new generalized linear latent variable modeling approach for developing statistically sound procedures that furnish meaningful interpretation and can incorporate many types of outcome variables. In the special case of polytomous outcomes, we also propose a model that incorporates response errors. A rather simple model parameterization used in our approach is appropriate for multi-sample analysis and leads to practically useful inference procedures. A Monte Carlo EM algorithm is developed for computing the full maximum likelihood estimates. Simulation studies are presented to validate the benefits of the new approach and to compare its performance to other methods. The new approach is also applied to analyze data from two substance abuse prevention studies.

Nordman, Daniel John

On nonparametric methods for strongly and weakly dependent lattice data. (2002)

This dissertation develops nonparametric inference procedures for data exhibiting dependencies of varied form and structure. There are four research papers, each concerning observations located (sampled) on some lattice (eg. integers Z^d) On optimal spatial subsample size for variance estimation, 2) On the approximation of differenced lattice point counts with application to statistical bias expansions, 3) Frequency domain empirical likelihood for short- and long-range dependent processes, 4) Empirical likelihood confidence intervals for the mean of a long-range dependent process. Let R_h be a sampling region in R^d, $\mathbf{t} \in R^d$, and suppose data are those $\mathbf{t} + Z^d$ lattice points within R_h. Paper 1) considers the problem of optimally implementing a spatial subsampling method for nonparametrically estimating the variance of statistics on R_h. The results are applicable to a wide variety of stationary random fields exhibiting weak dependence and a broad range of sampling regions. Paper 2) frames and addresses a mathematical problem in lattice point theory. Bias expansions for statistics of spatial lattice data often require subtracted lattice point counts for sets like R_h and $R_h \cap (\mathbf{t} + R_h)$. This paper provides new lattice point count approximations that facilitate asymptotic bias expansions with non-rectangular sampling regions. The count estimation tools are valid for numerous R^2 and R^3 sampling regions, including all convex sets. Papers 3) and 4) consider inference on dependent time series data, allowing for many possible process dependence strengths. Let $X_1, X_2, \ldots$ be a sequence of stationary random variables with autocovariance function $r(k) = \mathrm{Cov}(X_1, X_{1+k})$ where $r(k) \sim k^{-\alpha} L(k)$ for a $\in (0, 1)$ and a slowly varying function L. Since $\sum_{k=1}^{\infty} |r(k)| = \infty$, the process $\{X_i\}$ exhibits strong or long-range dependence (LRD). Inference methods proposed for iid or weakly dependent data often do not work for strongly dependent data, or at least require suitable modifications. Paper 3) develops spectral empirical likelihood which allows nonparametric, likelihood-based confidence region estimation and hypothesis testing for processes exhibiting either LRD or weak dependence. Inference is possible for spectral parameters like autocorrelations and Whittle parameters and spectral goodness-of-fit tests can also be made. Paper 4) develops new empirical likelihood confidence intervals for the process mean $E(X_1) = m$ under LRD, using (time-domain) "blocking" techniques. The paper shows that empirical likelihood provides valid nonparametric estimation of m, even in those instances of LRD where the block bootstrap is known to fail.

Park, Mingue

Regression estimation of the mean in survey sampling. (2002)

Regression estimators for the finite population mean constructed under superpopulation models are considered. The conditions under which the model-based estimator is design-consistent are presented. Methods of augmenting the regression model to produce a design consistent estimator are discussed. It is shown that adding a specified column to the model-based regression estimator gives a design consistent regression estimator with the generalized least squares estimator for the vector of regression coefficients. The regression estimator that is the best linear unbiased predictor under the mixed effects model and that is design-consistent is presented. An estimator for the design variance of the regression estimator is developed. A weighted regression estimator that builds upon the approximate conditional inclusion probabilities of the sample elements is developed. The sample weights of the weighted regression estimator are positive with high probability. It is demonstrated that the strategy of the best linear unbiased predictor with a balanced sample is similar to the strategy of a regression estimator with a random sample. A balanced sample constructed by restricted random sampling and two stratified random sampling designs, both using the regression estimator, are compared for the problem of estimating the population distribution function. The regression estimator with a stratified sample gives smaller bias and smaller mean squared error than the best linear unbiased predictor with a restricted random sample for almost all points on the distribution function.

Qu, Yongming

Estimation for the nonlinear errors-in-variables model. (2002)

Estimation of the parameters of the functional nonlinear measurement error model is considered. A simulation bias adjusted (SIMBA) estimation procedure is presented. In the SIMBA procedure, internal Monte Carlo simulation based on the sample data is used to adjust a naive estimator, such as the ordinary least squares estimator, for bias. Let the measurement error variance (s_{un}^2) be a sequence depending on the sample size n, and assume $s_{un}^2 \to 0$ as $n \to \infty$. Under some regularity conditions, the order in probability convergence rate for the SIMBA estimator is $\max(s_{un}^4\, n^{-1/2})$, while the order in probability convergence rate for the ordinary least squares estimator is $\max(s_{un}^2\, n^{-1/2})$. Monte Carlo simulation is conducted to test the performance of SIMBA for four models: linear model, quadratic model, cosine model and logistic model. Monte Carlo simulation shows that the SIMBA estimation procedure outperforms or is comparable to methods such as simulation extrapolation, regression calibration and adjusted least squares. An example application of SIMBA estimation for the logistic regression model with errors in variables is given. In the example, the relation between minerals from dietary intake and the supplement use for people over 50 is studied. The data are from the two surveys: the Third National Health and

Nutrition Examination Survey and the related Supplemental Nutrition Survey. One interesting result is that people whose dietary intake of minerals is high are more likely to take supplements.

Wright, James Hollis, Jr.

An investigation of balanced sampling excluding adjacent units. (2002)

Commonly, in environmental and ecological populations, neighboring units within a finite population may provide similar information. In an attempt to obtain the most informative picture of a population, researchers may not want to collect information from similar units within the obtained sample. Moreover, when sampling from such populations, the selection of dispersed units may result in a reduction in the variance of estimators. Hedayat, Rao, and Stufken (1988a and 1988b) introduced balanced sampling designs for the exclusion of contiguous units. Under the assumption that contiguous units provided similar information, finite populations of N units arranged in a circular, one-dimensional ordering were considered. Sampling plans that excluded the selection of contiguous units within a given sample, while maintaining a constant second-order inclusion probability for non-contiguous units, were investigated. Stufken (1993) extended the ideas of balanced sampling avoiding contiguous units to balanced sampling avoiding adjacent units-units that are within a spaces of each other-from circularly ordered populations and provided necessary conditions for the existence of such sampling plans. In this paper, two direct search algorithms for identifying generators of cyclical balanced sampling plans excluding adjacent units from circularly ordered populations are detailed. Generators for plans with a=1 and n[less than or equal to]15 and with a=2 and 3 with n [less than or equal to]10 are presented, including the first known sets of generators of plans for n [greater than or equal to] 9 with a=1, n[greater than or equal to]6 with a=2, and n[greater than or equal to]5 with a=3. Furthermore, the necessary conditions for existence of balanced sampling plans excluding adjacent units from circularly ordered populations are shown to be sufficient for n=5 and 6 with a=1, n=3, 4, and 5 with a=2, and n=3 and 4 with a=3. Techniques for obtaining supports of balanced sampling plans excluding adjacent units from linearly ordered populations using plans from circularly ordered populations, and vice versa, are also presented. In addition, various sampling schemes involving balanced sampling plans excluding adjacent units from circularly ordered populations and variance approximation techniques are compared through a simulation study.

Zhang, Yao

Bayesian design for life tests and accelerated life tests. (2002)

This dissertation, consisting of three separate papers, describes Bayesian methods for life test planning and accelerated life test planning with censored data from a log-location-scale distribution, when prior information of the model parameters is available. The first paper studies Bayesian life testing planning with Type II censored data from a Weibull distribution with given shape parameter, where closed form solutions are available. The second paper presents Bayesian methods for life test planning with a general distribution in a log-location-scale-family, in which a large sample approximation approach and a simulation approach are developed to evaluate the criterion and provide plan solutions. The third paper describes Bayesian optimum design methods for accelerated life tests with one accelerating variable and a linear acceleration model, where a large sample approximation is used for the test solutions and simulations are used to evaluate the resulting designs. Appropriate Bayes criteria are developed for each of the situations discussed, and numerical examples are used to illustrate the practical use of the Bayesian design methods.

Zhao, Yan

Likelihood based procedures for general nonlinear structural equation analysis. (2002)

Valid Statistical inferences in nonlinear structural equation models are of great interest recently. This dissertation aims at fitting a nonlinear structural equation model consisting of two parts; a general nonlinear measurement model relating observed variables or indicators to unobserved concepts or latent variables, and a nonlinear simultaneous structural model describing relationships among the latent variables. For model identification, we assume an explicitly solved reduced structural model exists. This dissertation is composed of two papers. The first paper deals with the case where the latent variables in the reduced structural model are normally distributed. We developed maximum likelihood estimation by a Monte Carlo EM algorithm. The asymptotic covariance matrix of the estimator is computed by the inverse of the empirical observed information matrix. Initial values of the parameters for general and special reduced structural models are presented. For a Monte Carlo EM algorithm, we developed a new procedure both to choose the Monte Carlo sample size for computing the expectation in the E-step, and to stop the algorithm. Simulation studies for structural equation models with a variety of structural models are presented to assess the performance of our stopping rule and the estimators. The second paper develops distribution-free statistical procedures without specifying distribution forms of the latent variables. We use the normal-mixtures as a flexible distribution family. A pseudo maximum likelihood estimation procedure is introduced by first obtaining the measurement model parameters by factor analysis, then maximizing the pseudo likelihood, the likelihood evaluated at the measurement model parameters estimates, with respect to the structural equation model parameters. The asymptotic covariance matrix of the measurement parameters estimates is computed by non-parametric bootstrap, which is combined with the empirical information matrix of all parameters for the full likelihood to produce an estimate of the asymptotic covariance of the reduced model parameters estimates. Simulation studies are presented.

PUBLICATIONS

Books

Probability, Statistics and their Applications: Papers in Honor of Rabi Bhattacharya,
Athreya, Krishna B., Mukul Majumdar, Madan Puri, and Edward Waymire, editors, IMS Lecture Notes #41, March 2003.

This volume honoring Professor Rabi Bhattacharya contains research contributions to a broad range of topics from a distinguished group of probabilists and statisticians. The areas covered include time series, stochastic differential equations, fractional Brownian motion, Levy Processes, iterated random maps and statistical inference. Several of the articles concern applications of these areas to economics, mathematical finance, population ecology, and mathematical physics. Apart from being a useful reference on contemporary research, the present volume could also be used in graduate seminars to expose students to current research on some exciting topics in probability, statistics and their applications.

Dietary Reference Intakes: Applications in Dietary Planning,
Argus-Collins, T., Barr, S., **Carriquiry, A.,** Coulston, A., Devaney, B., Dwyer, J., Hunt, J., Murphy, S., and Tarasuk, V. ISBN 0-309-51882-2 (PDF), 2003.

This book is the second in a series intended to provide guidance to researchers and practitioners who wish to use the new Dietary Reference Intakes in dietary assessment. Authors discuss several topics, including 1) appropriate applications of the DRIs for specific purposes, 2) inappropriate applications of the DRIs, 3) statistical methods useful for estimating, analyzing, and interpreting intake and requirements distributions, 4) potential measurement errors in dietary intake data, and approaches to minimizing the impact of those measurement errors on dietary planning.

Order Statistics,
David, H. A. and H. N. Nagaraja, 3rd Edition, (Wiley-Interscience), xv + 458 pages. ISBN No.: 0-471-38926-9, 2003.

This book deals with the theory and applications of ordered random variables. The second edition published in 1981 has been much revised and extended. New sections include Stochastic orderings, Characterizations, Distribution-free prediction intervals, Bootstrap estimation of quantiles, Moving order statistics, Ranked-set sampling, and Estimation of tail index. The coverage of asymptotic theory has been doubled.

The Practice of Business Statistics,
Moore, David S., McCabe, George P., **Duckworth, William M., II**, and Sclove, Stanley L., 1st Edition, W. H. Freeman Publishers. ISBN: 0-7167-9773-9, 2003

Like no other business statistics text, The Practice of Business Statistics (PBS) involves students in practical, statistics-supported business decision making from the outset. Using real data to provide a context for tackling modern business problems, the book introduces a range of core ideas in data production and interpretation early. This approach emphasizes the usefulness of statistical concepts in contemporary business, the connections between probability and inference, and the relationship between data and decisions. From this beginning, the text continually builds on what students have learned, often revisiting data sets from previous examples and exercises to explore different situations and to look at the data through the eyes of professionals in different parts of a business (accounting, finance, marketing, manufacturing, R & D, etc.).

American Government and Politics Today: The Essentials,
Bardes, Barbara A., **Shelley, Mack C., II,** and Schmidt, Steffen W. 2004-2005 Edition, Belmont, CA: Wadsworth/Thomson Learning. 588 pp. ISBN: 0534620825, 2003.

This is the continuation of a leading textbook, in print continuously since 1986. The book features discussions of public opinion data, survey research methods, and Web-based information sources for digital citizenship.

American Government and Politics Today,
Schmidt, Steffen W., **Shelley, Mack C. II,** and Bardes, Barbara A., *2003-2004 Edition.* Belmont, CA: West/Wadsworth, 2003.
American Government and Politics Today: The Essentials,
Bardes, Barbara A., **Shelley, Mack C., II,** and Schmidt, Steffen W., *2004-2005 Edition.* Belmont, CA: Wadsworth/Thomson Learning, 2003.
American Government and Politics Today: Brief Edition,
Schmidt, Steffen W., **Shelley, Mack C., II,** and Bardes, Barbara A., *2003-2004 Edition*. Belmont, CA: Wadsworth/Thomson Learning, 2003.

These publications are alternative versions of a textbook that has been in continuous publication since 1985. Highlights include interpretation of public opinion polling and election results, descriptive statistics of government activities, and links to online data and information sources.

Published Research

Kassam, D. D., **Adams, D. C.,** Ambali, A. J. D., and Yamaoka, K. Body shape variation in relation to resource partitioning within cichlid trophic guilds coexisting along the rocky shore of Lake Malawi. *Animal Biology* 53: (2003) 59-70.

To appreciate better how cichlids segregate along the trophic, spatial and temporal dimensions, it is necessary to understand the cichlids' body design, and its role in resource partitioning. We investigated body shape variation, quantified using landmark-based geometric morphometrics, among cichlid species belonging to algal and zooplankton feeders coexisting along the rocky shores of Lake Malawi, in order to elucidate the adaptive significance of body shape. Significant differences were found within zooplankton feeders in which Copadichromis borleyi had a shorter gape, smaller eyes and shorter caudal peduncle relative to Ctenopharynx pictus and, within algal feeders, Labeotropheus fuelleborni had a shorter and inferior subterminal gape, and shorter head relative to Petrotilapia genalutea. Variation among species is discussed with reference to trophic and feeding microhabitat differentiation which enables us to appreciate the role of body shape in enhancing ecological separation, and thus leads to coexistence among cichlid species.

Kassam, D. D., **Adams**, **D. C.,** Hori, M., and Yamaoka, K. Morphometric analysis on ecomorphologically equivalent cichlid species from Lakes Malawi and Tanganyika. *Journal of Zoology* 260: (2003) 153-157.

Landmark-based geometric morphometric techniques were used to test the hypothesis that *Petrochromis* spp. From Lake Tanganyika are ecomorphologically equivalent to *Petrotilapia* spp. From Lake Malawi both genera are epilithic algal feeders and inhabit the rocky shores of their respective lakes. We investigated the morphological component of the ecomorphology hypothesis by investigating body shape, using landmark-based morphometric techniques. A MANOVA revealed significant differences among species and an ordination of all species along the first two CV axes showed clear separation of the two genera in the morphospace with *Petrochromis fasciolatus* as an intermediate. A thin-plate spline analysis revealed that *Petrochromis* spp. had a deeper, broader anterior body, larger gape, shorter anal fin base and narrower caudal peduncle then *Petrotilapia* spp. Basically, differences between lakes were found, but there were no similarities or clusters of presumptive ecomorphs. Based on such results, we reject the hypothesis of morphological equivalence between these two genera. However, considering the non-significant difference in body shape revealed between *P. fasciolatus*, *Petrotilapia genalutea* and *Petrotilapia* 'mumbo blue', we conclude that these three species represent morphological equivalence and hence display a best example of convergent evolution.

Valenzuela, N., **Adams, D. C.**, and Janzen, F. J. Pattern does not equal process: Exactly when is sex environmentally determined? *American Naturalist* 161: (2003) 676-683.

Athreya, Krishna B. and Atucar, G. Kernel estimators for semi Markov processes. *Brazilian Journal of Probability and Statistics* 16: (2003) 69-85.

Bakhsh, A., Kanwar, R. S., **Bailey, T. B.**, Cambardella, C. A., Karlen, D. L., Colvin, T. S. Cropping system effects on NO_3-N loss with subsurface drainage water. *American Society of Agricultural Engeneers* 45:6 (2003) 1789-1797.

An appropriate combination of tillage and nitrogen management practices will be necessary to develop sustainable farming practices. A six-year (1993-1998) field study was conducted on subsurface-drained Clyde-Kenyon-Floyd soils to quantify the impact of two tillage systems (chisel plow vs. no tillage) and two N fertilizer management practices (preplant single application vs. late-spring soil test based application) on nitrate-nitrogen (NO_3-N) leaching loss with subsurface drain discharge from corn (Zea mays L.) soybean (Glycine max L.) rotation plots. Preplant injected urea ammonium nitrate solution (UAN) fertilizer was applied at the rate of 110 kg ha $^{-1}$ to chisel plow and no-till corn plots, while the late-spring N application rate averaged 179 and 156 kg ha $^{-1}$ for the no-till and chisel plow corn plots, respectively. Data on subsurface drainage flow volume, NO_3-N concentrations in subsurface drainage water, NO_3-N loss with subsurface drainage flow, and crop yield were collected and analyzed using a randomized complete block design. Differences in subsurface drainage flow volume due to annual variations in rainfall significantly ($P = 0.05$) affected the NO_3-N loss with subsurface drainage flows. High correlation ($R^2 = 0.89$) between annual subsurface drainage flow volume and the annual NO_3-N leaching loss with subsurface drainage water was observed. The flow-weighted average annual NO_3-N concentrations varied from a low of 6.8 mg L $^{-1}$ in 1994 to a high of 13.9 mg L $^{-1}$ in 1996. Results of this study indicated that NO_3-N losses from the chisel plow plots were 16% (16 vs. 19 kg-N ha $^{-1}$) lower in comparison with no-till plots, while corn grain yield was 11% higher in the chisel plow plots (8.3 vs. 7.5 Mg ha $^{-1}$). Late-spring N application applied as a sidedress resulted in 25% lower NO_3-N leaching losses with subsurface drainage water in comparison with preplant single N application and also significantly ($P = 0.5$) higher corn grain yield by 13% (8.4 vs. 7.4 Mg ha $^{-1}$). These results

clearly demonstrate that chisel plow tillage with late-spring soil test based N application for corn after soybean can be a sustainable farming practice for the northeast part of Iowa.

Heywood, A. A., Myers, D. J., **Bailey, T. B.**, and Johnson, L. A. Effect of value-enhanced texturized soy protein on the sensory and cooking properties of beef patties. *Journal of the American Oil Chemists' Society* 79:7 (2002) 703-707.

Texturized soy protein (TSP) originating from varieties of value-enhanced soybeans and commodity soybeans, which were processed by extrusion-expelling, were incorporated into ground-beef patties. The soybean varieties included high-cysteine, low-linolenic, lipoxygenase-null, high-sucrose, low-saturated-fat, and high-oleic. The lower the bulk density was, the better the water-holding capacity of TSP. Neither property was affected by the protein dispersibility index or residual oil of the low-fat soy flours from which the TSP was prepared. All extruded-expelled processed flours from value-enhanced soybeans made acceptable TSP. The high-sucrose soybeans produced TSP with higher expansion and improved water-holding capacity. There were no differences in cooking properties or proximate compositions of patties for all treatments. Inside and outside colors were darker for the TSP-extended patties than for the all-beef control, and there was little difference among soybean varieties. The patties containing TSP had significantly more soy flavor and were harder than the all-beef control patties. Some TSP treatments produced more tender and less cohesive cooked patties than did the all-beef control.

Heywood, A. A., Myers, D. J., **Bailey, T. B.**, and Johnson, L. A. Functional properties of extruded-expelled soybean flours from value-enhanced soybeans. *Journal of the American Oil Chemists' Society* 79:7 (2002) 699-702.

The functional properties (protein solubility, emulsification characteristics, foaming characteristics, water- and fat-binding capacities) of extruded-expelled (EE) soy flours originating from six varieties of value-enhanced soybeans (high-sucrose, high-cysteine, low-linolenic, low-saturated FA, high-oleic, and lipoxygenase-null) and two commodity soybeans were determined. The soy flours varied in protein dispersibility index (PDI) and residual oil (RO), with PDI values ranging from 32 to 50% and RO values ranging from 7.0 to 11.7%. Protein solubility was reduced at pH values near the isoelectric region and was higher at both low and high pH. There were no significant differences for water-holding capacity, fat-binding capacity, emulsification activity, or emulsification stability. Only the high-oleic soy flour had significantly lower emulsification capacity. In general, the PDI and RO values of EE soy flours originating from value-enhanced and commodity soybeans had the greatest influence on protein functionality. The genetic modifications largely did not affect functional properties.

Hostetter, Jesse M., Steadham, Edward M., Haynes, Joseph S., **Bailey, T. B.,** and Cheville, Norman F. Cytokine effects on maturation of the phagosomes containing *Mycobacteria avium* subspecies *paratuberculosis* in J774 cells. *FEMS Immunology and Medical Microbiology* 34:2 (2002) 127-134.

Mycobacterium avium subspecies *paratuberculosis* (*M. a. ptb*) is an intracellular pathogen of macrophages. Intracellular survival of several species of pathogenic mycobacteria is dependent on inhibition of maturation of the phagosomes containing these pathogens into functional phagolysosomes. In activated macrophages, however, this capacity is reduced, leading to increased bacterial killing. It is the hypothesis of this study that there is increased acidification and maturation of the phagosome containing *M. a. ptb* in interferon gamma and lipopolysaccharide (IFN-γ/LPS) activated macrophages. In activated macrophages colocalization of *M. a. ptb* with either a marker of acidic compartments (Lysotracker Red) or compartments containing a late phagosome maturation marker lysosome-associated membrane protein-1 (Lamp-1) were evaluated by laser confocal microscopy. Intracellular survival of *M. a. ptb* in activated macrophages was evaluated directly using differential fluorescent live/dead staining. The results of this study demonstrated increased colocalization of both Lysotracker Red and Lamp-1 with FITC labeled *M. a. ptb*, which correlated with decreased survival of *M. a. ptb* within activated macrophages.

Tian, A. D., Knapp, L. R., Gibson, R., Struthers, Moore, K. J., Brummer, E. C., and **Bailey, T. B.** Response of eastern gamagrass seed to gibberellic acid buffered below its pKa. *Crop Science* 43:3 (2003) 927-933.

Eastern gamagrass [*Tripsacum dactyloides* (L.) L.] seed are usually dormant, often causing seedling establishment difficulties. This study was conducted to assess the effect of gibberellic acid (GA_3) buffered below its pKa (3.8) on seed germination of eastern gamagrass. In one experiment, concentrations of 0.001-, 0.005-, and 0.01 *M* buffered GA_3 solutions were applied to seed with cupules removed from six commercial seed lots produced in three different years. After 28 d of germination, GA_3 application increased total seed germination by 25 to 47 percentage points. The three GA_3 concentrations were equally effective in promoting germination in all seed lots except one, where 0.001 *M* GA_3 was more effective than 0.01 *M* GA_3. The germination rate was accelerated by GA_3 application during the germination process but did not result in germination of all the viable seeds. An average 10% of the viable caryopses remained dormant at the end of the germination test. A second experiment evaluated the germination of intact cupules after treatment for 24 or 48 h in distilled water, 0.001 *M* GA_3 solution, buffer solution, or buffered 0.001 *M* GA_3 solution. Buffered GA_3 was not effective at enhancing germination of eastern gamagrass seed when cupules were left intact. These results suggest that there may be multiple dormancy mechanisms in eastern gamagrass. At least one

mechanism involves the caryopsis and is affected by GA_3 application. Furthermore, the cupule-mediated dormancy mechanism(s) and the caryopsis-mediated mechanism(s) must be addressed to obtain complete germination of dormant seed.

Bonett, D. G. Sample size requirements for comparing two alpha coefficients. *Applied Psychological Measurement* 27: (2003) 72-74.

Graphs and tables are currently available for approximating the sample size needed to test the equality of two alpha reliability coefficients with desired power. These tables and graphs are limited to particular values of Type I error, power, and effect size. General formulas are derived to determine the sample size requirements for hypothesis testing with desired power and interval estimation with desired precision.

Bonett, D. G. Sample size requirements for testing and estimating coefficient alpha. *Journal of Educational and Behavioral Statistics* 27: (2002) 235-240.

An approximate test and confidence interval for coefficient alpha are derived. The approximate test and confidence interval are then used to derive closed-form samples size formulas. The sample size formulas can be used to determine the sample size needed to test coefficient alpha with desired power or to estimate coefficient alpha with desired precision. The sample size formulas closely approximate the sample size requirements for an exact confidence interval or an exact test.

Bonett, D. G. A simple approximation to the percentiles of the t distribution. *Computational Statistics* 17: (2002) 265-268.

A new approximation to the percentiles of the *t* distribution is presented that is simple and is accurate enough for most practical purposes.

Bonett, D. G. and Price, R. M. Statistical inference for linear functions of medians: Confidence intervals, hypothesis testing, and sample size requirements. *Psychological Methods* 7: (2002) 370-383.

When the distribution of the response variable is skewed, the population median may be a more meaningful measure of centrality than the population mean, and when the population distribution of the response variable has heavy tails, the sample median may be a more efficient estimator of centrality than the sample mean. The authors propose a confidence interval for a general linear function of population medians. Linear functions have many important special cases including pairwise comparisons, main effects, interaction effects, simple main effects, curvature, and slope. The confidence interval can be used to test 2-sided directional hypotheses and finite interval hypotheses. Sample size formulas are given for both interval estimation and hypothesis testing problems.

Bonett, D. G and Seier, E. Statistical inference for a ratio of dispersions using paired-samples. *Journal of Educational and Behavioral Statistics* 28: (2003) 21-30.

Wilcox (1990) examined the Type I and Type II error rates for several robust tests of $H_0 : s_1^2 / s_2^2 = I$ in paired-data designs and concluded that a satisfactory solution does not yet exist. A confidence interval for a ratio of correlated mean absolute deviations is derived and performs well in small sample sizes across realistically nonnormal distributions. When used to test a hypothesis, the proposed confidence interval is almost as powerful as the most powerful test examined by Wilcox.

Bonett, D. G. and Seier, E. A test of normality with high uniform power. *Computational Statistics and Data Analysis* 40: (2002) 435-445.

Kurtosis can be measured in more than one way. A modification of Geary's measure of kurtosis is shown to be more sensitive to kurtosis in the center of the distribution while Pearson's measure of kurtosis is more sensitive to kurtosis in the tails of the distribution. The modified Geary measure and the Pearson measure are used to define a joint test of kurtosis that has high uniform power across a very wide range of symmetric nonnormal distributions.

Price, R. M. and **Bonett, D. G**. Distribution-free confidence intervals for difference and ratio of medians. *Journal of Computational Statistics and Simulation* 72: (2002) 119-124.

The classic nonparametric confidence intervals for a difference or ratio of medians assume that the distributions of the response variable or the log-transformed response variable have identical shapes in each population. Asymptotic distribution-free confidence intervals for a difference and ratio of medians are proposed which do not require identically shaped distributions. The new asymptotic methods are easy to compute and simulation results show that they perform well in small samples.

Seier, E. and **Bonett, D. G**. Two families of kurtosis measures. *Metrika* 58: (2003) 59-70.

Two families of kurtosis measures are defined as $K_1(b) = E[ab^{-|z|}]$ and $K_2(b) = E[a(1-|z|^b)]$ where z denotes the standardized variable and a is a normalizing constant chosen such that the kurtosis is equal to 3

for normal distributions. $K_2(b)$ is an extension of Stavig's robust kurtosis. As with Pearson's measure of kurtosis $b_2 = E[z^4]$, both measures are expected values of continuous functions of z that are even, convex, or linear and strictly monotonic in $\Re^-$ and $\Re^+$. In contract to b_2, our proposed kurtosis measures give more importance to the central part of the distribution instead of the tails. Tests of normality based on these new measures are more sensitive with respect to the peak of the distribution. $K_1(b)$ and $K_2(b)$ satisfy Van Zwet's ordering and correlate highly with other kurtosis measures such as L-kurtosis and quantile kurtosis.

Wright, T. A. and **Bonett, D. G**. The moderating effect of tenure on the relation between job performance and commitment: A meta-analysis. *Journal of Applied Psychology* 87: (2002) 1183-1190.

This meta-analysis investigated the correlation between attitudinal commitment and job performance for 3,360 employees obtained from 27 independent studies across various levels of employee tenure. Controlling for employee age and other nuisance variables, the authors found that tenure had a very strong nonlinear moderating effect on the commitment-performance correlation, with correlations tending to decrease exponentially with increasing tenure. These findings do not appear to be the result of differences across studies in terms of the type of performance measure (supervisory vs. self), type of tenure (job vs. organizational), or commitment measure (Organizational Commitment Questionnaire [L. W. Porter, R. M. Steers, R. T. Mowday, and P. V. Boulian, 1974] vs. other). The implications and future research directions of these results are discussed.

Chandler, V. L. and **Brendel, V.** The maize genome sequencing project. *Plant Physiology* 130: (2002) 1594-1597.

On September 20, 2002, the National Science Foundation (NSF) announced the launch of the Maize Genome Sequencing Project. The momentum for this endeavor has been building within the maize (*Zea mays*) genetics and larger plant science community for several years. Reasons for launching a concerted effort at this time are at least 4-fold. First, advances in DNA sequencing technology now allow faster sequencing at a lower cost than in the past. Second, new high-resolution, high-throughput DNA fingerprinting methods should yield a minimum clone set colinear with the genetic map of the maize genome. Third, promising approaches to preparing fractions of the maize genome enriched for genes have been developed. Fourth, comparative analyses of maize with rice (*Oryza sativa*) or Arabidopsis suggest that the genome sequences of these two species will not be sufficient to understand the precise details of maize gene content and expression. This *Update* reviews the project goals and the expected deliverables deriving from the two funded consortia.

Dong, Q., Roy, L., Freeling, M., Walbot, V., and **Brendel, V.** ZmDB, an integrated database for maize genome research. *Nucl. Acids Research* 31: (2003) 244-247.

Zea mays DataBase (ZmDB) seeks to provide a comprehensive view of maize (corn) genetics by linking genomic sequence data with gene expression analysis and phenotypes of mutant plants. ZmDB originated in 1999 as the Web portal for a large project of maize gene discovery, sequencing and phenotypic analysis using a transposon tagging strategy and expressed sequence tag (EST) sequencing. Recently, ZmDB has broadened its scope to include all public maize ESTs, genome survey sequences (GSSs), and protein sequences. More than 170 000 ESTs are currently clustered into approximately 20 000 contigs and about an equal number of apparent singlets. These clusters are continuously updated and annotated with respect to potential encoded protein products. More than 100 000 GSSs are similarly assembled and annotated by spliced alignment with EST and protein sequences. The ZmDB interface provides quick access to analytical tools for further sequence analysis. Every sequence record is linked to several display options and similarity search tools, including services for multiple sequence alignment, protein domain determination and spliced alignment. Furthermore, ZmDB provides web-based ordering of materials generated in the project, including ESTs, ordered collections of genomic sequences tagged with the RescueMu transposon and microarrays of amplified ESTs. ZmDB can be accessed at http://zmdb.iastate.edu/.

Kalyanaraman, A., Aluru, S., Kothari, S., and **Brendel, V**. Efficient clustering of large EST data sets on parallel computers. *Nucl. Acids Research* 31: (2003) 2963-2974.

Clustering expressed sequence tags (ESTs) is a powerful strategy for gene identification, gene expression studies and identifying important genetic variations such as single nucleotide polymorphisms. To enable fast clustering of large-scale EST data, we developed PaCE (for Parallel Clustering of ESTs), a software program for EST clustering on parallel computers. In this paper, we report on the design and development of PaCE and its evaluation using Arabidopsis ESTs. The novel features of our approach include: (i) design of memory efficient algorithms to reduce the memory required to linear in the size of the input, (ii) a combination of algorithmic techniques to reduce the computational work without sacrificing the quality of clustering, and (iii) use of parallel processing to reduce run-time and facilitate clustering of larger data sets. Using a combination of these techniques, we report the clustering of 168 200 Arabidopsis ESTs in 15 min on an IBM xSeries cluster with 30 dual-processor nodes. We also clustered 327 632 rat ESTs in 47 min and 420 694 Triticum aestivum ESTs in 3 h and 15 min. We demonstrate the quality of our software using benchmark Arabidopsis EST data, and by comparing it with CAP3, a software widely used for EST assembly. Our software allows clustering of much larger EST data sets than is possible with current software. Because of its speed, it also facilitates

multiple runs with different parameters, providing biologists a tool to better analyze EST sequence data. Using PaCE, we clustered EST data from 23 plant species and the results are available at the PlantGDB website.

Lal, S. K., Giroux, M. J., **Brendel, V.,** Vallejos, C. E., and Hannah, L. C. The maize genome contains a *Helitron* insertion. *Plant Cell* 15: (2003) 381-391.

The maize mutation sh2-7527 was isolated in a conventional maize breeding program in the 1970s. Although the mutant contains foreign sequences within the gene, the mutation is not attributable to an interchromosomal exchange or to a chromosomal inversion. Hence, the mutation was caused by an insertion. Sequences at the two Sh2 borders have not been scrambled or mutated, suggesting that the insertion is not caused by a catastrophic reshuffling of the maize genome. The insertion is large, at least 12 kb, and is highly repetitive in maize. As judged by hybridization, sorghum contains only one or a few copies of the element, whereas no hybridization was seen to the Arabidopsis genome. The insertion acts from a distance to alter the splicing of the sh2 pre-mRNA. Three distinct intron-bearing maize genes were found in the insertion. Of most significance, the insertion bears striking similarity to the recently described DNA helicase-bearing transposable elements termed HELITRONS: Like Helitrons, the inserted sequence of sh2-7527 is large, lacks terminal repeats, does not duplicate host sequences, and was inserted between a host dinucleotide AT. Like Helitrons, the maize element contains 5' TC and 3' CTRR termini as well as two short palindromic sequences near the 3' terminus that potentially can form a 20-bp hairpin. Although the maize element lacks sequence information for a DNA helicase, it does contain four exons with similarity to a plant DEAD box RNA helicase. A second Helitron insertion was found in the maize genomic database. These data strongly suggest an active Helitron in the present-day maize genome.

Zhu, W., Schlueter, S. D., and **Brendel, V**. Refined annotation of the *Arabidopsis thaliana* genome by complete EST mapping. *Plant Physiology* 132: (2003) 469-484.

Expressed sequence tags (ESTs) currently encompass more entries in the public databases than any other form of sequence data. Thus, EST data sets provide a vast resource for gene identification and expression profiling. We have mapped the complete set of 176,915 publicly available Arabidopsis EST sequences onto the Arabidopsis genome using GeneSeqer, a spliced alignment program incorporating sequence similarity and splice site scoring. About 96% of the available ESTs could be properly aligned with a genomic locus, with the remaining ESTs deriving from organelle genomes and non-Arabidopsis sources or displaying insufficient sequence quality for alignment. The mapping provides verified sets of EST clusters for evaluation of EST clustering programs. Analysis of the spliced alignments suggests corrections to current gene structure annotation and provides examples of alternative and non-canonical pre-mRNA splicing. All results of this study were parsed into a database and are accessible via a flexible Web interface at http://www.plantgdb.org/AtGDB/.

Carriquiry, A. L. Estimation of usual intake distributions of nutrients and foods. *Journal of Nutrition* 133: (2003) 601-608.

The issue of estimating usual intake distributions using daily intake data as collected by nationwide food consumption surveys is discussed. Of interest are not only the usual nutrient intake distributions based on food intake alone, but also the total nutrient intake distributions that must be based on information on food and supplement consumption. The problems of estimating usual food intake distributions and distinguishing between frequently consumed and infrequently consumed food items are considered. Data needs as well as statistical methodologies available to carry out each of the tasks outlined above are discussed, with particular reference to the integrated National Health and Nutrition Examination Survey that is now in the field. The replicated 24-h recalls should be augmented with a propensity questionnaire to improve on the estimation of intake distributions for infrequently consumed nutrients, supplements and food items.

Carriquiry, A. L and **S. M. Nusser**. Comment on Patterson, B. H., C. M. Dayton, B. I. Graubard, Latent class analysis of complex sample survey data: Application to dietary data. *Journal of the American Statistical Association* 97: (2002) 729-731.

Arab, L., **Carriquiry, A. L.,** Gaudet, M., and Scott, S. Ethnic differences in the nutrient intake adequacy of premenopausal women: results from the National Health and Nutrition Examination Survey III. *Journal of the American Dietetics Association* 103: (2002) 1008-1014.

OBJECTIVE: To examine the adequacy of dietary intake of calcium; folate; and vitamins C, D, E, B-6, and B-12 in premenopausal US women of differing ethnicity. DESIGN: Analyses of single and duplicate 24-hour recalls were conducted to determine dietary intake during the Third National Health and Nutrition Examination Survey. SUBJECTS: Three thousand five hundred eighty-five randomly selected women aged 20 to 50 years from across the United States who were not pregnant or lactating were examined between 1988 and 1994. STATISTICAL ANALYSES: Usual nutrient intake distributions were estimated using the Iowa State University method for adjustment of the distribution. The Estimated Average Requirement cut-point method was used to determine the proportion of women with inadequate intake for each nutrient in each ethnic group. RESULTS: More than 75% of women irrespective of ethnic group had usual intakes of calcium lower than the new

Adequate Intake. More than 90% of the women had inadequate intakes of folate and vitamin E from food sources alone. More than half of smokers had inadequate intakes of vitamin C. Intakes of vitamins B-6 and B-12 were low in less than 10% of these women. APPLICATIONS/CONCLUSIONS: This article provides evidence that a high proportion of premenopausal U.S. women are underconsuming a variety of nutrients. Dietary intakes alone are not currently adequate to meet the new recommended intakes. Nutritional supplement use is widespread and effective, but does not eliminate the concerns for at-risk populations. Awareness of the general inadequacies in intakes of vitamin E and folic acid at large, and in many women vitamin C as well, can help direct individual dietary recommendations and place the emphasis in group counseling on nutrients that are of widespread concern. In addition, foods rich in vitamins B-6 and of general nutritional benefit should be emphasized among African American women in the United States as a substantial proportion of this group is still showing inadequate intakes from foods.

Fernández, Soledad A., Fernando, Rohan L., Guldbrandtsen, Bernt Stricker, Christian Schelling Matthias and **Carriquiry A. L.** Irreducibility and efficiency of ESIP to sample marker genotypes in large pedigrees with loops. *Genetics, Selection, Evolution* 34: (2002) 537-555.

Markov chain Monte Carlo (MCMC) methods have been proposed to overcome computational problems in linkage and segregation analyses. This approach involves sampling genotypes at the marker and trait loci. Among MCMC methods, scalar-Gibbs is the easiest to implement, and it is used in genetics. However, the Markov chain that corresponds to scalar-Gibbs may not be irreducible when the marker locus has more than two alleles, and even when the chain is irreducible, mixing has been observed to be slow. Joint sampling of genotypes has been proposed as a strategy to overcome these problems. An algorithm that combines the Elston-Stewart algorithm and iterative peeling (ESIP sampler) to sample genotypes jointly from the entire pedigree is used in this study. Here, it is shown that the ESIP sampler yields an irreducible Markov chain, regardless of the number of alleles at a locus. Further, results obtained by ESIP sampler are compared with other methods in the literature. Of the methods that are guaranteed to be irreducible, ESIP was the most efficient.

Kurkalova, L., and **Carriquiry, A. L.** An analysis of graing production decline during the early transition in Ukraine: Bayesian inference. *American Journal of Agricultural Economics* 84: (2002) 1256-1263.

Kurkalova, L. and **Carriquiry, A. L.** Input- and output-oriented technical efficiency of Ukrainian collective farms, 1989-1992: Bayesian analysis of a stochastic production frontier model. *Journal of Productivity Analysis* 20: (2003) 191-211.

We propose estimation of a stochastic production frontier model within a Bayesian framework to obtain the posterior distribution of single-input-oriented technical efficiency at the firm level. All computations are carried out using Markov chain Monte Carlo methods. The approach is illustrated by applying it to production data obtained from a survey of Ukrainian collective farms. We show that looking at the changes in single-input-oriented technical efficiency in addition to the changes in output-oriented technical efficiency improves the understanding of the dynamics of technical efficiency over the first years of transition in the former Soviet Union.

Wang, H., Reitmeir, C. A., Glatz, B. A., and **Carriquiry, A. L.** Mixed model analysis of sensory characteristics of irradiated apple cider. *Journal of Food Science* 68: (2003) 1498-1503.

Trained panelists evaluated the sensory characteristics of 4 kinds of apple ciders: untreated, pasteurized, and irradiated at 2 or 4 kGy. A mixed model analysis was implemented. From among several realistic models, a mixed model without an interaction term was selected for fitting most of the sensory attributes studied. Irradiated ciders were lighter in color and had less apple flavor than untreated cider. Cider irradiated at both 2- and 4-kGy doses contained more "cardboard-like" flavor compared to untreated and pasteurized ciders. Consequently, "cardboard-like" was a suitable term for the description of the specific off-flavor in irradiated cider with preservative.

Cook, D. Interactive and dynamic graphics for data analysis: A case study on quasar data. *Statistical Challenges of Astronomy* (2003)

This paper describes the use of interactive and dynamic statistical graphics for a classification task of separating quasars from non-quasars, using measurements on red and blue plates, radio and optical values. Multivariate plotting techniques used are the scatterplot matrix, parallel coordinate plot and tours, an extension of 3D rotation to arbitrary dimensional rotation.

Swayne, D. F., Temple Lang, D., Buja, A., and **Cook, D.** GGobi: Evolving from XGobi into an extensible framework for interactive data visualization. *Journal of Computational Statistics and Data Analysis* 43:4 (2003) 423-444.

GGobi is a direct descendent of a data visualization system called Xgobi that has been around since the early 1990's. GGobi's new features include multiple plotting windows, a color lookup table manager, and an XML (Extensible Markup Language) file format for data. Perhaps the biggest advance is that GGobi can be easily

extended, either by being embedded in other software or by the addition of plugins; either way, it can be controlled using an API (Application Programming Interface). An illustration of its extensibility is that it can be embedded in R. The result is a full marriage between GGobi's direct manipulation graphical environment and R's familiar extensible environment for statistical data analysis.

Adam, M. L., Kelly, J. M., Graves, W. R., and **Dixon, P. M**. Nitrate uptake by red maple is a function of root-zone temperature. *Journal of Plant Nutrition* 26 (2003) 203-222

Previous studies show that nutrient acquisition increases with root-zone temperature to an optimum, but the response may be unique to the nutrient and species combination investigated. The objective was to determine the influence of root-zone temperature on the kinetics of net nitrate uptake by using solution-grown "Autumn Flame" and "Franksred" (Red Sunset®) ramets as representatives of red maple (*Acer rubrum* L.). Red maple was exposed to root-zone temperatures of 14, 24, or 34 C for 3, 4, or 6 weeks during three experiments. Standard solution-depletion techniques were then used to assess nitrate uptake for 14 h. Averaged over both cultivars and all experiments, means for root-surface area were 0.129, 0.141, 0.120 m^2 (SE 0.0080 m^2) for root zones at 14, 24, and 34 C, respectively. Means for uptake differed by cultivar only in experiment 1. A linear, concentration-independent estimate of I_{max} dominated net uptake below 540 µM. Averaged over both cultivars in all experiments, apparent I_{max} estimates were 120, 150, and 170 nmol m^{-2} s^{-1} (SE 8.8 nmol m^{-2} s^{-1}) for the root-zone treatments 14, 24, and 34 C, respectively. Apparent K_m and C_{min} could be estimated only for experiment 3. K_m increased with root-zone temperature and had means of 88, 140, and 190 µM (SE 51 µM) whereas C_{min} decreased and had means of 66, 38, and 18 µM (SE 17 µM) for the 14, 24, and 34°C treatments, respectively. It was concluded that it is necessary to account for root-zone temperature when estimating nitrate uptake in red maple, and these results suggest that only a single concentration-independent constant for nitrate uptake is necessary for uptake calculations below 540 µM.

Batzer, J. C., Gleason, M. L., Weldon, B., **Dixon, P. M.,** and Nutter, F. W. Jr. Evaluation of postharvest removal of sooty blotch and flyspeck on apples using sodium hypochlorite, hydrogen peroxide with peroxyacetic acid, and soap. *Plant Disease* 86: (2002) 1325-1332.

Postharvest dips of apples (*Malus* × *domestica*) in commercial disinfestants were used to remove signs of the flyspeck (FS) pathogen, *Schizothyrium pomi*, and the sooty blotch (SB) complex (*Peltaster fructicola, Leptodontium elatius*, and *Geastrumia polystigmatis*). Apples were dipped for 7 or 15 min in buffered sodium hypochlorite (Agclor 310 plus Decco 312 Buffer) at 200, 400, 500, 600, or 800 ppm chlorine, a mixture of hydrogen peroxide and peroxyacetic acid (Tsunami 100) at 60 ppm/80 ppm, 120 ppm/160 ppm, or 360 ppm/480 ppm, respectively, or soap (Kleen 440), then brushed and rinsed for 30 s on a commercial grading line. Disease severity was assessed as percent diseased area using a quantitative rating system, and by counting the number of colonies of three mycelial types of SB and FS. Percent diseased area on apples was converted to USDA apple grade ratings and retail values. Both assessment methods provided similar results, but the percent-diseased-area method was less labor intensive. A 7-min dip in 800 ppm chlorine resulted in a mean increase from 25 and 55% to 100% Extra Fancy grade for 'Jonathan' and 'Golden Delicious' apples, respectively, and increased market value by 31 and 14%, respectively. The 7-min, 200-ppm chlorine dip resulted in an increase from 28 and 45% to 92.5 and 96.5% Extra Fancy after treatment for 'Jonathan' and 'Golden Delicious', respectively. Blemishes were removed more effectively from 'Jonathan' and 'McIntosh' apples than from 'Golden Delicious'. Mycelial types of the sooty blotch and flyspeck fungi were removed differentially by the disinfestant dip treatments.

Dale, M. R. T., **Dixon, P. M.,** Fortin, M. J., Legendre, P., Myers, D. E., and Rosenberg, M. S. Conceptual and mathematical relationships among methods for spatial analysis. *Ecography* 25: (2002) 558-577.

A large number of methods for the analysis of the spatial structure of natural phenomena (for example, the clumping or overdispersion of tree stems, the positions of veins of ore in a rock formation, the arrangement of habitat patches in a landscape, and so on) have been developed in a wide range of scientific fields. This paper reviews many of the methods and describes the relationships among them, both mathematically, using the cross-product as a unifying principle, and conceptually, based on the form of a moving window or template used in calculation. The relationships among these methods suggest that while no single method can reveal all the important characteristics of spatial data, the results of different analyses are not expected to be completely independent of each other.

De Roin, M. A., Foong S. C. C., **Dixon P. M.,** and Dickson J. S. Survival and recovery of *Listeria monocytogenes* on ready-to-eat meats inoculated with a desiccated and nutritionally depleted dustlike vector. *Journal of Food Protection* 66: (2003) 962-969.

Dust from construction was theorized to serve as a vector for *L. monocytogenes* transmission to ready-to-eat (RTE) meats after heat processing but before packaging. A five-strain *Listeria monocytogenes* culture including serotype 4b was continually stressed on a sand vector under four sets of nutritionally depleted and dry conditions to simulate postprocessing contamination by dustlike particulates. The stresses included that associated with sand stored at different temperatures (10 and 22 C) and levels of humidity (40% relative humidity [RH], 88% RH, or complete desiccation). Irradiated RTE meats, including frankfurters, bologna,

chopped ham, and deli-style roast beef, were inoculated with the *L. monocytogenes*-contaminated sand every 2 to 3 days over a period of 12 months. After inoculation, the RTE meats were vacuum packed and stored at 4 C for 24 h. Populations of *L. monocytogenes* were enumerated by surface plating on nonselective and selective media to recover cells on the basis of the different stresses presented (osmotic or antibiotic). *L. monocytogenes* was demonstrated to be capable of surviving on the sand vector for > 151 days at 10 C and 88% RH, 136 days at 10 C and 0% RH, 73 days at 22 C and 40% RH, and 82 days at 22 C and 0% RH. These results show that under the most conservative scenario, the 73-day-old *L. monocytogenes*-contaminated sand was able to attach to and be recovered from the RTE meats. This study illustrated that dust contaminated with *L. monocytogenes*, once in contact with meat surfaces, can survive and grow, posing a health hazard to consumers.

Keitt, T. H., Bjørnstad, O., **Dixon, P. M.,** and Citron-Pousty, S. Accounting for spatial pattern when modeling organism-environment interactions. *Ecography* 25: (2002) 616-625.

Accounting for spatial pattern when modeling organism-environment interactions Timothy H. Keitt, Ottar N. Bjørnstad, Philip M. Dixon and Steve Citron-PoustyStatistical models of environment-abundance relationships may be influenced by spatial autocorrelation in abundance, environmental variables, or both. Failure to account for spatial autocorrelation can lead to incorrect conclusions regarding both the absolute and relative importance of environmental variables as determinants of abundance. We consider several classes of statistical models that are appropriate for modeling environment-abundance relationships in the presence of spatial autocorrelation, and apply these to three case studies: 1) abundance of voles in relation to habitat characteristics; 2) a plant competition experiment; and 3) abundance of Orbatid mites along environmental gradients. We find that when spatial pattern is accounted for in the modeling process, conclusions about environmental control over abundance can change dramatically. We conclude with five lessons: 1) spatial models are easy to calculate with several of the most common statistical packages; 2) results from spatially-structured models may point to conclusions radically different from those suggested by a spatially independent model; 3) not all spatial autocorrelation in abundances results from spatial population dynamics; it may also result from abundance associations with environmental variables not included in the model; 4) the different spatial models do have different mechanistic interpretations in terms of ecological processes - thus ecological model selection should take primacy over statistical model selection; 5) the conclusions of the different spatial models are typically fairly similar - making any correction is more important than quibbling about which correction to make.

Suchard, M. A., Weiss, R. E., **Dorman**, **K. S.**, and Sinsheimer. J. S. Inferring spatial phylogenetic variation along nucleotide sequences. *Journal of the American Statistical Association* 98: (2003) 427-437.

We develop a Bayesian multiple changepoint model to infer spatial phylogenetic variation (SPV) along aligned molecular sequence data. SPV occurs in sequences from organisms that have undergone biological recombination or when evolutionary rates and selective pressures vary along the sequences. This Bayesian approach permits estimation of uncertainty regarding recombination, the crossing-over locations, and all other model parameters. The model assumes that the sites along the data separate into an unknown number of contiguous segments, each with possibly different evolutionary relationships between organisms, evolutionary rates, and transition: transversion ratios. We develop a transition kernel, use reversible-jump Markov chain Monte Carlo to fit our model, and draw inference from both simulated and real data. Through simulation, we examine the minimal length recombinant segment that our model can detect for several levels of evolutionary divergence. We examine the entire genome of a reported human immunodeficiency virus (HIV)-1 isolate, related to a purported recombinant virus thought to be the causative agent of an epidemic outbreak of HIV-1 infection among intravenous drug users in Russia. We find that regions of the genome differ in their evolutionary history and selective pressures. There is strong evidence for multiple crossovers along the genome and frequent shifts in selective pressure changes throughout the *vif* through *env* genes.

Suchard, M. A., Weiss, R. E., **Dorman**, **K. S.**, and Sinsheimer. J. S. Oh brother where art thou? A bayes factor test for recobmination with unceratin heritage. *Systematic Biology* 51:5 (2002) 1-14.

Current methods to identify recombination between subtypes of human immunodeficiency virus-1 (HIV-1) fall into a sequential testing trap, in which significance is assessed conditional on parental representative sequences and crossover points (COPs) that maximize the same test statistic. We overcome this shortfall by testing for recombination while simultaneously inferring parental heritage and COPs using an extended Bayesian multiple change-point model. The model assumes that aligned molecular sequence data consist of an unknown number of contiguous segments that may support alternative topologies or varying evolutionary pressures. We allow for heterogeneity in the substitution process and specifically test for inter-subtype recombination using Bayes factors. We also develop a new class of priors to assess significance across a wide range of support for recombination in the data. We apply our method to three putative, gag gene recombinants. HIV-1 isolate RW024 decisively supports recombination with an inferred parental heritage of AD and a COP 95% Bayesian credible interval of (1152; 1178) using the HXB2 numbering scheme. HIV-1 isolate VI557 barely supports recombination. HIV-1 isolate RF decisively rejects recombination, as expected given the sequence is commonly used as a reference sequence for subtype B. We employ scaled regeneration

quantile plots to assess convergence and find this approach convenient to use even for our variable dimensional model parameter space.

Duckworth, W. M., II and **Stephenson, W. R.** Beyond traditional statistical methods. *The American Statistician* 56:3 (2002) 230-233.

Today's courses in statistical methods, for the most part, focus on the same methods that were taught 30 years ago. The actual practice of statistics has moved beyond these traditional statistical methods. Modern methods - including dynamic graphics, nonlinear estimation, resampling, and other simulation-based inference methods - are being used by many scientists and engineers. However, these methods generally are not included in courses in statistical methods, especially at the undergraduate level. This article discusses the development of a collection of instructional modules, built around actual applications from science and engineering. Each module is self-contained and includes instructional materials such as: objectives, examples, lecture materials, computer implementation of the methodology, homework, class/discussion exercises, and assignments. The modules are intended as a resource for instructors to experiment with and explore the use of modern statistical methodology in undergraduate statistics methods courses. Two of the modules will be presented in some detail. We also discuss the use of the modules in a new course that goes beyond our traditional methods courses.

Chen, C., **Fuller, W. A.**, and Breidt, F. J. Spline estimators of the density function of a variable measured with error. *Communications in Statistics Simulation and Computation* 1: (2003) 73-86.

The estimation of the distribution function of a random variable X measured with error is studied. It is assumed that the measurement error has a normal distribution with known parameters. Let the i-th observation on X be denoted by $Y_i = X_i + \in_i$, where $\in_i$ is the measurement error. Let $\{Y_i\}(i = 1, 2, \ldots, n)$ be a sample of independent observations. It is assumed that $\{X_i\}$ and $\{\in_i\}$ are mutually independent and each is identically distributed. The proposed estimator is a spline function that transforms X into a standard normal variable. The parameters of the spline function are obtained by maximum likelihood estimation. The number of parameters is determined by the data with a simple criterion, such as AIC. Computationally, a weighted quantile regression estimator is used as the starting value for the nonlinear optimatization procedure of the MLE. In a simulation study, both the quantile regression estimator and the maximum likelihood estimator dominate an optimal kernel estimator and a mixture estimator under a wide class of scenarios.

Hofmann, H. Constructing and reading mosaicplots. *Journal of Computational Statistics and Data Analysis* 43:4 (2003) 565-580.

Mosaicplots have been around now for quite some time, however, they are not very well understood. This may both be due to their high dimensionality as well as their hierarchical construction, which makes it hard to figure out what exactly can be seen in a picture as well as to decide which plot to draw given a specific problem. This paper will discuss these problems by giving yet another approach to mosaicplots, based on the underlying geometrical model. We will have a closer look at the popular statement that mosaicplots are the "graphical equivalent of contingency tables". This paper gives a wrap-up of mosaicplots in default construction mode as well as for some of their variations, such as fluctuation mode, Doubledecker plots and same-bin-size display.

Ahn, J. S., **Hofmann, H.**, and **Cook, D.** A projection pursuit method on the multidimensional squared contingency table. *Computational Statistics* (2003).

In this study a projection pursuit method is used to explore c^d (square) contingency table data. The method operates on projection matrices constructed from the contingency tables using affine geometry and creates projections (or marginals) using a Radon transform. The projection matrices and the projections can be used to find the "interesting" (nonuniform structures), and to cluster and to order the cases. This projection pursuit method is implemented with graph visualization of projections. It is similar to the discrete version of Andrews' curves. We demonstrate how this approach compares to association rules commonly used in data mining using a market basket data set and compare the PP results with the analysis of a data set from Wishart and Leach (1970).

Kaiser, M. S., Cressie, N., and Lee, J. Spatial mixture models based on exponential family conditional distributions. *Statistica Sinica* 12: (2002) 449-474.

Spatial statistical models are applied in many problems for which dependence in observed random variables is not easily explained by a direct scientific mechanism. In such situations there may be a latent spatial process that acts to produce the observed spatial pattern. Scientific interest often centers on the latent process and the degree of spatial dependence that characterizes it. Such latent processes may be thought of as spatial mixing distributions. We present methods for the specification of flexible joint distributions to model spatial processes through multi-parameter exponential family conditional distributions. One approach to the analysis of these models is the Monte Carlo maximum likelihood, and an approach based on independence pseudo-models is presented for formulating importance sampling distributions that allow such an analysis. The

methods developed are applied to a problem of forest-health monitoring, where the numbers of affected trees in spatial field plots are modeled using a spatial beta-binomial mixture.

Kaiser, M. S., Daniels, M. J., Furakawa, K., and **Dixon, P.** Analysis of particulate matter air pollution using Markov random field models on spatial dependence. *Environmetrics* 13: (2002) 615-628.

Researchers are beginning to realize the need to take spatial structure into account when modeling data on air pollutants. We develop several models for particulate matter in an urban region that allow spatial dependence to be represented in different manners over a time period of one year. The models are based on a Markov random field approach, and a conceptualization of observed data as arising from two random processes, a conditionally independent observation process and a spatially dependent latent pollution process. Optimal predictors are developed for both of these processes, and predictions of the observation process are used for model assessment.

Chen, P., Baas, T. J., Dekkers, J. C. M., **Koehler**, **K. J.,** and Mabry, J. W. Evaluation of strategies for selection for lean growth rate in pigs. *Journal of Animal Science* 81:5 (2003) 1150-1157.

Lean growth rate (LGR) in pigs is a nonlinear biological function of growth rate and lean quantity. According to animal breeding theory, genetic progress for LGR is maximized with selection on a linear index of its component traits, but selection on direct EBV for LGR is also common. In this study, the performance of five criteria for selection on estimated LGR in pigs was evaluated through simulation over five generations: linear indexes of multiple-trait EBV of component traits with or without updating index weights in each generation; a nonlinear index of multiple-trait EBV of component traits; and direct selection on EBV for LGR from a single-trait model or a multiple-trait model that included LGR and component traits. The nonlinear index yielded the highest response in LGR in Generation 5, but the linear index with updating performed almost as well. Not updating weights for the linear index reduced response in LGR by 1.1% in Generation 5 ($P < 0.05$). Direct selection on single-trait EBV for LGR yielded the lowest responses in Generation 5. Direct selection on EBV for LGR from a multiple-trait animal model yielded a 3.1% greater response in LGR in Generation 5 than direct selection on EBV for LGR based on a single-trait animal model ($P < 0.05$), but yielded a 1.9% lower response than the nonlinear index. Although differences in response in LGR were limited, alternative selection criteria resulted in substantially different responses in component traits. Linear index selection for LGR placed more emphasis on lean quantity, whereas direct selection for LGR emphasized growth rate. Based on the relative changes in the responses in LGR, selection for estimated LGR based on a nonlinear index or a linear index with updating is recommended for use in the swine industry.

Chen, P., Baas, T. J., Mabry, J. W., Dekkers, J. C. M., and **Koehler, K. J.** Genetic parameters and trends for lean growth rate and its components in U.S. Yorkshire, Duroc, Hampshire, and Landrace pigs. *Journal of Animal Science* 80: (2002) 2062-2070.

Records on 361,300 Yorkshire, 154,833 Duroc, 99,311 Hampshire, and 71,097 Landrace pigs collected between 1985 and April of 2000 in herds on the National Swine Registry Swine Testing and Genetic Evaluation System were analyzed. Animal model and REML procedures were used to estimate random effects of animal genetic, common litter, maternal genetic, and the covariances between animal and maternal for lean growth rate (LGR), days to 113.5 kg (DAYS), backfat adjusted to 113.5 kg (BF), and loin eye area adjusted to 113.5 kg (LEA). Fixed effects of contemporary group and sex were also in the statistical model. Based on the single-trait model, estimates of heritabilities were 0.44, 0.44, 0.46, and 0.39 for LGR; 0.35, 0.40, 0.44, and 0.40 for DAYS; 0.48, 0.48, 0.49, and 0.48 for BF; and 0.33, 0.32, 0.35, and 0.31 for LEA in the Yorkshire, Duroc, Hampshire, and Landrace breeds, respectively. Estimates of maternal genetic effects were low and ranged from 0.01 to 0.05 for all traits across breeds. Estimates of common litter effects ranged from 0.07 to 0.16. A bivariate analysis was used to estimate the genetic correlations between lean growth traits. Average genetic correlations over four breeds were -0.83, -0.37, 0.44, 0.07, 0.08, and -0.37 for LGR with DAYS, BF, and LEA, DAYS with BF and LEA, and BF with LEA, respectively. Average genetic trends were 2.35 g/yr, -0.40 d/yr, -0.39 mm/yr, and 0.37 cm 2/yr for LGR, DAYS, BF, and LEA, respectively. Results indicate that selection based on LGR can improve leanness and growth rate simultaneously and can be a useful biological selection criterion.

Chen, P., Baas, T. J. Mabry**,** J. W., **Koehler K. J.,** and Dekkers, J. C. M. Genetic parameters and trends for litter traits in U.S. Yorkshire, Duroc, Hampshire, and Landrace pigs. *Journal of Animal Science* 81: (2003) 46-53.

Records on 251,296 Yorkshire, 75,262 Duroc, 83,338 Hampshire, and 53,234 Landrace litters born between 1984 and April of 1999 in herds on the National Swine Registry Swine Testing and Genetic Evaluation System were analyzed. Animal model and restricted maximum likelihood procedures were used to estimate variances of animal genetic (a), maternal genetic (m), permanent environmental, and service sire, and the covariances between a and m for number born alive (NBA), litter weight at 21 d (L21WT), and number weaned (NW). Fixed effects of contemporary groups were included in the analysis. Based on a single-trait model, estimates of heritabilities were 0.10, 0.09, 0.08, and 0.08 for NBA; 0.08, 0.07, 0.08, and 0.09 for L21WT; and 0.05, 0.07, 0.05, and 0.05 for NW in the Yorkshire, Duroc, Hampshire, and Landrace breeds, respectively. Estimates of maternal genetic effects were low and ranged from 0.00 to 0.02 for all traits and all breeds. Estimates of

permanent environmental effects ranged from 0.03 to 0.08. Estimates of service sire effects ranged from 0.02 to 0.05. A bivariate analysis was used to estimate the genetic correlations among traits. Average genetic correlations over the four breeds were 0.13, 0.15, and 0.71 for NBA with L21WT, NBA with NW, and L21WT with NW, respectively. Average genetic trends were 0.018 pigs/yr, 0.114 kg/yr, and 0.004 pigs/yr for NBA, L21WT, and NW, respectively. Although estimates of heritabilities for litter traits were low and similar across breeds, genetic variances for litter traits were sufficiently large to indicate that litter traits could be improved through selection. This study presents the first set of breed-specific estimates of genetic parameters available from large numbers of field records. It provides information for use in national genetic evaluations.

Kim K. S., Taylor S. E, Gleason M. L, and **Koehler K. J.** Optimal weather variables for estimation of leaf wetness duration using an empirical method. *Korean Journal of Agricultural and Forest Meteorology* 4: (2002) 23-28.

Sets of weather variables for estimation of LWD were evaluated using CART (Classification and Regression Tree) models. Input variables were sets of hourly observations of air temperature at 0.3-m and 1.5-m height, relative humidity (RH), and wind speed that were obtained from May to September in 1997, 1998, and 1999 at 15 weather stations in Iowa, Illinois, and Nebraska, USA. A model that included air temperature at 0.3-m height, RH, and wind speed showed the lowest misidentification rate for wetness. The model estimated presence or absence of wetness more accurately (85.5%) than the CART/SLD model (84.7%) proposed by Gleason *et al.* (1994). This slight improvement, however, was insufficient to justify the use of our model, which requires additional measurements, in preference to the CART/SLD model. This study demonstrated that the use of measurements of temperature, humidity, and wind from automated stations was sufficient to make LWD estimations of reasonable accuracy when the CART/SLD model was used. Therefore, implementation of crop disease-warning systems may be facilitated by application of the CART/SLD model that inputs readily obtainable weather observations.

Mengeling, William L., Lager, Kelly M., Vorwald, Ann C., and **Koehler, Kenneth J.** Strain specificity of the immune response of pigs following vaccination with various strains of porcine reproductive and respiratory syndrome virus. *Veterinary Microbiology* 93:1 (2003) 13-24.

The primary objective of the study was to determine strain specificity of the immune response of pigs following vaccination with selected strains of porcine reproductive and respiratory syndrome virus (PRRSV). The experimental design included five groups (I through V, six pigs per group) free of antibody for PRRSV at the beginning of the experiment (day 0). On day 0, groups III, IV, and V were vaccinated with attenuated versions of PRRSV strains 8, 9, and 14, respectively. On day 21, the immunity of group II (non-vaccinated/challenged controls) and groups III, IV, and V was challenged by exposing each pig to a composite of the virulent versions of these same three strains. On day 35, all pigs, including non-vaccinated/non-challenged pigs of group I, were necropsied. Lungs and selected lymph nodes were examined for lesions. Serum samples obtained at weekly intervals throughout the study and lung lavage fluids obtained at necropsy were tested for the presence of PRRSV and its strain identity. Before challenge the strain of PRRSV identified in the sera of vaccinated pigs was always that with which the particular pig had been vaccinated (i.e. homologous strain), whereas, with one exception, only heterologous strains were identified after challenge. This apparent strain exclusion as a result of vaccination was statistically significant (P = 0.004). The tendency for heterologous strains to predominate after challenge suggests that a pig's immune response to PRRSV has some degree of strain specificity. Whether this finding has any clinical relevance in regard to immunoprophylaxis remains to be determined.

Lahiri, S. N. A necessary and sufficient condition for asymptotic independence of discrete Fourier transforms under short- and long-range dependence. *Annals of Statistics* 31: (2003) 613-641.

Let $\{X_t\}$ be a stationary time series and let $d_T(?)$ denote the discrete Fourier transform (DFT) of $\{X_0, \ldots, X_{T-1}\}$ with a data taper. The main results of this paper provide a characterization of asymptotic independence of the DFTs in terms of the distance between their arguments under both short- and long-range dependence of the process $\{X_t\}$. Further, asymptotic joint distributions of the DFTs $d_T(?_{1T})$ and $d_T(?_{2T})$ are also established for the cases $T(?_{1T} - ?_{2T}) = 0(1)$ as T ? 8 (asymptotically close ordinates) and $|T(?_{1T} - ?_{2T})|$? 8 as T ? 8 (asymptotically distant ordinates). Some implications of the main results on the estimation of the index of dependence are also discussed.

Lahiri, S. N., Lee, Yoon Dong, and Cressie, Noel. On asymptotic distribution and asymptotic efficiency of least squares estimators of spatial variogram parameters. *Journal of Statistical Planning and Inference* 103: (2002) 65-85. {In a special volume honoring C. R. Rao on his 80th birthday}.

In this article, we consider the least-squares approach for estimating parameters of a spatial variogram and establish consistency and asymptotic normality of these estimators under general conditions. Large-sample distributions are also established under a spatial regression model where the sampling design possibly has an *infill* sampling component. These results allow us to investigate efficiencies of different least squares variogram-parameter estimators in large samples. We provide two *necessary* and *sufficient* conditions for these estimators to be asymptotically efficient. It is an interesting consequence of our results that when the number of lags used to define the estimators is chosen to be equal to the number of variogram parameters to be

estimated, the ordinary least squares estimator, the weighted least squares and the generalized least squares estimators are all asymptotically efficient.

Lee, Yoon Dong and **Lahiri, S. N**. Least squares variogram fitting by spatial subsampling. *Journal of the Royal Statistical Society, Series B* 64: (2002) 837-854.

Least squares methods are popular for fitting valid variogram models to spatial data. The paper proposes a new least squares method based on spatial subsampling for variogram model fitting. We show that the method proposed is statistically efficient among a class of least squares methods, including the generalized least squares method. Further, it is computationally much simpler than the generalized least squares method. The method produces valid variogram estimators under very mild regularity conditions on the underlying random field and may be applied with different choices of the generic variogram estimator with analytical calculation. An extension of the method proposed to a class of spatial regression models is illustrated with a real data example. Results from a simulation study on finite sample properties of the method are also reported.

Zhu, Jun, **Lahiri, S. N**., and Cressie, Noel. Asymptotic inference for spatial CDFs over time. *Statistica Sinica* 12: (2002) 843-861.

A spatial cumulative distribution function (SCDF) is a random function that provides a statistical summary of a random process over a spatial domain of interest. In this paper, we consider a spatio-temporal process and establish statistical methodology to analyze changes in the SCDF over time. We develop hypothesis testing to detect a difference in the spatial random processes at two time points, and we construct a prediction interval to quantify such discrepancy in the corresponding SCDFs. Using a spatial subsampling method, we show that our inferences are valid asymptotically. As an illustration, we apply these inference procedures to test and predict changes in the SCDF of an ecological index for foliage condition of red maple trees in the state of Maine in the early 1990s.

Hraba, J., **Lorenz, Frederick O**., and Lee, S. Support for the Czech reforms, economic experiences, and additional burdens. *International Journal of Contemporary Sociology* 40: (2003) 255 – 280.

Transition theory predicts that support for reforms quickly diminishes when individuals encounter economic hardship during the transformation to a market economy. Using data from 11 repeated surveys conducted between 1990 and 1998, we found support for the predictions. We also found that the prediction did not hold beyond the economic domain: additional burdens associated with health, marriage and friendships were unrelated to attitudes toward post-communist economic reforms.

Hraba, J., Mullick, R., **Lorenz, Frederick O**., and Vercenik, J. Education and support for the Czech reforms. *Sociology of Education* 75: (2002) 147-168

Educated Czechs faired poorly during the communist period, but have been doing well since 1989. Using data from 11 surveys conducted between 1990 and 1998, we found that part of the relationship between education and support for reforms is mediated by new economic opportunities, but there was also an education by time interaction that suggests that values associated with education are crystallizing to shape strong support for reforms among the better educated.

Kim, K. J., Conger, R. D., Elder, G. H. Jr., and **Lorenz, Frederick O**. Reciprocal influences between stressful life events and adolescent internalizing and externalizing problems. *Child Development* 74: (2003) 127-143.

Using 5 waves of data from the Iowa Critical Transitions study, we estimated autoregressive models of the relationship between stressful life events and adolescent internalizing and externalizing problems. The results showed that stressful life events and these two forms of adjustment problems were reciprocally interrelated over time. For example, stressful life events predicted delinquency one year later, which in turn significantly predicted stressful life events in the following year. The results give insight into processes of accumulating disadvantage.

Wickrama, K. A. S. and **Lorenz, Frederick O.** Women's status, fertility decline and women's health in developing countries: Direct and indirect influences of social status on health. *Rural Sociology* 67: (2002) 255-277.

Growth curve analysis was used with 3 waves of data from 72 countries to examine predictors of change in fertility and women and infants mortality. Change in fertility between 1970 and 1990 was predicted by age at marriage, while level of fertility in 1990 was predicted by age at marriage and contraceptive use. Change in infant mortality between 1970 and 1994 was predicted by age at marriage, women's education, and level (1990) and change (1970–90) in fertility. Women's mortality in 1994 was predicted by women's education and level and change in fertility.

Meeker, W. Q., Jr. and Escobar, L. A. Software for reliability data analysis and test planning. *Brazilian Journal of Statistics* 15: (2002) 169-200.

Increasingly, statisticians and reliability engineers in industry are being asked to analyze reliability data. Because of the complicated nature of the data and models that are often encountered in reliability studies,

statistical methods and corresponding software needed for appropriate analyses are not developed as well as methods and software needed for the analysis of standard experimental designs and observational studies. This paper outlines the needs of practitioners and researchers in this area and describes a software tool that is being developed to satisfy the most important needs facing reliability analysts.

Doganaksoy, N., Hahn, G. J., and **Meeker, W. Q., Jr.** Accelerated testing for speedier reliability analysis. *Quality Progress* 36: (2003) 58-63.

Well-planned and carefully analyzed accelerated life tests provide statistical assurance that reliability goals can be met-and an early warning if they cannot. This tutorial paper describes the basic ideas behind accelerated life tests. We explain the different physical methods of acceleration (increasing use rate, accelerated aging, and subjecting units to increased stress) and the corresponding statistical models. The basic ideas of planning and analyzing the data from such tests are illustrated with an application in which the reliability of a new solid dielectric insulation for generator armature bars was evaluated.

Morris, M. D. Invited discussion of "Statistically based validation of computer simulation models in traffic operations and management," by Sacks, Rouphail, Park, and Thakuriah. *Journal of Transportation Statistics* 5: (2002) 18-22.

Nettleton, D. Testing for ordered means in a variation of the normal mixture model. *Journal of Statistical Planning and Inference* 107: (2002) 143-153.

A likelihood ratio test is developed for a null hypothesis that places a simple order restriction on the component density means in a variation of the normal mixture model. The asymptotic null distribution of the likelihood ratio statistic is shown to be a mixture of chi-square distributions when the true parameter lies on the boundary of the null space. Equality of the component means is found to be the asymptotically least favorable subhypothesis within the null hypothesis. The test is applied to a problem in statistical genetics. Extensions to null hypotheses that restrict the mean vector to polyhedral cones are discussed.

Hwang, J. T. G. and **Nettleton, D**. Principal components regression with data-chosen components and related methods. *Technometrics* 45: (2003) 70-79.

Multiple regression with correlated predictor variables is relevant to a broad range of problems in the physical, chemical, and engineering sciences. Chemometricians, in particular, have made heavy use of principal components regression and related procedures for predicting a response variable from a large number of highly correlated predictors. In this paper we develop a general theory that guides us in choosing principal components that yield very good estimates of regression coefficients. Our numerical results suggest that the theory also can be used to improve partial least squares regression estimators and regression estimators based on rotated principal components. Our methods also provide insight about the subspace of the predictor matrix that explains the response best.

Puthoff, D. P., **Nettleton, D**., Rodermel, S. R., and Baum, T. J. Arabidopsis gene expression changes during cyst nematode parasitism revealed by statistical analyses of microarray expression profiles. *The Plant Journal* 33: (2003) 911-921.

Cyst nematodes infect and devastate many agricultural crops. After penetrating plant roots, cyst nematodes set up intricate feeding cells (syncytia). Syncytia are the nematodes' sole source of nutrition, and because nematodes become sedentary they must maintain these feeding cells throughout their development. The sugar beet cyst nematode (BCN), Heterodera schachtii, infects Arabidopsis thaliana roots and successfully induces the formation of syncytia. In contrast, the soybean cyst nematode (SCN), H. glycines, does not induce functional syncytia in Arabidopsis roots yet retains many of the pre-feeding behaviors such as probing and penetration. With the availability of microarray technology, the expression profiles of thousands of genes can be monitored simultaneously to help determine the mechanisms of these biological processes. We conducted Affymetrix GeneChip microarray analyses of the Arabidopsis-cyst nematode interaction and developed a novel statistical procedure to analyze the resultant data that allowed us to identify more genes and with less false positives than by conventional 2 fold cutoff analysis. Real time RT-PCR assays were used to confirm the microarray analyses. The results of the expression profiling revealed 128 genes whose mRNA steady state levels are altered following infection by H. schachtii, in contrast to only 12 that have altered expression following H. glycines infection. These 12 genes also changed expression following infection by H. schachtii, i.e., we did not identify any genes that are specifically regulated by H. glycines. We conclude that the inability of SCN to parasitize Arabidopsis is not due to active defense responses, but rather to a lack of its ability to communicate with the plant. The strong trend in gene expression changes associated with successful cyst nematode parasitism by BCN suggests a potential involvement of as many as 116 H. schachtii-induced genes in the infection events starting with successful syncytium induction. Further characterization of these genes will permit the formulation of testable hypotheses to explain successful cyst nematode parasitism.

Nusser, S. M. and E. E. Klaas. Survey methods for assessing land cover map accuracy. *Environmental and Ecological Statistics* 10:3 (2003) 309-331.

The increasing availability of digital photographic materials has fueled efforts by agencies and organizations to generate land cover maps for states, regions, and the US as a whole. Regardless of the information sources and classification methods used, land cover maps are subject to numerous sources of error. In order to understand the quality of the information contained in these maps, it is desirable to generate statistically valid estimates of accuracy rates describing misclassification errors. We explored a full sample survey framework for creating accuracy assessment study designs that balance statistical and operational considerations in relation to study objectives for a regional assessment of GAP land cover maps. We focused not only on appropriate sample designs and estimation approaches, but on aspects of the data collection process, such as gaining cooperation of land owners and using pixel clusters as an observation unit. The approach was tested in a pilot study to assess the accuracy of Iowa GAP land cover maps. A stratified two-stage cluster sampling design addressed sample size requirements for land covers and the need for geographic spread while minimizing operational effort. Recruitment methods used for private land owners yielded high response rates, minimizing a source of nonresponse error. Collecting data for a 9-pixel cluster centered on the sampled pixel was simple to implement, and provided better information on rarer vegetation classes as well as substantial gains in precision relative to observing data at a single-pixel.

Nusser, S. M, Miller, L. L. Clarke, K. and Goodchild, M. F. Geospatial IT for mobile field data collection. *Communications of the ACM (Association for Computing Machinery)* 46: (2003) 64-65.

Federal statistical agencies generate critical data about the nation's population, economy, and natural resources. A large portion of these data are gathered in the field, using geospatial information as an essential reference material. The ability to interact with digital geospatial data in the field offers significant enhancements for data quality and operational efficiencies. We discuss research on computing infrastructures and mobile devices to support field data collection. The goal of this research is to enable access to and use of digital geospatial information for field data gatherers who do not have extensive training in spatial analysis or information systems

Opsomer, J. D., Botts, C., and Kim, J. Y. Small area estimation in a watershed erosion assessment survey. *Journal of Agricultural, Biological and Environmental Statistics* 8: (2003) 139-152.

This article describes an application of small area estimation in a survey conducted in the Rathbun LakeWatershed in Iowa (USA). From a sample of 183 plots in the watershed, erosion from four sources as well as total erosion are estimated for 61 small areas within the study region. Information on land cover and topography from GIS coverages are used to create plot-level covariates for the regression model. Two estimators are discussed in the article: an empirical best linear unbiased predictor and a composite estimator. The latter estimator is potentially less efficient than the former, but preserves the additivity between the estimates for the four erosion sources and the total erosion. For this survey, the estimated efficiency loss is shown to be very small.

Opsomer, J. D., Jensen, H. H., and Pan, S. An evaluation of the USDA Food Security measure with generalized linear mixed models. *Journal of Nutrition* 133: (2003) 421-427.

Over the last decade, new information has been developed and collected to measure the extentof food insecurity and hunger in the United States. Common measurement of the phenomenon of hunger and food insecurity has become possible through efforts of the U.S. Department of Agriculture (USDA) to develop a set of survey questions that can be used to obtain estimates of the prevalence and severity of food insecurity. We evaluated the measurement of food insecurity and the effect of household variables on measured food insecurity. The effects of demographic and survey-specific variables on the food insecurity/hunger scale were evaluated using a generalized linear model with mixed effects. Data came from the 1995, 1997 and 1999 Food Security Module of the Current Population Survey. The results generally validated the model currently used by the USDA. In addition, our approach made it possible to consider the effect ofdemographics and several survey design variables on food security among measurably food-insecure households, as well as interactions between these factors and the food security questions. The analysis of the expanded model with the 1995 data found results similar to those reported based on the Rasch model used by the USDA. Even though the sample size was reduced and a number of screening and questionnaire changes were introduced in 1997 and 1999, the results for those years appear mostly unchanged and confirm the robustness of the scale in measuring food insecurity. There is some evidence that interpretation of questions may vary among different demographic groups.

Kauermann, G. and **J. D. Opsomer.** Local likelihood estimation in generalized additive models. *Scandinavian Journal of Statistics* 30: (2003) 317-337.

Generalized additive models are a popular class of multivariate nonparametric regression models, due in large part to the ease of use of the local scoring estimation algorithm. However, the theoretical properties of the local scoring estimator are poorly understood. In this article, we propose a local likelihood estimator for generalized additive models that is closely related to the local scoring estimator fitted by local polynomial

regression. We derive the statistical properties of the estimator and show that it achieves the same asymptotic convergence rate as a one-dimensional local polynomial regression estimator. We also propose a wild bootstrap estimator for calculating pointwise confidence intervals for the additive component functions. The practical behavior of the proposed estimator is illustrated through simulation experiments and an example.

Wang, Yufeng and **Pollak, Edward.** The effective number of a population that varies cyclically in size. II. Overlapping generations. *Mathematical Biosciences* 179: (2002) 161-181.

We consider haploid and dioecious age-structured populations that vary over time in cycles of length *k*. Results are obtained for both autosomal and sex-linked loci if the population is dioecious. It is assumed that *k* is small in comparison with number of haploid individuals (or of numbers of males and females) in any generation of a cycle. The inbreeding effective population size N_e is then approximately given by the expression $[T\sum_{j=0}^{k-1} 1/[N_e(j)T(j)]\,]^{-1}$, where $N_e(j)$ and $T(j)$ are, respectively the effective population size and generation interval that would hold if the population was at all times generated in the same way as at time *j*. The constant *T*, which is the effective overall generation interval, is defined to be k times the harmonic mean of the quantities $T(j)$. Our expressions for *T* and *Ne*, in terms of $Ne(j)$ and $T(j)$, are general, but the $Ne(j)$s are derived under the assumption that offspring are produced according to Poisson distributions.

Rollins, D. K., Bhandari, N., Bassily, A. M., Colver, G. M., and Chin, S. A continuous-time nonlinear dynamic predictive modeling method for hammerstein processes. *Industrial and Engineering Chemistry Research* 42:4 (2003) 861-872.

This article extends the method introduced by Rollins *et al.*[1] to multiple-input, multiple-output (MIMO) systems that gives an exact closed-form solution to continuous-time Hammerstein processes written in terms of differential equations and nonlinear inputs. This ability is demonstrated on a theoretical nonlinear Hammerstein process of complex dynamics where perfect identification of the closed-form model is assumed. This article then demonstrates the simplicity of the proposed identification procedure to obtain an accurate estimate of the exact model using a theoretical Hammerstein model. A powerful attribute of this methodology is the ability to make full use of statistical design of experiments (SDOE) for optimal data collection and accurate parameter estimation. Application of the proposed method is demonstrated on a household clothes dryer with four input and five output variables. Only 27 trials (input changes) of a central composite design were needed for accurate model development of all five outputs over the input space and the accurate predictive performance is demonstrated.

Rollins, D. K. and Devanathan, S. Measurement bias detection in linear dynamic systems. *Computers and Chemical Engineering* 26:9 (2002) 1201-1211.

A new method to detect the existence of biased measured variables in dynamic processes is presented. Hence, this work presents a new Dynamic Global Test (DGT) and test procedure for dynamic gross error detection (GED) that brings to light certain of its attributes which have not hitherto (to our knowledge) been presented in GED literature. Recognition of these attributes leads to a scheme that enables identification of the type of biased measurement (e.g., flow or level). This approach is not computationally intensive and is applicable in the case of process leaks and multiple biased variables. Simulation results for the identification of the type of biased measurement (e.g., flow or level) and the estimation of the time of occurrence (ETOC) are given. The performance study in this work specifically varied the size of measurement bias ($?_i$), the bias location (*i*), the bias true time of occurrence (TTOC), the significance level (*?*), and the sample size (N). This study shows the proposed approach to be accurate in identifying the type of biased variable and its TTOC. The performance of the proposed scheme improves as N and $?_i$ increase.

Arboleda, Ana, Wang, Yongyi, **Shelley, Mack C., II**, and Whalen, Donald F. Predictors of residence hall involvement. *Journal of College Student Development* 44:4 (2003) 517-531.

Residence hall students' (*n* = 1,186, 52% male, 90% White, 66% freshmen) involvement in their living community is influenced significantly by precollege student characteristics (gender, ethnicity), classification, attitudes (toward hall director, house cabinet, academic comfort, social environment, group study), and environmental variables (noise, time spent in the house, residence assistant interaction, peer academic conversations, employment).

Arboleda-Arango, Ana, Morrow, Paula C., Crum, Michael, R., and **Shelley, Mack C., II.** Management practices as antecedents of safety culture within the trucking industry: Similarities and differences by hierarchical level. *Journal of Safety Research 34*:2 (2003) 189-197.

Problem: A homogeneous perception of safety is important for the achievement of a strong safety culture; however, employees may differ in their safety perceptions, depending on their position and/or hierarchical level within the organization. Moreover, there is limited information on the antecedents of safety culture. This study examines how safety training, driver scheduling autonomy, opportunity for safety input, and management commitment to safety influence individuals' perceptions of safety culture. Method: Data for this study were drawn from 116 trucking firms, stratified by three safety performance levels. The data were

collected from drivers (lowest hierarchical level), dispatchers (medium hierarchical level), and safety directors (highest hierarchical level), regarding their perceptions of their respective corporate safety cultures. Perceptions of safety culture were analyzed through a linear regression using dummy variables to differentiate among the three hierarchical groups. The resulting model allowed for examination of the specific antecedents of safety culture for the three employee groups and the extent to which the hierarchical groups were in agreement with each other. Results: Driver fatigue training, driver opportunity for safety input, and top management commitment to safety were perceived to be integral determinants of safety culture in all three groups. Impact on industry: Trucking firms seeking to strengthen employees' perceptions of safety culture might begin by improving these safety management practices while appreciating that they may have a different impact depending on the employee's hierarchical position (e.g., drivers' perceptions of safety culture are more influenced by top management commitment and driver fatigue training). A fourth safety practice examined, driver scheduling autonomy, was not found to be instrumental in shaping safety culture for any of the three hierarchical levels. Consistent with previous research, implementation of stronger safety cultures should result in fewer accidents.

Desai, Uday, **Shelley, Mack C., II**, Mutiti, James, and Anebo, Felix. *Policy Studies Journal:* Articles, Authors, and Research Themes, 1991-2001, *Policy Studies Journal* [Appeared as an on-line article on the Policy Studies Organization Website, http://www.ipsonet.org/index.cgi?go=psj-1991-2001 (2003)].

In this article, the two most recent co-editors of the Policy Studies Journal (PSJ) explore the nature and evolution of articles published in volume 19-29 (1991-2001) of the Journal. We examine two main aspects of PSJ's role in the policy studies firmament. First, the structure and orientation of the Journal is addressed, including editorial staff, three broad types of articles published (individually submitted manuscripts, manuscripts that are part of a symposium, and articles for other purposes), manuscript acceptance rate, article length, substantive themes addressed, global and international perspectives, the nature and varieties of qualitative (largely theory-developing) articles, and the varies uses of quantitative research methods. Second, the nature and evolution of authorship is analyzed, with emphasis on the national distribution of authors[1] institutional affiliations, the types of those institutions, author gender, and the sector of author occupation. The article concludes with some anticipations of and hopes for the future of the field of policy studies, particularly as it is reflected in the pages of PSJ.

Franke, Warren D., Ramey, Sandra L., and **Shelley, Mack C., II**. Relationship between cardiovascular disease morbidity, risk factors, and stress in a law enforcement cohort. *Journal of Occupational and Environmental Medicine* 44:12 (2002) 1182-1189.

Problem: It is unclear the extent to which law enforcement officers (LEOs) have an increased prevalence of cardiovascular disease (CVD; defined as coronary heart disease, myocardial infarction, angina, or stroke) and, if so, whether perceived stress affected this relationship. Methods: First, the self-reported prevalence of CVD and CVD risk factors among currently employed male LEOs from nine states (n = 2,818) was compared to other males in the same states (n = 9,650 for CVD risk factors, n = 3,147 for CVD prevalence). Second, among the LEOs only, perceived stress was assessed to determine if it affected the relationship between CVD prevalence and CVD risk factors. Results: CVD prevalence was lower in the LEO group than among the general population [2.3 $\pm$ 0.2 vs. 5.6 $\pm$ 0.2%; p = .001]. The best predictor variables for CVD in the combined group were: hypertension (p = .001), hypercholesterolemia (p = .001) and physical inactivity (p = .015). In the LEO-only group, the best predictor variables for CVD were: time in the profession (p = .001), and hypertension (p = .001) and perceived stress (p = .032). Perceived stress was associated with CVD in the LEO group (p = .008) and three CVD risk factors were significantly affected by perceived stress: cholesterol (p = .001), hypertension (p = .001), and physical activity (p = .001). Perceived stress was affected by duration of time in the profession (p = .004) independent of an age effect (p = .353). Conclusions: Among susceptible officers, stress may contribute to CVD directly and through potentiating several CVD risk factors.

Guo, C., Stone, J., Stahr, H. M., and **Shelley, Mack C., II.** Cleanup of gloves contaminated with granular terbufos and tefluthrin. *Archives of Environmental Contamination and Toxiocology* 42:3 (2002) 383-388.

Chemical-resistant gloves are used for protection from pesticides in farming operations. Cleanup of gloves after pesticide contamination was the focus of this research. Nitrile, neoprene, and barrier laminate glove specimens were exposed to 30 mg terbufos or tefluthrin granules for 3 or 30 min in petri dishes in a laboratory. Specimens were cleaned by flush with running water or LaunderOmeter washing with detergent. Following the cleanup treatments, specimens were dried and placed in test tubes with solvents to extract pesticide residue. Levels of contamination remaining were determined by gas chromatography. The residue remaining varied with exposure time, material type, cleanup method, and pesticide. Flush was more effective with the shorter exposure time. Tefluthrin was more effectively removed than terbufos. Barrier laminate was confirmed as a single-use material. Cleanup procedures reduced contamination in nitrile and neoprene, but findings show that these materials retained residue after cleanup.

Hackmann, Donald G. and **Shelley, Mack C., II**. Instructional practices and curricular integration in an interdisciplinary secondary school teaming approach. *Planning and Changing 33*:3-4 (2002) 223-247.

> This case study examines issues related to the implementation of interdisciplinary teaming at the secondary level. Through teacher observations and archival data analysis, the authors note obstacles encountered in creating high-functioning teams, including curriculum alignment of interdisciplinary units, effective use of instructional blocks, and a shift toward constructivist teaching practices.

Hayes, Brian, Knight, Robert, Wang, Yongyi, Whalen, Donald F., and **Shelley, Mack C., II.** Contributors to dining satisfaction of residence hall students. *Journal of College and University Student Housing, 32*:1 (2003) 39-46.

> Residence hall students' (n = 2,129) overall dining satisfaction at one large midwestern institution was influenced significantly by four derived factors measuring different dimensions of student perceptions of dining service (in order of influence: regular food line choices, dining environment, beverage and optional food choices, and serving hours), and majority student status. Two other variables were statistically significant but somewhat less powerful predictors of dining satisfaction: total meals eaten and frequency of using one smaller dining center.

Hensen, Kari A. and **Shelley, Mack C., II**. The impact of supplemental instruction: Results from a large, public, midwestern university. *Journal of College Student Development* 44:2 (2003) 250-259.

> A Supplemental Instruction (SI) program at a large, public, Midwestern university was implemented in 1992 to assist students with difficult 100-200 level courses. This study examines whether SI participants in entry-level biology, chemistry, mathematics, and physics courses earn higher mean final course grades than non-SI participants and whether there is a relationship between students' pre-entry characteristics and their participation in SI. The study found that SI participants have lower ACT composite scores than non-participants, yet achieve higher final course grades than those who did not participate in the program. A comparison of final course grade outcomes for students at this institution is compared with National SI data for these selected courses.

Shertzer, John, Saunders, Kevin P., Zheng, J. Lily, **Shelley, Mack C., II**, and Whalen, Donald F. Influences on residence hall undergraduates' perceptions of student leadership. *Journal of College and University Student Housing* 31:2 (2003) 12-21.

> Student perceptions of leadership, leadership programming, and student government can help an institution create effective leadership development strategies. A survey administered to a sample of students living in residence halls at a large four-year Midwestern land grant university addressed how students perceive leadership, what kinds of leadership programs would be attractive to students, and how students perceive residence hall student government structure. Participation in and respect for student government are predicted significantly by four leadership perceptions (hierarchical, situational, democratic, and anarchistic), gender, previous leadership role, and number of semesters living in residence halls.

Tien, Chia-Ling, Peterson, Carla A., and **Shelley, Mack C., II**. Postdischarge service use by families of neonatal intensive care unit graduates. *Journal of Early Intervention* 25:1 (2002) 42-57.

> This study examined patterns and predictors of service use by families of NICU graduates, specifically premature infants. The use of each individual service was predicted by different variables. Enabling variables (e.g., contacts originated in the NICU, services coordinated by the follow-up clinic) and parents' perceptions of a child's problems (e.g., health concerns) were major predictors of service use in multiple regression models. No demographic characteristics (e.g., parental education levels, ethnicity) were found to be predictive.

Zheng, J. Lily, Saunders, Kevin P., **Shelley, Mack C., II**, and Whalen, Donald F. Predictors of academic success for freshmen residence hall students. *The Journal of College Student Development* 43:2 (2002) 267-283.

> Grade point average for residence hall freshmen (*N* = 1,167; 52% male, 90% White, 74% in-state), is related significantly to precollege characteristics (high school rank, gender, ethnicity, parental education, divorced/separated parents, self-perception of abilities, expectation of honors or changing major) and environmental variables (learning community membership, academic college).

Sherman, P. J. On the statistical nature of real sinusoids associated with rotating machinery. *Digital Signal Processing* 12: (2002) 471-483.

> This paper represents the first phase of an ongoing investigation into the nature of sinusoidal types of random processes associated with real world phenomena. The tools used in this work include mathematical limit theorems, spectral estimation theory and Kalman filtering. Noteworthy results include the normality of amplitude and frequency distributions, characterization of the same as stationary random processes, and the potential to improve condition monitoring in rotating machinery.

Stephenson, W. R. Experiencing statistics at a distance. Refereed portion of the *Proceedings of the 6th International Conference on the Teaching of Statistics* (2002) (CD-ROM).

In 1994-95 the Department of Statistics at Iowa State University first offered a new two-semester sequence of distance education courses, Applied Statistics for Industry I & II. The courses were designed to meet the needs of engineers and managers in industrial settings. The courses are filmed during the on-campus delivery of the class and videotapes are sent to off-campus students for viewing the following week. Over the past 10 years, a major emphasis in statistics education has been the active participation of students in the practice of statistics. The present paper will discuss strategies for incorporating activities and other practical experiences into a distance education course. We will also explore the use of technology to enhance the active statistics experience for students at a distance.

Vardeman, Stephen B. and **Morris, Max D.** Statistics and ethics: Some advice for young statisticians. *The American Statistician* 57:1 (2003) 21-26.

We write to young statisticians about the nature of statistics and their responsibilities as members of the statistical profession. We observe that the practice of the discipline is inherently moral and that this fact has serious implications for their work. In light of this, we offer some advice about how they should resolve to think and act.

Lee, Chiang-Sheng and **Vardeman, Stephen B.** Confidence intervals based on rounded data from the balanced one-way normal random effects model. *Communications in Statistics* 32:3 (2003) 835-856.

In standard statistical analyses, data are assumed to be essentially exact. But indeed they are often obtained from a relatively crude gaging method and are thus intrinsically "rounded" to some nearest unit. The discussions in Lee and Vardeman (Lee, Chiang-Sheng, Vardeman, Stephen B. (2001). Interval estimation of a normal process mean from rounded data. *Journal of Quality Technology* 33:335-348.) and Lee and Vardeman (Lee, Chiang-Sheng, Vardeman, Stephen B. (2002). Interval estimation of a normal process standard deviation from rounded data. *Communications in Statistics* 31:13–34.) for a rounded sample from a single normal distribution established that nominal confidence levels of standard intervals for m and s are much larger than actual coverage probabilities when the rounding is severe. In this article we consider interval estimation in the balanced normal one-way random effects model. We demonstrate the deficiency of standard interval estimators in the presence of rounding and show how likelihood-based results from Lee and Vardeman (Lee, Chiang-Sheng, Vardeman, Stephen B. (2002). Interval estimation of a normal process standard deviation from rounded data. *Communications in Statistics* 31:13-34.) can be used to produce reliable confidence procedures for the two variance components.

Wu, Huaiqing. D-optimal designs for combined linear and trigonometric regression. *Journal of Statistical Planning and Inference* 116: (2003) 177-184.

This paper studies D-optimal designs for combined linear and trigonometric regression models. It is observed and then proved that equispaced minimum-support designs are D-optimal. D-efficiencies of equispaced support designs are also obtained.

Wu, Huaiqing. Optimal designs for first-order trigonometric regression on a partial cycle. *Statistica Sinica* 12: (2002) 917-930.

Trigonometric regression is commonly used to describe cyclic phenomena that occur in the engineering, biological, andmedical sciences. Optimal designs for this model on a complete cycle have been studied extensively in the literature. However, much less attention has been paid to the design problem with a partial cycle. This paper solves this problem for the first-order trigonometric regression. Explicit D-, A-, and E-optimal designs are analytically derived. These designs are used to evaluate the D-, A-, and E-efficiencies of the equidistant sampling method commonly used in practice. Efficient and practical designs are then suggested. Some optimal exact designs and optimal designs for all nontrivial subsets of the coefficients are also obtained. A discussion is made on the phi_p-optimal designs for the general trigonometric regression on a partial cycle.

Wu, Huaiqing and Wu, C. F. Jeff. Clear two-factor interactions and minimum aberration. *The Annals of Statistics* 30: (2002) 1496-1511.

Wu and Hamada recommend selecting resolution IV designs with the maximum number of clear two-factor interactions (2fi's), called MaxC2 designs. In this paper, we develop a method by using graphical representations, combinatorial and group-theoretic arguments to prove if a given design is a MaxC2 design. In particular, we show that all known minimum aberration designs with resolution IV are MaxC2 designs (except in six cases) and that the second $2^{(9-4)}$, $2^{(13-7)}$, $2^{(16-10)}$, and $2^{(17-11)}$ designs given in Wu and Hamada are MaxC2 designs. The method also enables us to identify new MaxC2 designs that are too large to be verified by computer search.

Cheng, Shaowei, Wu, C. F. Jeff, and **Wu, Huaiqing**. Finding defining generators with extreme lengths. *Journal of Statistical Planning and Inference* 113: (2003) 315-321.

In some practical situations the choice of defining generators matters even for the same defining contrast subgroup. Two such examples are blocking schemes for full and fractional factorial designs and split-plot fractional factorial designs. We propose an algorithm to find defining generators with extreme lengths for any $s^{(n-k)}$ designs, s being a prime power. Some illustrations of the method are given.

Jiang, Wei, **Wu, Huaiqing**, Tsung, Fugee Nair, Vijayan N., and Tsui, Kwok-Leung. Proportional Intergral Derivative Charts for Process Monitoring. *Technometrics* 44: (2002) 205-214.

We introduce a new class of monitoring procedures based on the relationship between a proportional-integral-derivative (PID) feedback control scheme and the corresponding prediction scheme. The charts are obtained by applying the PID predictor to the autocorrelated data to get residuals and then monitoring the residuals. This class of procedures includes as special cases several charts that have been recently proposed in the literature and thus provides a unifying framework. The PID charts have three parameters that can be suitably tuned to achieve good average run length (ARL) performance for large or small mean shifts. Methods for determining chart parameters to obtain good ARL performance are discussed. Simulation studies for autoregressive moving average (1, 1) models show that PID charts are competitive with the special cause charts of Alwan and Roberts for detecting large shifts and perform better in detecting small to moderate shifts. The effects of model-parameter misspecification and bias in estimating the variance of the residuals are investigated in a robustness study.

Book Chapters

Adams, D. C. and G. J. P. Naylor. 2003. A comparison of methods for assessing the structural similarity of proteins. *In* Mathematical Methods for Protein Structure Analysis and Design. Advanced Lectures. (C. Guerra, S. Istrail., eds.). Springer Verlag Lecture Notes in Bioinformatics. 2666:109-115.

The link between biological form and function is well known, and is assumed to hold true at the molecular level. Since identifying similar protein structures is the first step in identifying similar functions, much effort has been placed in developing methods to detect structural similarity. Several methods exist, including: SCOP [8], the DALI algorithm (from the FSSP Database [6]), the VAST algorithm (from the MMDB database [5]), and Root Mean Square (RMS) superimposition [9]. The latter three provide quantitative metrics describing protein similarity on an objective, continuous scale. Statistical analyses can then be performed on similarity scores for a set of proteins, to obtain a plot of 'protein structure space' [7]. Before such analyses are done however, one must be sure that the metric used accurately represents similarity. In this paper, we describe the DALI Z-score and RMS-distance (DRMS) metrics, and discuss their shortcomings. We then present a novel means of comparing protein structures using Geometric Morphometric (GM) methods: statistical shape methods borrowed from anatomy. Finally, we compare results.

Brendel, V. 2002. Integration of data management and analysis for genome research. *In* Informatik Bewegt. (S. Schubert, B. Reusch, and N. Jesse, eds.). Lecture Notes in Informatics (LNI) – Proceedings. P-20, 10-21.

Technological advances in genome research have produced unprecedented volumes of genetic and molecular data that now provide the context for any biological research. However, data access, curation, and analysis have remained challenging areas for continued research and development and often prove to be the bottleneck for scientific progress.

David, H. A. 2002. Some unifying techniques in the theory of order statistics. *In* Uncertainty and Optimality. (J. C. Misra, ed.). World Scientific. **3:**155-165.

Let $X_1, \ldots, X_n$ be any n random variables and let $X_{1:n} \le \ldots \le X_{n:n}$ denote the same variables arranged in nondecreasing order. Then $X_{r:n}$ is called the rth order statistic, $r = 1,\ldots,n$. When one of the X's is dropped at random, there results a simple relation between the order statistics in the original and the reduced samples. This "dropping" argument will be shown to provide a unified approach to establishing recurrence relations between moments of order statistics, whatever the dependence structure of the observations. Also useful in studying recurrence relations is the classical theorem on the probability of occurrence of r events out of n. It will also be shown that a simple general method of obtaining universal bounds for linear functions of order statistics in terms of the sample standard deviation can be based on Cauchy's inequality coupled with convexity arguments.

Fuller, W. A. 2002. Estimation for multiple phase samples. *In* Chapter 19 Analysis of Survey Data. (R. L. Chambers and C. J. Skinner, eds.). John Wiley & Sons, Inc..

Two-phase sampling, also called double sampling, is used in surveys of many types, including forest surveys, environmental studies, and official statistics. The procedure is applicable when it is relatively inexpensive to collect information on a vector denoted by x, relatively expensive to collect information on the vector y of primary interest, and x and y are correlated. Regression estimation for two and three phase samples is described. Regression estimation with imputation is illustrated with a large scale survey called the National Resources Inventory.

Opsomer, J. D. 2002. Nonparametric regression model. *In* Encyclopedia of Environmetrics. (H. El-Shaarawi and W. W. Piegorsch, eds.). John Wiley & Sons, Inc. 3:1411-1425.

This article introduces the basic concepts of nonparametric regression, in the context of environmental statistics. The major methods currently available are reviewed, and we discuss the important issue of smoothing parameter selection. Several extensions of the basic regression model are described, including generalized nonparametric regression, and smoothing for multidimensional data. Several examples from environmental statistics are used to illustrate the applicability of the methods.

Vardeman, Stephen B. and R. Kasprzyk. 2003. Applied statistical methods and the chemical industry. *In* Riegel's Handbook of Industrial Chemistry. **(**J. A. Kent, ed.). Kluwer Academic, 10th ed. 4:50-81.

This article provides an introduction to the goals and methods of statistical inference and experimental design for industrial chemists and chemical engineers. It is self-contained, but also provides references for further reading.

Proceedings and Reports

Cerney, M. M., **D. C. Adams**, and J. M. Vance. 2003. Image Warping of Three-Dimensional Scan Data. *Proceedings of the SAE Digital Human Modeling Conference.* Montreal, Canada. 2003-01-2231.

Abstract: This paper details the application of three-dimensional image warping techniques to full body scan data. Borrowed from the toolbox of geometric morphometrics--methodscommonly used to quantify the size and shape of anatomical objects in biological researchimage unwarping transforms a given image such that relevant landmark positions of the starting image coincide with their positions in the consensus or target configuration. This study demonstrates the process of transforming static scan data to any posture, position, or homology for which landmark data is available, enabling detailed human models to be re-postured and examined in design environments widely varied from the one in which they were scanned.

DiBenedetto, D. and **H. Hofmann. 2003.** Mining With Your Eyes. That's Interactivity. In *Proceedings of the Meeting of the Societ`a Italiana di Statistica*.

Abstract: Managing large data set to discover information is an important purpose for data mining. Graphical and interactive techniques can together make this objective easier to reach. We will describe of how data mining can take advantage from using our eyes, thanks to interactivity. Manet is one of those software designed for Visual Data Mining, easily handling some tens of thousands of observations and allowing the direct manipulation of missing data, which usually affect the data, even more likely when the number of observation increases. The originality of Manet, comes from the possibility to consider missing data as special cases, and to get many different parametrizations of the Mosaic Plot.

Software & Videos

Cook, D., Sutherland, P., Honavar, V., Miller, L., and Suarez, M. (1999-). {Limn}: Visualizing extremely large data sets. {www.public.iastate.edu/~dicook/Limn/index.html.. The code available through {http: // sourceforge.net / projects/limn/}.

In 2003 a density matrix plot was added and the code was adapted to read data stored on multiple, possibly remote, hard disks. A density matrix is a scatterplot matrix where the scatterplots are represented by grey scale density plots, enabling bivariate densities of large amounts of data to be examined. The density matrix has brushing controls built on an indexing system that enables fast movement of information between plots. Large amounts of data are likely that it is stored in several places, so it is important to be able to read from multiple sources. In 2002 the code was developed to overlay multiple movies of large data. It is quite common to have subgroups in the data, and using this

information is one way to break the data into smaller more manageable chunks. Movies can be made on the sub-groups of the data and combined on the fly as a movie of all the data.

Lee, E. K., **Cook, D**., Kim, D., Lee, J., An, H., and **Hofmann, H**. (2003-). GeneGobi: public software for exploratory graphical analysis of microarray data and metabolic networks. It is built upon R {www.R-project.org} and GGobi {www.ggobi.org}.

Swayne, D., Temple~Lang, D., **Cook, D.,** and Buja, A. (2001-). GGobi: software for exploratory graphical analysis of high-dimensional data. Available publicly from {www.ggobi.org}.

The code will create a tour for arbitrary dimensional projections. The current version has 1D tours using ASH plots for display, 2D tours using scatterplots, and 2x1D tours using scatterplots. Projection pursuit indices are now defined for arbitrary projection dimension (1, 2, ...), and this code will work on either unscaled or sphered data. The optimization code is now derivative-free and robust to changes in interactive subsetting of data and variable selection. New indices for handling classification problems have been added.

Hofmann, H. Further development of MANET (software for interactive graphical data analysis), see http://www.rosuda.org/Manet.

Meeker, William Q., Jr. (2003) Splida (Splus Life Data Analysis, version 6.1.9), available from www.public.iastate. edu/~splida.

Book Reviews

Adams, Dean C. 2002. Review of "Morphology, Shape and Phylogeny". *Biometrics*. 58:694-695.

Cook, Dianne 2002. Review of The Visual Display of Quantitative Information (Second Issue). *SIAM Review*.

Dixon, Philip M. 2002. Review of "Spatial Optimization for Managed Ecosystems", edited by Hof, J. and Bevers, M. 1998. *Journal of Vegetation Science*, 13:141.

Koehler, Kenneth J. 2003. Review of "Analysis of Messy Data: Volume III: Analysis of Covariance", edited by George A. Milliken and Dallas E. Johnson. Chapman and Hall/CRC. 2002. *Journal of the American Statistical Association*, 97:1206-1207.

Lorenz, Frederick O. 2002. Review of "Social Integration in the Second Half of Life", edited by Karl Pillemer, Phyllis Moen, Elaine Wethington, and Nina Glasgow. Johns Hopkins Press. 2000. *Rural Sociology*, 67:664-667.

Rollins, Derrick K. 2002. Review of "Statistics for Engineers and Scientists", edited by William Navidi. The McGraw-Hill Company. 2002.

Shelley, Mack C., II.

2002. Review of "Democracy, Justice, and the Welfare State", edited by Julie Anne White. In *Perspectives on Political Science*, 31:1, 50.

2003. Review of "Guidance for Governance: Comparing Alternative Sources of Public Policy Advice", edited by R. Kent Weaver and Paul B. Stares. In *Perspectives on Political Science*, 32:1, 52.

2003. Review of "The Quest for Drug Control: Politics and Federal Policy in a Period of Increasing Substance Abuse, 1963-1981", edited by David F. Musto and Pamela Korsmeyer. In *Perspectives on Political Science*, 32:4, 234.

EDITORSHIPS

AMEMIYA, YASUO

- Associate editor, Journal of Business Statistics
- Associate editor, Statistics and Probability Letters

ATHREYA, KRISHNA B.

- Associate editor, Indian Academy of Sciences (Math sciences)
- Associate editor, Journal of Theoretical Probability
- Associate editor, Resonance, Journal of Science Education
- Associate editor, Sankhya, Indian Journal of Statistics

BONETT, DOUGLAS G.

- Editorial board, Journal of Applied Business Statistics
- Editorial board, Review of Business Information Systems

CARRIQUIRY, ALICIA L.

- Associate editor, Proyecciones - Revista Boliviana de Mathematics
- Editor, Statistical Science
- Editorial board, Case Studies in Bayesian Statistics V and VI

DIXON, PHILIP M.

- Associate editor, Quantitative Methods, Conservation Biology
- Editorial board, Journal of Vegetation Science

DUCKWORTH, WILLIAM M., II

- Associate editor, Education for Amstat Online (the ASA's web site)

FULLER, WAYNE A.

- Associate editor, Survey Methodology

HOFMANN, HEIKE

- Associate editor, Journal of Computational and Graphical Statistics
- Associate editor, Journal of Computational Statistics

KAISER, MARK S.

- Associate editor, Journal of the American Statistical Association

KOEHLER, KENNETH J.

- Associate editor, Plant Ecology

LAHIRI, SOUMENDRA N.

- Associate editor, Statistics and Probability Letters

LORENZ, FREDERICK O.

- Associate editor, Rural Sociology

MEEKER, WILLIAM Q., JR.

- Advisory editor, Quality Technology & Quality Management
- Associate editor, Lifetime Data Analysis

MORRIS, MAX D.

- Editorial statistical consultant, Radiation Research

OPSOMER, JEAN D.

- Associate editor, Journal of Computational and Graphical Statistics

POLLAK, EDWARD

- Editorial board, Mathematical Biosciences

SHELLEY, MACK C., II

- Co-editor, Policy Studies Journal
- Editorial board, TESOL Quarterly

SHERMAN, PETER J.

- Associate editor, The Journal of Mechanical Systems and Signal Processing

STEPHENSON, W. ROBERT

- Associate editor, The Journal of Statistics Education
- Associate editor, STATS: The Magazine for Students of Statistics

STUFKEN, JOHN

- Associate editor, Communication in Statistics
- Associate editor, The Journal of Statistical Planning and Inference

VARDEMAN, STEPHEN B

- Associate editor, The American Statistician

PROFESSIONAL ACTIVITIES

Offices & Committee Work for National Organizations

ATHREYA, KRISHNA B.

- Member, Memorials Committee, Institute of Mathematical Statistics (IMS)

CARRIQUIRY, ALICIA L.

- Chair, Ad-hoc Journals Committee, International Society for Bayesian Analysis
- Chair, Nominations Committee, International Society for Bayesian Analysis
- Member, Board on Technology and the Law: Advisability and Ethics of the Use of Third Party Studies with Human Subjects by the Environmental Protection Agency, National Academy of Sciences
- Member, Committee on Meetings and Joint Meetings Management Committee, Institute of Mathematical Statistics
- Member, Committee on Uses and Interpretations of Dietary Reference Intakes, Food and Nutrition Board, Institute of Medicine, National Academy of Sciences
- Member, Executive Committee, Institute of Mathematical Statistics
- Member, Executive Committee, International Society for Bayesian Analysis
- Member, Executive Committee, National Institute of Statistical Sciences
- Member, Panel on Estimating Eligibility and Participation Rates in the Women and Infant Children (WIC) Program, National Research Council

COOK, DIANNE

- Newsletter editor, Statistical Graphics Section, American Statistical Association (ASA)

DIXON, PHILIP M.

- Member, Committee on Sampling Radionuclides in the Environment, International Commission on Radiation Units and Measures

ISAACSON, DEAN L.

- Board of directors, SPAIG Committee, American Statistical Association

KOEHLER, KENNETH J.

- Member, SAT Mathematics Examination Development Committee, College Board

LORENZ, FREDERICK O.

- Chair, Program Committee, Rural Sociology Society Meetings

MEEKER, WILLIAM Q., JR.

- Chair, Publications Committee, American Statistical Association
- Member, Fellows Committee, American Statistical Association
- Member, Panel on Operational Test Design and Evaluation of the Interim Armored Vehicle, National Research Council
- Member, Proposal Review Panel, National Science Foundation Career

MORRIS, MAX D.

- Chair, Management Committee, Technometrics
- Chair, Spring Research Conference Management Committee, ASA/IMS
- Member, Survivability and Lethality Panel, National Research Council

NUSSER, SARAH M.

- Member, Advisory Group for the Behavioral Risk Factor Surveillance System, Section on Survey Research Methods, American Statistical Association

- Member, ASA Management Committee for the Journal of Agriculture, Biological and Environmental Statistics

- Member, National Selection Board for Undergraduate Internships in Federal Statistics Agencies

- Organizer, Workshop on Mobile Computing for Survey Data Collection for 2002 FedCASIC Conference

- Treasurer, Survey Research Methods Section, American Statistical Association

OPSOMER, JEAN D.

- Chair, E. C. Bryant Scholarship Committee, American Statistical Association

ROLLINS, DERRICK K.

- Member, Technical Advisory Committee of the Foundations of Computer-Aided Process Operations 2003, AICHE

STEPHENSON, W. ROBERT

- Board of directors, Mu Sigma Rho, National Statistical Honor Society

- Chair, Advisory Committee on Teacher Enhancement, American Statistical Association

- Member, Advisory Board, Consortium for the Advancement of Undergradute Statistics Education (CAUSE)

- Member, Advisory Board, Teachers Education: Awareness, Methods and Strategies (TEAMS)

- Table leader, Advanced Placement Statistics, College Board

STUFKEN, JOHN

- Program director, Mathematical Sciences Division, National Science Foundation

VARDEMAN, STEPHEN B.

- Board of directors, American Statistical Association

WOLTER, KIRK

- Member, Advisory Committee, Federal Economics Statistics

Papers Presented, Lectures & Seminars

ADAMS, DEAN C.

"The effects of interference and exploitative competition on morphology in Plethodon salamanders: A geometric morphometric approach." International Congress of Systematic and Evolutionary Biology (ICSEB) VI. Patras, Greece, 2002.

"Morphological consequences of interspecific competition between Plethodon jordani and P. teyahalee." Joint Annual Meeting of the Herpetologist League, and the Society for the Study of Amphibians and Reptiles. Kansas City, MO, 2002.

"Morphological consequences of interspecific competition between Plethodon jordani and P. teyahalee in the Great Smoky and Balsam Mountains." Joint Annual Meeting of the Society for the Study of Evolution, and the Society of Systematic Biologists. Champaign-Urbana, IL, 2002.

"Morphological consequences of interspecific competition: New twists on an old theme." Department of Biology. Washington University in Saint Louis. St. Louis, MO, 2003.

"Stasis of morphological evolution in Plethodon salamanders?" Department of Biology. Washington University in Saint Louis. St. Louis, MO, 2003.

(With Collyer, M. L. and Stockwell, C. A.) "Adaptive morphological divergence of a pupfish species in as little as three decades." Annual Meeting of the Desert Fishes Council. Death Valley, CA, 2003.

(With Olson, C. and Farrar, E.) "A morphometric shape analysis of phenotypic plasticity in plains spadefoot toad (Spea bombifrons) tadpoles." Annual Meeting of the Society of Integrative and Comparative Biology. Toronto, Ontario, 2003.

(With Valenzuela, N. and Janzen, F. J.) "Pattern does not equal process: When exactly is sex environmentally determined?" Joint Annual Meeting of the Society for the Study of Evolution, and the Society of Systematic Biologists. Champagne-Urbana, IL, 2002.

(With Valenzuela, N. and Janzen, F. J.) "When exactly is sex environmentally determined?" Joint Annual Meeting of the Herpetologist League, and the Society for the Study of Amphibians and Reptiles. Kansas City, MO, 2002.

ATHREYA, KRISHNA B.

Indian Institute of Science. (Colloquium Speaker). Bangalore, India, Januray 2003.

Probability colloquium. Cornell University. Ithica, NY, November 2002.

BAILEY, THEODORE B.

"Design and analysis of experiments involving development of new food products and taste panels." Joint Statistical Meetings. American Statistical Association. New York, NY, August 13, 2002.

BRENDEL, VOLKER

"Gene expression profiling: Comparison of EST sampling and microarray hybridization approaches." Microarray Month at University of Missouri-Columbia. Columbia, MO, September 16, 2002.

"The genomic origin of maize revisited." 45th Maize Genetics Conference. Lake Geneva, WI, March 13-16, 2003.

"Integrated databases and analytical tools for genome research." South Dakota Biomedical Research Infrastructure Network. Vermillion, SD, September 9, 2002.

"Integration of data management and analysis for genome research." 32nd Annual Conference of the German Informatics Society. Dortmund, Germany, September 30-October 2, 2002.

"Novel tools for plant genome annotation and applications to Arabidopsis and rice." 23rd Stadler Genetics Symposium. Columbia, MO, March 31-April 2, 2003.

CARRIQUIRY, ALICIA L.

"Challenges in the application of the upper tolerance levels (UL) to dietary assessment." ILSI. March 23, 2003.

"Estimated association between added sugar and micronutrient intake using nationwide food consumption data." ILSI. March 22, 2003.

"Estimating the distribution of usual nutrient and food intakes." Fifth International Conference on Dietary Assessment. Bangkok, Thailand, January 26, 2003.

(With Breidt, F. J.) "An analysis of the volatility of the British pound to guide arbitration." Fifth International Conference on Forensic Statistics. Venice, Italy, September 1, 2002.

(With Nusser, S. M.) "A discussion of a latent model approach to assessing the intakes of fruits and vegetables." Joint Statistical Meetings. New York, NY, August 14, 2002.

COOK, DIANNE

"Classification tours applied to microarray data." Department of Statistics. Harvard University. Cambridge, MA, December 13, 2002.

"Dynamic graphics for multivariate space-time data." Geology Department. Iowa State University. Ames, IA, April 9, 2002.

"Limn: Using movie technology to drive graphics for massive amounts of data." University of Augsburg. Augsburg, Germany, July 11, 2002.

"Some dynamic graphical tools to assist analysis of microarray data." Workshop on Microarrays, Victorian Microarray Technology Consortium. Melbourne, Victoria, Australia, April 10, 2003.

"Understanding support vector machine classifiers using graphics." Current Advances and Trends in Nonparametric Statistics. Crete, Greece, July 15-19, 2002.

"Using multimedia animation with real-time graphic overlays for visualizing a million cases of multivariate data." How to visualize a million. Augsburg, Germany, October 8 2002.

"Visualization of microarrays using tours and projection pursuit." Cambridge HealthTech Institute Conference. Washington, DC, September 12-13, 2002.

DIXON, PHILIP M.

"An integrated Michaelis-Menton model to estimate nutrient uptake parameters." Joint Statistical Meetings. New York, NY, August 2002.

"Estimating the location of the maximum when the response is not necessarily quadratic." Conference on Statistics in Agriculture. Kansas State University. Manhattan, KS, May 2003.

DORMAN, KARIN S.

"Modeling pathways to drug resistance in HIV-1." 2nd Biannual All Iowa Virology Symposium. Iowa City, IA, October, 2002.

"Predicting HIV drug resistance with a branching process model. HIV Dynamics and Evolution." 10th International Workshop. Lake Arrowhead, CA, April, 2003.

FULLER, WAYNE A.

"Analytic studies with complex survey data." Seminar given at North Carolina State University. Raleigh, NC, April 3, 2003.

"Analytic studies with complex survey data." 2003 Marvin Zelen Leadership Award Lecture, Harvard Department of Biostatistics Sharing-Plough Workshop. Boston, MA, May 30, 2003.

"Discussion of Some new developments in small area estimation by J.N.K. Rao." Meeting of Statistical Society of Canada. Halifax, Nova Scotia, June 10, 2003.

"Regression estimation in survey sampling." North Carolina State University. Raleigh, NC, March 29, 2003.

"Regression estimation in survey sampling." University of North Carolina. Chapel Hill, NC, April 2, 2003.

(With Park, Mingue) "Model weights for regression estimation." Joint Statistical Meetings. New York, NY, August 12, 2002.

(With Park, Mingue) "Survey regression estimation: A review." International Conference on Recent Advances in Survey Sampling. Ottawa, Canada, July 10, 2002.

HOFMANN, HEIKE

"Explorative analysis of microarray data." Annual meeting of the German Society of Statistical Computing. Reisensburg, Germany, July 2002.

"First analysis of the biotin data." Metabolic Networks Working Group. Iowa State University. Ames, IA, February 2003.

"Graphical opportunities in exploring microarray data." Toxicogenomics: Through the Eyes of Informatics, organized by the Virginia Bioinformatics Institute and NIEHS. Washington DC, May 2003.

"Graphics - an ace up the statistician's sleeve." WNAR President's Invited Address. Golden, CO, June 2003.

"How to visualize a million bins." International Meeting of the Psychometric Society. 3rd Workshop of Data Visualisation, Rain am Lech Germany. Cagliari, Italy, October 2002.

"Introduction to the bioconductor software." Metabolic Networks Working Group. Iowa State University. Ames, IA, March 2003.

"Introduction to the software Manet." VIGRE Computational Statistics & Graphics Working Group. Iowa State University. Ames, IA, March 2003.

"Large *p* and small *n* - the biotin data." Metabolic Networks Working Group. Iowa State University. Ames, IA, February 2003.

"Normalization of Affymetrix data using BioConductor." VIGRE Bioinformatics and Genetic Statistics Working Group. Iowa State University. Ames, IA, November 2002.

"Visualizing conditional distributions." Annual meeting of the German Society of Statistical Computing. Reisensburg, Germany, July 2003.

"Visualizing conditional distributions." Annual meeting of the Gesellschaft für Klassifikation (German Classification Society). Mannheim, Germany, July 2002.

"Visualizing conditional distributions." Annual meeting of the Interface. Salt Lake City, UT, March 2003.

"Visualizing conditional distributions." VIGRE Graphical and Computational Statistics Working Group. Iowa State University. Ames, IA, April 2003.

"Visualizing simple association models." COMPSTAT meeting. Berlin, Germany, August 2002.

"Visualizing large numbers of categories." VIGRE Graphical and Computational Statistics Working Group. Iowa State University. Ames, IA, October 2002.

KOEHLER, KENNETH J.

"Analysis of disease progression when disease status is subject to misclassification." Meeting of the ENAR of the Biometric Society. Washington, DC, March 2002.

(With Wang, J., Fulton, J. E. and Dekkers, J. C. M,) "Accuracy of mapping QTL with selective DNA pooling interval mapping." John M. Airy Beef Cattle Symposium (Visions for Genetics and Breeding). Carver Center, Pioneer Hi-Bred International, Inc. Johnston, IA, May 15-17, 2003.

(With Wang, J., Soller, M. and Dekkers, J. C. M.) "Least squares interval mapping to detect QTL with selective DNA pooling." Plant and Animal Genome XI Conference. San Diego, CA, January 11-15, 2003.

LAHIRI, SOUMENDRA N.

"On the choice of the optimal block size for variance estimation using a spatial subsampling method." (Colloquium Talk) Department of Probability and Statistics. Michigan State University. East Lansing, MI, March 25, 2003.

"On the choice of the optimal block size for variance estimation using a spatial subsampling method." (Colloquium Talk) Department of Statistics, University of Michigan. Ann Arbor, MI, March 24, 2003.

"A nonparametric plug-in rule for selecting the optimal block length for block bootstrap methods." 35th Symposium of the Interface. Salt Lake City, UT, March 12-15, 2003.

"Optimal block sizes for a spatial subsampling method." (Colloquium Talk) Division of Theoretical Statistics. Indian Statistical Institute. Calcutta, India, August 11, 2002.

"On optimal choice of the subsampling block length for spatial processes." Current Advances and Trends in Nonparametric Statistics. Crete, Greece, July 15-19, 2002.

"Wavelets." VIGRE seminar on 'Theoretical Statistics'. (A series of 4 learning seminars). Department of Statistics, Iowa State University. Ames, IA, Spring, 2003.

LORENZ, FREDERICK O.

"The chronicity of chronic conditions: Health and distress implications for married and divorced women at midlife." A Population Center/Rural Sociology Seminar. Pennsylvania State University. University Park, PA, February 11, 2003.

"Garnering evidence to argue for change: A view of the world through the eyes of a statistician." A plenary given at the conference, "The clock is ticking for rural America: A behavioral health and safety conference." Kansas City, MO, May 29-30, 2003.

"Time and interaction: Modeling growth and decline in family processes." A workshop presented June 20 at the 4th Annual Summer Institute of the Family Research Consortium III. Charlotte, NC, June 20-23, 2002.

(With McMorris, Margaaret) "Religious affiliation and health: The mediating effects of cohesion and coherence on physical and mental health outcomes." Midwest Sociological Meetings. Chicago, IL, April 16-19, 2003.

(With Wickrama, K. A. S. and Hsiu-Chen, Yeh) "Trajectories of mental health among divorced and married rural women." Rural Sociological Society. Chicago, IL, August 14-18, 2002.

MARASINGHE, MERVYN G.

"Computer modules for teaching statistical concepts." 2002 International Conference on Teaching of Statistics 6. Cape Town, South Africa, July 7-12, 2002.

MEEKER, WILLIAM Q., JR.

"Accelerated degradation tests: Modeling and analysis." Los Alamos National Laboratory. Los Alamos, NM, October 29, 2002.

"Accelerated destructive degradation tests data, models, and analysis." Tunghai University. Taichung, Taiwan, July 16, 2002.

"Accelerated destructive degradation tests data, models, and analysis." Universidade Federal de São Carlos. São Paulo, Brazil, February 20, 2003.

"Extracting reliability information from warranty data bases.'" Tunghai University. Taichung, Taiwan, July 16, 2002.

"Reliability, the other dimension of quality," International Conference on Reliability and Survival Analysis. Columbia, SC, May 22, 2003.

"Reliability, the other dimension of quality." Keynote Address, International Conference Statistics in Industry and Business. Cochin, India, January 2, 2003.

"Reliability, the other dimension of quality." National Institution for Quality and Reliability. Bangalore Branch, Bangalore, India, January 8, 2003.

"Reliability, the other dimension of quality." Youden Memorial Address, Fall Technical Conference. Valley Forge, PA, October 18, 2002.

"Statistical methods for reliability data." GE India Technology Centre. Bangalore, India, January 10, 2003.

"Statistical methods for reliability data." Mabe Company. Queretaro, Mexico, November 20, 2002.

"Use of sensitivity analysis to assess the effect of model uncertainty in analyzing accelerated life test data." Escola de Modelos de egressao. Associasccao Brasileira de Estatistica, Conservatoria, Brazil, February 24, 2003.

"Use of a transfer function model to predict field reliability from accelerated test data." Centro de Investicion en Matematicas (CIMAT). Guanajuato, Mexico, November 21, 2002.

"Use of a transfer function model to predict field reliability from accelerated test data." Plenary address, International Conference on Ranking and Selection, Multiple Comparisons, Reliability, and Their Applications. Chennai, India, December 30, 2002.

"Use of a transfer function model to predict field reliability from accelerated test data." Taipei Symposium on Statistics. Taipei, Taiwan, July 9, 2002.

"Using accelerated life tests results to predict field reliability, workshop on survival and reliability." Workshop in Survival and Reliability Analysis. Campinas, Brazil, February 21, 2003.

MORRIS, MAX D.

"Combining physical data and model outputs: General principles and proto-analyses." Workshop on Uncertainty in Computational Modeling. Los Alamos National Laboratory. Los Alamos, NM, December 17, 2002.

"Computer experiments and statistics." Colorado/Wyoming ASA Chapter Annual Meeting. Denver, CO, October 26, 2002.

"Computer experiments and statistics." IBM T. J. Watson Research Center. Yorktown Heights, NY, November 25, 2002.

"Random factorial designs for evaluating the importance of inputs in computer experiments." Joint Statistical Meetings. New York, NY, August 13, 2002.

NETTLETON, DAN

"A comparison of methods for managing type I errors when testing for gene expression changes." Joint Statistical Meeting. New York, NY, August 2002.

"Estimating the number of differentially expressed genes in a microarray experiment." 3rd Annual Iowa/Iowa State Bioinformatics Workshop. University of Iowa. Iowa City, IA, April 25, 2003.

"Estimating the number of false null hypotheses in a multiple test situation." International Biometric Society. Eastern North Atlantic Spring Meeting. Tampa, FL, March 2003.

"Identifying differentially expressed genes in unreplicated multiple-treatment time-course microarray experiments." Graybill Conference on Microarrays, Bioinformatics, and Related Topics. Colorado State University. Ft. Collins, CO, June 2003.

"Probe-level analysis of a large-scale split-split-plot experiment using the affymetrix barley1 genechip." 2003 Affymetrix GeneChip Microarray Low-Level Workshop. University of California, Berkeley. Berkeley, CA, August 2003.

NUSSER, SARAH M.

"Combining data from state and national monitoring surveys to assess large-scale impacts of agricultural policy." International Biometric Society ENAR Meeting. Tampa, FL, March 2003.

"Computer-assisted survey data collection using geospatial data." Interdisciplinary Research Institute for Survey Science Workshop. Ames, IA, May 2003.

"Computer-assisted survey data collection using geospatial data." National Agricultural Statistics Service. Fairfax, VA, May 2003.

"Latent class analysis of dietary intake data." (Discussion) Joint Statistical Meetings. New York, NY, August 2002.

"Metadata and computer-assisted data collection." Open Forum 2003 on Metadata Repositories. Sante Fe, NM, January 2003.

"Mobile computing and field data collection for statistical surveys." Department of Geography. University of Iowa. Iowa City, IA, April 2003.

"Mobile computing for sample surveys." 35th Symposium on the Interface. Salt Lake City, UT, March 2003.

"Survey methods for assessing land cover map accuracy." Institute for Social Research. University of Michigan. Ann Arbor, MI, December 2002.

"Using geospatial information in planning and navigation." Joint Statistical Meetings. New York, NY, August 2002.

"Using GIS data in analysis weights for environmental surveys." Spatial Statistics: Integrating Statistics, GIS, and Statistical Graphics. Seattle, WA, October 2002.

OPSOMER, JEAN D.

"Model-assisted estimation of forest resources with generalized additive models." Universidad de Santiago de Compostela. Santiago de Compostela, Spain, July 3, 2002.

"Nonparametric estimation in complex surveys with auxiliary information." XXXVèmes Journées de la Statistique. Lyon, France, June 2, 2003.

"Nonparametric and semiparametric estimation in complex surveys." Universidade da Coruña. A Coruña, Spain, July 2, 2002.

"Small area estimation for the current employment survey." Bureau of Labor Statistics. Washington DC, June 24, 2003.

"Semiparametric estimation in complex surveys." Bureau of Labor Statistics. Washington DC, July 25, 2002.

POLLAK, EDWARD

"Basic concepts in coalescent theory." Pioneer Hi-Bred. Johnston, IA, May 2, 2002.

"Oscar Kempthorne and theories of selection." 21st International Biometric Conference. Freiburg im Breisgau, Germany. July 21-26, 2002.

ROBERTS, CARL W.

(With Wang, Yong) "Schadenfreude: On the discursive structure of an emotion." American Sociological Association meeting. Chicago, IL, August 2002.

ROLLINS, DERRICK K.

"DOE for modeling block-oriented dynamic systems." Iowa State University Department of Statistics. Ames, IA, Fall 2002.

"Issues of experimental design and accurate modeling in dynamic block-oriented nonlinear systems." Florida State University Department of Chemical Engineering. Tallahassee, FL, March 28, 2003.

"Issues of experimental design and accurate modeling in dynamic block-oriented nonlinear systems." Kansas State University College of Engineering. Manhattan, KS, April 17, 2003.

"Issues of experimental design and accurate modeling in dynamic block-oriented nonlinear systems." Ohio State Department of Chemical Engineering. Columbus, OH, May 1, 2003.

"Issues of experimental design and accurate modeling in dynamic block-oriented nonlinear systems." Ruth-Larson Symposium. Iowa State University Department of Chemical Engineering. Ames, IA, April 10, 2003.

"The probabilistic modeling of segregation for powder mixtures and of dispersion of particles in fixed bed reactors." Chemical Engineering Department. Ohio State University. Columbus, OH, May, 2002.

"Statistics - getting beyond dangerous." Kansas State University Department of Chemical Engineering. Manhattan, KS, April 17, 2003.

(Speaker) (With Bhandari, N.) "Continuous-time identification and modeling of non-linear hammerstein processes." 52nd Canadian Chemical Engineering Conference. Vancouver, British Columbia, Canada, October 20-23, 2002.

(Speaker) (With Hulting, S. and Bhandari, N.) "Accurate predictions with optimal experimental design modeling for human thermoregulatory system." AIChE Annual Meeting, paper 342e. Indianapolis, IN, November 2002.

(Speaker) (With Pacheco, L. and Bhandari, N.) "A quantitative measure to evaluate competing designs for non-linear dynamic process identification." Annual Meeting of the American Institute of Chemical Engineers. Indianapolis, IN, 2002.

(With Bhandari, N) "Continuous-time optimum parameterization modeling of nonlinear dynamic processes." AIChE Annual Meeting, poster 258d. Indianapolis, IN, November 2002.

SHELLEY, MACK C., II

"Chair of Session 3 - Education studies." First Annual Interdisciplinary Research Institute for Survey Science Workshop. Ames, IA, May 27-28, 2003.

(Panel member) "Future Collaborations." First Annual Interdisciplinary Research Institute for Survey Science Workshop. Ames, IA. May 27-28, 2003.

(With Collins, Susan M. and Mercier, Joyce M.) "Attachment, social support, and loneliness in later life." 55th Annual Scientific of the Gerontological Society of America. Boston, MA, November 22-26, 2002.

(With Keinert, Fritz, Shapiro, Howard, Schmidt, Allan and Dhingra, Ruchi) "Math 150: Discrete mathematics." Pew Grant Program in Course Redesign, Round III, Workshop IV. Seattle, WA, June 19, 2003.

(With Lubienski, Sarah Theule) "A closer look at U.S. mathematics instruction and achievement: Examinations of race and sex in a Decade of NAEP Data." 2003 Annual Meeting of the American Educational Research Association. Chicago, IL, April 21-25, 2003.

(With Lubienski, Sarah Theule) "Mathematics instruction and student achievement: Multilevel models and social structures in NAEP 2000 Data." 2003 Annual Meeting of the American Educational Research Association. Chicago, IL, April 21-25, 2003.

(With Ramey, Sandra R., Franke, Warren R. and Welk, Gregory) "Application of precede-proceed health promotion planning model for cardiovascular disease risk reduction efforts among law enforcement officers." 27th Annual Research Conference of the Midwest Nursing Research Society. Grand Rapids, MI, April 4-7, 2003.

(With Schuh, John H. and Huba, Mary) "Formative approaches to assessing the experiences of doctoral students." 27th Annual Association for the Study of Higher Education Conference. Sacramento, CA, November 21-24, 2002.

(With Shertzer, John, Saunders, Kevin P., Zheng, J. Lily and Whalen, Donald F.) "A structural equations model of perceptions of student leadership in higher education." Joint Statistical Meetings. New York, NY, August 11-15, 2002.

(With Shertzer, John, Wall, Vernon, Frandsen, Alisa, Guo, Yan and Whalen, Don) "Four dimensions of student leadership: What predicts students' attitudes toward leadership development?" 2002 Annual Meeting of the Iowa Educational Research and Evaluation Association. Ames, IA, December 5-6, 2002.

(With Shulman, Stuart, Beisser, Sally and Larson, Teresa) "Digital citizenship: lessons learned as service-learning meets the digital divide." 2002 Annual Meeting of the American Political Science Association. Boston, MA, August 29-September 1, 2002.

(With Shulman, Stuart and Thrane, Lisa) "Digital citizenship: Parameters of the digital divide." dg.o2003 National Conference on Digital Government Research. Boston, MA, May 18-21, 2003.

(With Shulman, Stuart and Thrane, Lisa) "Digital citizenship: Parameters of the digital divide." First Annual Interdisciplinary Research Institute for Survey Science Workshop. Ames, IA, May 27-28, 2003,

(With Wohlgemuth, Darin, Whalen, Don, Wang, Yongyi, Sullivan, Julia and Nading, Carolyn) "What helps Dick and Jane graduate...an examination of the Fall 1996 Iowa State Freshmen Class." Department of Educational Leadership and Policy Studies. Ames, IA, April 30, 2003.

(With Zheng, J. Lily, Saunders, Kevin and Whalen, Don) "Predictors of academic success for freshmen residence hall students." 5th Annual Learning Communities Institute. Iowa State University. Ames, IA, May 12-13, 2003.

SHERMAN, PETER J.

(With Wen, L.) "Investigation of the choice of the sampling interval in relation to studies concerning continuous-time random processes." Proceedings of the 2002 IEEE International Symposium on Intelligent Signal Processing & Communication Systems. Kaohsiung, Taiwan, November 21-24, 2002.

STEPHENSON, W. ROBERT

"Experiencing statistics at a distance." Sixth International Conference on the Teaching of Statistics. Cape Town, South Africa, July 7-12, 2002.

VARDEMAN, STEPHEN B.

"Development programs for 1-shot systems using multiple state design reliability models." Joint National Meeting of ASA, Biometric Society and SSC. New York, NY, August 2002.

"Providing 'real' context in statistical quality control courses for engineers." 6th International Conference on the Teaching of Statistics. Cape Town, South Africa, July 2002.

WU, HUAIQING

"Clear two-factor interactions and minimum aberration." Design and Analysis of Experiments 1. Vancouver, Canada, July 14-18, 2002.

"Clear two-factor interactions and minimum aberration." 2002 Taipei International Statistical Symposium and Bernoulli Society EAPR Conference. Taipei, Taiwan, July 7-10, 2002.

"Early detection of reliability problems using information from warranty databases." Spring Research Conference on Statistics in Industry and Technology. Dayton, OH, June 4-6, 2003.

"PID charts for process monitoring." INFORMS Annual Meeting. San Jose, CA, November 17-20, 2002.

(With Jiang, Wei) "PID charts for process monitoring." Technometrics Session, Fall Technical Conference. Valley Forge, PA, October 17-18, 2002.

YANG, YUHONG

"Combining models/procedures for adaptive nonparametric estimation." Department of Statistics. University of Pennsylvania. Philadelphia, PA, January 29, 2003.

"Randomized allocation with nonparametric estimation for a multi-armed bandit problem with covariates." Joint Statistical Meetings. New York, NY, August 15, 2002.

CONTRACTS & GRANTS 2002-03

AGRICULTURE RESEARCH SERVICE / US DEPARTMENT OF AGRICULTURE

Brendel, Volker, PI. Database of maize genome information (DBMGI) - a new generation maize genome database. 2001-2004.

AMERICAN HEART ASSOCIATION, RISK

Koehler, Kenneth J., Co-PI
With: Manju B. Reddy (PI). Soy isoflavones and cardiovascular disease. 2003-2005.

AMERICAN STATISTICAL ASSOCIATION

Opsomer, Jean D., PI. Semiparametric estimation for the current employment statistics survey. 2002.

AT&T

Meeker, William Q., Jr., PI. Private instruction and consulting on the technical material in and related to Professor Meeker's book. *Statistical Intervals*. 2000-2010.

BAE SYSTEMS

Nusser, Sarah, M., PI
With: L. M. Miller. Mobile computing. 2002-2003.

ENVIRONMENTAL PROTECTION AGENCY

Opsomer, Jean D.,
With: F. Jay Breidt,. Nonparametric model-assisted survey estimation for aquatic resources. (Subcontract through Oregon State University.) 2001-2005.

FEDERAL AVIATION ADMINISTRATION, CENTER FOR NONDESTRUCTIVE EVALUATION

Meeker, William Q., Jr., Co-PI
With: Lisa Brasche (PI). Phase II engine titanium consortium. 2002-2003.

HEALTHY LIVESTOCK INITIATIVE COMPETETIVE GRANTS PROGRAM

Dorman Karin S., Co-PI
With: Susan Carpenter (PI). Genetic and computational analysis of virus evolution. 2002-2003.

IOWA DEPARTMENT OF EDUCATION

Shelley, Mack C., II. Development of an area education agency cost efficiency study.

Shelley, Mack C., II, PI. Response to the United States Department of Education, Office of Civil Rights' (OCR) request that Iowa students requiring special education be assigned categorical disability labels for purposes of OCR's data collection requirements.

Shelley, Mack C., II, Co-PI
With: Carl Smith, Marion Panyan and Kelli Tallman. Iowa positive behavioral support for children and youth. 2003-2008.

IOWA DEPARTMENT OF EDUCATION / BUREAU OF CHILDREN, FAMILY & COMMUNITY SERVICES

Shelley, Mack C., II, PI
With: Barbara Ohlund (Co-PI). Focus groups on evaluation of special education programs in the State of Iowa.

IOWA DEPARTMENT OF PUBLIC HEALTH

Shelley, Mack C., II
With: Mary Jane Oakland and Grace Marquis. Improving how WIC teaches nutrition: Using stages of change criteria and critical thinking skills to teach about vegetables. 2002-2004.

ISU, AGRONOMY DEPARTMENT ENDOWMENT

Opsomer, Jean D., Co-PI
With: R. D. Cruse, W. James, J. Laflen Krajewski and D. Todey. Daily soil erosion and water runoff estimates in Iowa. 2001-2004.

ISU, CENTER FOR ONLINE LEARNING GRANT

Cook, Dianne, PI
With: **W. Robert Stephenson**, **Amy G. Froelich** and **William M. Duckworth, II**. 2002-2003.

ISU, LAS COMPUTER ADVISORY COMMITTEE GRANT

Hofmann, Heike. Mysql database for online storage of course material. 2003-2004.

Roberts, Carl, W., PI. A web-based applet for teaching the concept of statistical control. 2002-2003.

ISU, P & S GRANT

Rollins, Derrick K.
With: Anita Rollins. Science bound's learn and earn program and its impact on student success and program retention. 2003.

ISU/PIONEER HI-BRED INTERNATIONAL, INC.

Isaacson, Dean L., PI. Research Opportunity Agreement. 2002-2003.

Isaacson, Dean L., PI. Research Opportunity Agreement. 2002-2003.

ISU, PLANT SCIENCES INSTITUTE

Brendel, Volker, PI. Identification of alternatively spliced genes in arabidopsis. 2001-2003.

JOHN DEERE FOUNDATION

Vardeman, Stephen B., PI. Quality and reliability research. 2003.

JOHN DEERE TECHNOLOGY CENTER

Cook, Dianne, Co-PI
With: James E. Bernard (PI). Synthetic environments as enabling technology for product development - Phase 3. 2001-2004.

Cook, Dianne, Co-PI
With: Julie Dickerson (PI) and Carolina Cruz-Neira. Research Opportunity Agreement. 2001-2003.

MATHEMATICA POLICY RESEARCH

Carriquiry, Alicia L. Assessing the diet of high risk subgroup using the dietary reference intakes. 2001-2003.

MILLER FACULTY FELLOWSHIP

Stephenson, W. Robert, PI
With: William M. Duckworth, II and Amy G. Froelich. Engaging students in statistical discovery. 2003.

NATIONAL INSTITUTE ON AGING

Lorenz, Frederick O.
With: Carol Magai. Consultant, ethnicity and socioemotional functioning in later life. 2000-2007.

NATIONAL INSTITUTE FOR HEALTH

Dorman, Karin S., Co-PI
With: Susan Carpenter (PI). Multilocus selection of lentivirus variants. 7/1/02-6/30/04.

Dorman, Karin S. Co-PI
With: Susan Carpenter (PI). Quasispecies evolution during lentivirus persistence. 2002-2003.

Koehler, Kenneth J., Co-PI
With: Diane F. Birt (PI). Energy restriction, cell signaling and cancer prevention. 1998-2003.

Koehler, Kenneth J., Co-PI
With: D. Lee Alekel (PI). Bone response to soy isoflavones in women. 2002-2007.

Maiti, Tapabrata, PI. Bayesian neural networks for a prostate cancer study. (Subcontract from University of Florida.) 2001-2004.

NIH, CENTER FOR BOTANICAL PRODUCTS

Dixon, Philip M. and **Mark S. Kaiser**, Co-PIs
With: Diane Birt (PI). Integrated research on Echinaceae and Hypericum herbal medicines. 2002-2007.

NIH, NATIONAL INSTITUTE ON DRUG ABUSE

Amemiya, Yasuo, Co-PI
With: Richard Spoth (PI). Rural youth and families competencies building project. 9/18/02-6/30/03.

NIH, NATIONAL INSTITUTE OF MENTAL HEALTH

Bonett, Douglas G., Co-PI
With: D. L. Vogel, C. E. Cutrona and R. J. Werner-Wilson. Physiological effects of marital conflict. 2003-2004.

Lorenz, Frederick O., PI
With: Conger, Simons, Bryant and Wickrama. Midlife adaptation and health in rural society. 2000-2004.

Lorenz, Frederick O., Co-PI
With: Conger, Simons, Bryant and Wickrama. Critical transitions in rural families at risk. 2001-2004.

Lorenz, Frederick O., Co-PI
With: Gibbons, R. (PI). Factors influencing African-American youths' health behaviors. 2001-2004.

Lorenz, Frederick O.
With: Cheryl Beuchler (PI). Consultant, interparent conflict and youth maladjustment. 2000-2005.

NIH/NATIONAL SCIENCE FOUNDATION

Brendel, Volker, PI
With: **Dan Nettleton** and **Karin Dorman**. Summer Institute in Bioinformatics and Computational Biology - Iowa State University. 2002-2006.

NIH/NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE / PARKINSON'S DISEASE FOUNDATION / NATIONAL PARKINSON'S FOUNDATION

Koehler, Kenneth J., Co-PI
With: Ann L. Smiley-Owen (PI). Motor learning and transfer in PD and cerebellar dysfunction. 2001-2003.

NATIONAL K-12 FOREIGN LANGUAGE RESOURCE CENTER AT ISU / AMERICAN COUNCIL ON THE TEACHING OF FOREIGN LANGUAGES

Shelley, Mack C., II, Co-PI
With: Marcia Rosenbusch (PI). New visions in foreign language education survey.

NATIONAL SCIENCE FOUNDATION

Adams, Dean C., PI. The morphological consequences of competition I in Plethodon salamanders. 2001-2003.

Bonett, Douglas G.
With: Bushman, B. J. Using prior kurtosis information to improve confidence intervals for standard deviations. 2003-2004.

Brendel, Volker, PI. Efficient web-based serving of consolidated multi-source biological sequence data extracts. 2001-2003.

Brendel, Volker, Co-PI. Maize gene discovery, sequencing and phenotypic analysis. (Subcontract from ISU.) 2001-2002.

Brendel, Volker, PI. Plant GDB - plant genome database and analysis tools. 2001-2003.

Brendel, Volker, Co-PI.
With: Srinivas Aluru (PI). CISE research resources: Acquisition of a cluster for experimental parallel computing research in scientific computing and computational biology. 2001-2004.

Brendel, Volker, Co-PI.
With: Srinivas Aluru (PI). Parallel algorithms and software for gene identification and annotation from EST collections. 2002-2004.

Brendel, Volker, Co-PI.
With: Sarah Hake (PI). Regulation of inflorescence architecture in maize. (Subcontract from ISU.) 2001-2006.

Brendel, Volker, Co-PI.
With: Virginia Walbot (PI). Maize gene discovery, sequencing and phenotypic analysis. (Subcontract from ISU.) 2002-2004.

Carriquiry, Alicia L. VIII Latin American congress on probability and mathematical statistics. Mathematical Sciences at the Interface. 2001-2002.

Cook, Dianne, PI. Global expression data.

Cook, Dianne, PI
With: Vasant Honavar and Les Miller. Large scientific visualization program. 1999-2003.

Cook, Dianne, Co-PI
With: Eve Wurtele and Julie Dickerson. Visualizing and modelling global expression data in Arabidopsis. 2002-2003.

Isaacson, Dean L., Co-PI. The alliance for the production of african american PhD's in the mathematical sciences. 2002-2005.

Isaacson, Dean L. Co-PI. Iowa alliance for graduate education and the professoriate. 2002-2007.

Kaiser, Mark S., PI
With: **Isaacson, Dean L**. VIGRE-Department of Statistics. 2001-2004.

Lahiri, Soumendra N., PI. Higher order accuracy of Bootstrap methods for temporal and spatial patterns. 2001-2003.

Lahiri, Soumendra N. PI. Resampling methods for temporal and spatial patterns.

Maiti, Tapabrata, PI, Bayesian and likelihood vased multilevel models for small area estimation. 2000-2003.

Maiti, Tapabrata, PI. Topics in small area estimation. 2003-2006.

Nettleton, Daniel S., Co-PI
With: Stephen H. Howell (PI). Regulation of shoot development in Arabidopsis. 2003-2006.

Nusser, Sarah M., PI
With: **Tapabrata Maiti** and L. M. Miller (Co-PIs). Enabling the creation and use of geogrids for next generation geospatial information. (Subcontract from Univeristy of Maine). 2002-2004.

Nusser, Sarah M., PI
With: L. M. Miller, M. F. Goodchild and K. Clarke. Collecting and using geospatial data in the field: An extensible framework and testbed. 2000-2004.

Opsomer, Jean D.
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With: Wolfgang Kleimann (PI). Course redesign for revising delivery of discrete mathematics. 2002-2004.

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Meeker, William Q., Jr., Co-PI
With: Lisa Brasche (PI). Reliability calculations and inspectability support for contoured shapes titanium forgings, including POPD calculations. 2003.

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Dixon, Philip M. Co-PI
With: K-J Yoon (PI). Genetic and antigenic evolution of PRRS virus in persistently infected pigs. 2002-2005.

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With: M. Liebman (PI). Understanding weed dynamics in contrasting crop rotation systems: Combining a pulse/field experiment and matrix models. 2002-2005.

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With: Julie Dickerson (PI), **Volker Brendel** and **Dianne Cook.** BarleyBase, a prototype online database for cereal microarrays with integrated tools for data visualization and statistical analysis. 2002-2005.

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With: Chris Cook and Sue Crull. Local housing decisions and the economic vitality of rural communities. Initiative Rural Development.

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Shelley, Mack C., II, Co-PI
With: Sarah Lubienski (PI). A closer look at mathematics achievement and instructional practices: Examinations of race, SES, and gender in a decade of NAEP data. 2002-2004.

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Shelley, Mack C., II, Co-PI
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Morris, Max D., Co-PI,
With: George Ostrouchov and Bill Doll. Spatial models and optimal survey design for rapid geophysical characterization of UXO sites. 2001-2002.

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Carriquiry, Alicia, L. Software for intake distribution. 2001-2002.

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With: Stan Bajic and David Baldwin. Statistical tools for forensic analysis of toolmarks. 2002-2003.

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Nusser, Sarah, M., PI. Strategies for improving abilities to use digital maps. 2002-2004.

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Kaiser, Mark S., PI
With: **Philip Dixon**. Spatial prediction of sediment categories for use in ecological response modeling. 2002-2004.

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Nusser, Sarah M. Behavioral infection and genetics in early on-set stroke. 2001-2002.

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A publication of the Statistical Laboratory
& Department of Statistics

Ken Koehler, Chair and Director