

Amy G. Froelich

Education

- Ph.D. in Statistics** 10/00
University of Illinois at Urbana-Champaign
Advisor: William F. Stout
Thesis Title: *Assessing Unidimensionality of Test Items
and Some Asymptotics of Parametric Item Response Theory*
- B.S. in Secondary Mathematics Education** 5/94
University of Illinois at Urbana-Champaign
Highest University Honors - Bronze Tablet

Professional Employment

- Associate Professor** 8/08 - present
Department of Statistics, Iowa State University
- Faculty Member** 8/06 - present
Master of School Mathematics Program
Department of Mathematics, Iowa State University
- Assistant Professor** 8/00 - 8/08
Department of Statistics, Iowa State University
- Graduate Research Assistant** 8/97 - 7/00
Statistical Laboratory for Psychological and Educational Measurement
Department of Statistics, University of Illinois at Urbana-Champaign
- Graduate Teaching Assistant** 8/95 - 8/97
Department of Statistics, University of Illinois at Urbana-Champaign
- Mathematics Instructor** 8/94 - 8/95
United Township High School, East Moline, Illinois

Society Memberships

- American Statistical Association
National Council on Measurement in Education
Psychometric Society

Research Interests

- Statistics Education, Psychometrics, Educational Measurement

Honors and Awards

Ruth W. Swenson Award for Outstanding Advising College of Liberal Arts and Sciences, Iowa State University	Fall 2009
Faculty Learning Community for Large Class Enhancement Award Center for Excellence in Learning and Teaching and College of Liberal Arts and Sciences, Iowa State University	2007-2008
Miller Scholarship of Teaching and Learning Institute Award Center for Excellence in Learning and Teaching, Iowa State University	2007-2008
ISU Foundation Award for Early Achievement in Teaching Iowa State University	Fall 2004
Maurice Tatsouka Award Scholar College of Education, University of Illinois at Urbana-Champaign	Fall 1999
Incomplete List of Teachers Ranked as Excellent by Their Students University of Illinois at Urbana-Champaign	Fall 1996

Teaching

Iowa State University (2000-2009)

Typical (average) teaching load is four courses per year (41 courses total since 2000). Largely responsible for teaching several courses in the undergraduate program, including the introductory course for general majors and the two-course sequence in calculus-based probability and statistics for statistics and mathematics majors.

Total number of students since 2000: 1,411

Total Student Credit Hours since 2000: 5,034

Course	Title (Credit Hours)	Total Enrollment	Number of Times Taught
Stat 100	Orientation in Statistics (R)	42	5
Stat 101	Principles of Statistics (4)	758	8
Stat 101L	Principles of Statistics, Special Section (4)	64	3
Stat 341	Introduction to the Theory of Probability and Statistics I (3)	305	8
Stat 342	Introduction to the Theory of Probability and Statistics II (3)	158	7
Stat 401	Statistical Methods for Research Workers (4)	50	1
Stat 410X	Statistical Methods for Mathematics Teachers (6)	18	1
Stat 490H	Independent Study (3)	1	1
Stat 590B	Special Topics (Methods) (3)	1	1
Stat 599	Creative Component (4)	1	1
Stat 699	Research (3)	2	2
Math 397X	Teaching Secondary Mathematics Using University Mathematics (2 week module) (3)	8	1
Math 599	Creative Component (3)	3	3

Course Coordination

Responsible for instruction in all sections of Statistics 101 at Iowa State University. Typically five lecture sections per semester, with 500 total students, five course instructors and 10 laboratory teaching assistants. Duties include choosing the course textbook, setting the course syllabus, writing all homework and laboratory assignments and solutions, maintaining course website, supervising and mentoring all course instructors, supervising and mentoring all laboratory instructors, providing all disability accommodations, approving course grades for all sections.

Course Coordinator for 12 semesters from 2000-2009.

Total number of students from 2000-2009: 6,044

Additional total student credit hours (due to coordination alone): 21,144.

Advising

Responsible for advising undergraduate and graduate statistics majors in the department. A large portion of this responsibility is advising undergraduate statistics majors. Duties include a minimum of two advising meetings per year with each advisee, maintenance of each advisee's degree audit, assisting advisees in meeting career or graduate school goals, and writing letters of recommendation for advisees.

Duties for advising graduate students include working with students to identify topics for master's creative component or doctoral dissertation, developing and approving the student's program of study, and supervising the completion of the master's creative component or doctoral dissertation.

Undergraduate

2008-2009 (Total since 2000) 33 (67) advisees

Undergraduate Senior Honors Project

Jessica Culhane Statistics & Economics May 2007
What are the odds? A study of randomness and the iPod

Master of Science

Kira Barclay Sisson Statistics August 2005
Credit scorecard development using Model Builder for predictive analytics
Courtney Wahlstrom School Mathematics December 2008
Beta: A Statistical Analysis of a Stock's Volatility
Robert Dengler School Mathematics May 2009
Research Based Decision Making in a Community College Setting
Matthew Heston School Mathematics August 2009
An Analysis of APBA Baseball

Ph.D.

Ellis Ott Ph.D. Co-Major December 2007
(Statistics & Education)
Statistical issues with No Child Left Behind

Program of Study Committees

M.S. - 1 Outside Department, 1 Department

Ph.D. - 2 Outside Department, 1 Department

Mentoring

Responsible for mentoring graduate student teaching assistants serving as course instructors for Statistics 101 in the department. Mentoring activities include weekly meetings throughout the semester to discuss strategies for management of large classes, pedagogy for teaching topics in the course, and course scheduling timelines. Graduate students also receive feedback on teaching performance through a combination of a minimum of one classroom visit and examination of course materials.

Preparing Future Faculty

Melissa Bingham Fall 2007

Teaching

Julie Hanson Spring 2001
Brooke Fridley Spring 2001, Fall 2001
Rhonda DeCook Spring 2001, Fall 2001
Michael Eraas Spring 2001, Fall 2001, Fall 2002, Spring 2003
Luke Willis Fall 2002, Spring 2003
Huiyan Zhao Fall 2002, Spring 2003
Samantha Montgomery Fall 2002, Spring 2003
Tammy Brown Spring 2003, Fall 2003, Spring 2004
Myra Young Fall 2003, Spring 2004
Emile White Fall 2003, Spring 2004
Jennifer Hockett Fall 2003, Spring 2004
Jude Burger Spring 2004
Patrick Macke Spring 2004, Fall 2004, Spring 2005
Jessica Chapman Fall 2004, Spring 2005, Spring 2008
Kira Barclay Sisson Fall 2004, Spring 2005
Paul Buzinec Spring 2005
Timothy Bancroft Spring 2005
Kyle Hewitt Fall 2007, Spring 2008, Fall 2008, Spring 2009
Karl Pazdernik Fall 2007, Spring 2008
Reka Howard Fall 2007
Dai-Trang Le Spring 2008
Jeremy Craft Spring 2008, Fall 2008, Spring 2009
Derek Blythe Fall 2008, Spring 2009

Scholarship

Refereed Publications

- Froelich, A.G.**, Duckworth, W.M. & Stephenson, W.R. (2005). Training Statistics Teachers at Iowa State University, *The American Statistician*, Vol. 59, No. 1. (pp. 8-10).
- Froelich, A.G.** & Habing, B. (2008). Conditional covariance based subtest selection for DIMTEST. *Applied Psychological Measurement*, Vol. 32, No. 2. (pp. 138-155).
- Froelich, A.G.**, Kliemann, W. & Thompson, H. (2008). Changing the statistics curriculum for future and current high school mathematics teachers: a case study. *International Commission on Mathematical Instruction (ICMI) and the International Association for Statistical Education (IASE) Joint Study on Statistics Education in School Mathematics: Challenges for Teaching and Teacher Education*. Proceedings of the ICMI Study 18 Conference and IASE 2008 Round Table Conference. Available on web at http://www.ugr.es/~icmi/iase_study/Files/Topic6/T6P5_Froelich.pdf.
- Froelich, A.G.**, Stephenson, W.R. & Duckworth, W.M. (2008). Assessment of materials for engaging students in statistical discovery. *Journal of Statistics Education*, Vol. 16, No. 2. Available on web at <http://www.amstat.org/publications/jse/v16n2/froelich.html>.
- Froelich, A.G.**, Duckworth, W.M. & Culhane, J. (2009). Does your iPod *really* play favorites? *The American Statistician*, Vol. 63, No. 3. (pp. 263-268).
- Stephenson, W.R., **Froelich, A.G.** & Duckworth, W.M. (in press). Using resampling to compare two proportions. Accepted to appear in *Teaching Statistics*. (pp. 1-10).

Invited Book Chapters

- Stout, W., **Froelich, A.G.**, & Gao, F. (2001). *Using resampling to produce an improved DIMTEST procedure*. In Boomsma, A., van Duijn, M.A.J. & Snijders, T.A.B. (Eds.) *Essays on Item Response Theory*. (pp. 357-376). New York: Springer-Verlag.
- Froelich, A.G.** (2009). *Methods from Item Response Theory: Going Beyond Traditional Validity and Reliability in Standardizing Assessments*. In M. C. Shelley II, L. D. Yore, & B. Hand (Eds.), *Quality research in literacy and science education: International perspectives and gold standards*. (pp. 287-301). Dordrecht, The Netherlands, Springer.

Technical Reports

- Stout, W., Bolt, D., **Froelich, A.G.**, Habing, B., Hartz, S., Roussos, L. (2003) *Development of a SIBTEST Bundle Methodology for Improving Test Equity with Applications for GRE Test Development*. Graduate Record Exam Board Report No. 98-15P, Educational Testing Service Report 03-06. Available on web at <http://www.ets.org/Media/Research/pdf/RR-03-06-Stout.pdf>. (pp. 1-84).
- Alaimo, K. & **Froelich, A.G.** (2004) *Alternative construction of a Food Insecurity and Hunger Measure from the 1995 Current Population Survey Food Security Supplement Data*. Measuring Food Insecurity and Hunger: Phase 1 Report, Workshop on the Measurement of Food Insecurity and Hunger. Available on web at http://www7.nationalacademies.org/cnstat/Alternative_Construction_of_Food_Security_Paper.pdf. (pp. 1-31).

Froelich, A.G., Stout, W., & Ackerman, T. (2006) *Modifying Existing Dimensionality Assessment Tools for Use in a CAT Environment*. Law School Admission Council Research Report Series, Law School Admission Council Computerized Testing Report 99-10. Available on web at <http://www.lsacnet.org/Research/Modifying-Existing-Dimensionality-Assessment-tools-in-CAT-Environment.htm>. (pp. 1-23).

Proceedings

Froelich, A.G., Stephenson, W.R. & Duckworth, W.M. *Engaging students in statistical discovery*, American Statistical Association Proceedings of the Section on Statistical Education, (2004). (pp. 2660-2662).

Froelich, A.G., Stephenson, W.R. & Duckworth, W.M. *Assessment of materials for engaging students in statistical discovery*, American Statistical Association Proceedings of the Section on Statistical Education, (2005). (pp. 2223-2230).

Froelich, A.G., Stephenson, W.R. & Duckworth, W.M. *Further assessment of materials for engaging students in statistical discovery*, American Statistical Association Proceedings of the Section on Statistical Education, (2006). (pp. 2287-2294).

Froelich, A.G. & Duckworth, W.M. *Using JMP scripts in teaching introductory statistics*, American Statistical Association Proceedings of the Section on Statistical Education, (2007). (pp. 2194-2198).

Froelich, A.G. *Using R in undergraduate probability and mathematical statistics courses*, American Statistical Association Proceedings of the Section on Statistical Education, (2008). (pp. 2573-2580).

Froelich, A.G. *Using JMP scripting language to teach sampling and inference for the proportion*, American Statistical Association Proceedings of the Section on Statistical Education, (2009). In preparation.

Software

DIFPACK - Dimensionality-Based DIF Analysis Package - Fortran programs for Differential Item Functioning/Differential Test Functioning (DIF/DTF) detection, connected through Visual Basic front end in Windows. Available since 1999 through Assessment Systems Corporation, <http://www.assess.com>.

DIMTEST 2 - Fortran program based on dissertation and subsequent work on the second generation of DIMTEST program. Available from 2003 - 2007 through Assessment Systems Corporation, <http://www.assess.com>.

DIMPACK - Nonparametric Dimensionality Analysis Package - Fortran programs for non-parametric dimensionality assessment, connected through Visual Basic front end in Windows. Available since 2007 through Assessment Systems Corporation, <http://www.assess.com>.

JMP Concept Discovery Modules for Introductory Statistics - Available for download since 2009 through JMP Statistical Discovery Software, a business division of SAS Institute, Inc. at http://www.jmp.com/academic/learning_modules.shtml.

Manuscripts In Preparation

Froelich, A.G. & Stephenson, W.R. How much does an M&M weigh? To be submitted to the journal *Teaching Statistics*.

- Froelich, A.G.** Using R to teach probability and mathematical statistics. To be submitted to the journal *Technology Innovations in Statistics Education*.
- Nettleton, D. & **Froelich, A.G.** Does my baby really look like me? Testing for resemblance between parent and child. To be submitted to *The American Statistician*.
- Froelich, A.G.** A new bias correction method for the DIMTEST procedure. To be submitted to the *Journal of Educational and Behavioral Statistics*.
- Froelich, A.G.** Assessing the dimensionality of polytomous test items: Poly-DIMTEST. To be submitted to the *Journal of Educational and Behavioral Statistics*.
- Froelich, A.G.** & Jensen, H. Dimensionality of the USDA Food Security Index. To be submitted to the *Journal of Nutrition*.

Scholarship of Teaching and Learning - Departmental Teaching Documents

Guidelines for Teaching Introductory Courses in the Department of Statistics

This document was written primarily to serve as a resource for new graduate student course instructors in the department. However, faculty teaching courses at all levels also use this as a resource for their teaching. The document is updated at least once a year to reflect changes in University and Departmental policies, changes in personnel, and to incorporate special issues that arose since the last revision.

Manual for Teaching Assistants in the Department of Statistics

This document was written to communicate the responsibilities and duties of graders and laboratory assistants to graduate student teaching assistants in the department. The document is updated at least once a year to reflect changes in University and Departmental policies and to incorporate special issues that arose since the last revision.

Scholarship of Teaching and Learning - Curriculum and Course Development

Statistics 101L

Developed jointly with Professor W. Robert Stephenson a new section of the introductory course (non-calculus based) for students with strong mathematics backgrounds as evidenced by their ACT Math or SAT Math scores. Initial development was funded through grants from the Miller Faculty Fellowship program and NSF. This new section has been offered each Spring semester since 2003 and is open to all majors on campus. Enrollment is targeted towards freshmen and sophomores majors in the mathematical sciences and in fields that require Statistics 101 for graduation. Although this course covers much of the same content as the regular introductory course, almost all other aspects (syllabus, laboratory assignments, homework assignments, etc.) of this section are different than the regular sections of the course.

Statistics 341 and 342

Developing new course materials incorporating ideas from the reform movement in statistical education at the introductory course level into the traditional two-semester probability and mathematical statistics course sequence. The new materials are structured around the use of the statistical software package R.

Statistics for Pre-Service Secondary Mathematics Teachers

To support the National Council of Teachers of Mathematics (NCTM) 2001 *Principles and Standards for School Mathematics*, the American Statistical Association 2005

Guidelines for Assessment and Instruction in Statistics Education (GAISE), and the new Model Core Curricula for Mathematics in the State of Iowa, a proposal from the Department of Statistics for curriculum changes in statistics for the Bachelor of Science Degree in Mathematics with Licensure to Teach 7-12 Mathematics in the State of Iowa has been approved by the Department of Mathematics. The proposal increases the number of courses in statistics and probability required for the degree from one to two, without a third statistics course highly recommended. The three courses include the introductory course in statistics for students with strong mathematics backgrounds (Statistics 101L), and a calculus-based introduction to probability and mathematical statistics (Statistics 341 and 342).

Statistics for Master of School Mathematics Program

Developed and taught for the first time in Summer 2008 a new 6-credit hour graduate level course in Statistics for the Master of School Mathematics Program. This course (Stat 410X) includes topics from several courses at the 400-level in the Department, including mathematical statistics, univariate, bivariate and multivariate statistical methods, survey sampling and design of experiments. Course also incorporates materials and pedagogy appropriate for teachers of AP Statistics, high school teachers teaching a dual-credit introductory statistics course for the community college, or community college teachers of statistics.

Invited Presentations

Using JMP Statistical Discovery Software for Building Conceptual Understanding in Introductory Statistics. Invited Breakout Session at the United States Conference on Teaching Statistics (USCOTS), The Ohio State University, Columbus, Ohio, June 2009.

Using R to Teach Probability and Mathematical Statistics. Chair and presenter for invited session at the Conference Celebrating 75 Years of Statistics at Iowa State University, Ames, Iowa, June 2009.

Changing the Statistics Curriculum for Future and Current High School Mathematics Teachers: A Case Study. International Commission on Mathematical Instruction (ICMI) and the International Association for Statistical Education (IASE) Joint Study on Statistics Education in School Mathematics: Challenges for Teaching and Teacher Education, Monterrey, Mexico, June 2008.

Visions for the Future of Mathematics Education in Iowa. (with Ken Koehler). Meeting of the Chief Academic Officers and Deans of Arts and Sciences from the state's 15 community colleges, Des Moines Area Community College, Ankeny, Iowa, November, 2007.

Statistics Education in the State of Iowa, Grades 9 - 16: Current Status and Implications for the Future. Iowa Mathematics Association of Two-Year Colleges, Fall 2007 meeting, Iowa Central Community College, Fort Dodge, Iowa, October, 2007.

Using R in Undergraduate Probability and Mathematical Statistics Courses. Invited seminar, Department of Statistics, Iowa State University, Ames, Iowa, September 2007.

Teaching Problem-solving Transfer in High School Mathematics: Algebra I and Geometry. Professional Development Meetings for Enhancing Education Through Technology (E2T2) Co-hort 4, Area Education Agency 11 (Heartland AEA), Des Moines, Iowa, September 5 and 6, 2007.

- Using R in Undergraduate and Graduate Courses in Probability and Mathematical Statistics.* Co-Chair and Presenter for Invited Session on Teaching and R at the UseR! conference, Ames, Iowa, August 2007.
- How much does a single M&M weigh? Activities for engaging students in statistical discovery.* (with W. Robert Stephenson). Invited Breakout Session at the United States Conference on Teaching Statistics (USCOTS), The Ohio State University, Columbus, Ohio, May 2007.
- Preliminary Results of the Survey of Attitudes Toward Statistics in introductory statistics courses at Iowa State University.* Invited seminar sponsored by a TEACH grant from the Center for Excellence in Learning and Teaching, Iowa State University, Ames, Iowa, April 2007.
- Multidimensional Item Response Theory.* (with Brian Habing). Invited All-Day Workshop at the annual meeting of the National Council on Measurement in Education, Chicago, Illinois, April 2007.
- Teaching developments in the Department of Statistics.* (with Michael D. Larsen and C. Ted Peterson). Invited seminar, Department of Statistics, Iowa State University, Ames, Iowa, December 2006.
- Materials for and assessment of engaging students in statistical discovery.* Invited seminar, Department of Statistics and Actuarial Science, University of Iowa, Iowa City, Iowa, September 2006.
- Training statistics teachers at Iowa State University.* Invited panelist at the annual Joint Statistical Meetings, Seattle, Washington, August 2006.
- Multidimensional Item Response Theory.* (with Brian Habing). Invited All-Day Workshop at the annual meeting of the National Council on Measurement in Education, Montreal, Canada, April 2005.
- Do the obvious, tips for teaching.* Invited presentation, Faculty Forum sponsored by the Center for Excellence in Learning and Teaching, Iowa State University, Ames, September 2004.
- Alternative construction of a food insecurity and hunger measure from the 1995 Current Population Survey Food Security Supplement Data.* (with Katherine Alaimo). Invited Paper presented at the Workshop on the Measurement of Food Insecurity and Hunger. Sponsored by the Panel to Review USDA's Measurement of Food Insecurity and Hunger, Committee on National Statistics, The National Academies, Washington, D.C. July 2004.
- Refinements of the DIMTEST methodology for testing unidimensionality and local independence.* Invited Paper presented at the annual conference of the National Council on Measurement in Education, Seattle, WA, April 2001.

Contributed Presentations

- Using JMP Scripting Language to Teach Sampling and Inference for the Proportion.* Poster presented at the annual Joint Statistical Meetings, Washington, D.C., August 2009.
- GAISE Between the Lines: Criteria and a Rubric for Assessing Introductory Statistics Textbooks.* Paper presented by W. Robert Stephenson at the annual Joint Statistical Meetings, Washington, D.C., August 2009.

- Using R in probability and mathematical statistics courses.* Paper presented at the annual Joint Statistical Meetings, Denver, Colorado, August 2008.
- Teaching introductory statistics with simulations in JMP Statistical Discovery Software.* Poster presented by William M. Duckworth at the annual Joint Statistics Meetings, Denver, Colorado, August 2008.
- Tips in Ten: An Example of Using a Tablet PC with PowerPoint Slides.* Presentation made to the Faculty Learning Community for Large Class Enhancement, Center for Excellence in Learning and Teaching, Iowa State University, October 2007.
- Using JMP Scripts in Teaching Introductory Statistics.* Poster presented at the annual Joint Statistical Meetings, Salt Lake City, Utah, July 2007.
- Further assessment of material for engaging students in statistical discovery.* Paper presented by W. Robert Stephenson at the annual Joint Statistical Meetings, Seattle, Washington, August 2006.
- Further assessment of material for engaging students in statistical discovery.* Poster presented by W. Robert Stephenson at the International Conference on Teaching Statistics (ICOTS), Salvador, Brazil, July 2006.
- Assessment of materials for engaging students in statistical discovery.* Paper presented at the annual Joint Statistical Meetings, Minneapolis, Minnesota, August 2005.
- Using hands-on methods with computer simulations to teach sampling distributions and inference.* Poster presented at the United States Conference on Teaching Statistics (US-COTS), The Ohio State University, Columbus, Ohio, May 2005.
- Engaging students in statistical discovery.* Poster presented at the annual Joint Mathematics Meetings, Atlanta, Georgia, January 2005.
- Engaging students in statistical discovery.* Poster presented at the annual Joint Statistical Meetings, Toronto, Canada, August 2004.
- A study of methods for selecting the AT Subtest in the DIMTEST procedure.* Presented at the annual meeting of the Psychometric Society, University of North Carolina, Chapel-Hill, June 2002.
- Assessing the unidimensionality of CAT Items: CAT-DIMTEST.* Paper presented at the annual meeting of Psychometrics Society, June 24-27, 1999.

Funding

- Duckworth, W.M., **Froelich, A.G.** & Stephenson, W.R. *Engaging Students in Statistical Discovery*, Miller Faculty Fellowship, Iowa State University, (\$20,300). Funded from July 1, 2002 to June 30, 2003.
- Stephenson, W.R., **Froelich, A.G.** & Duckworth, W.M. *Conceptual Statistics: Engaging Students in Statistical Discovery*, National Science Foundation, Course, Curriculum and Laboratory Improvement Program (\$74,976). Funded from May 15, 2003 to June 30, 2005.
- Larsen, M. & **Froelich, A.G.** *Computer Instructional Material for Probability and Mathematical Statistics*, College of Liberal Arts & Sciences Computer Advisory Committee, (\$6,111). Funded from January 1, 2006 to June 30, 2006.

Phye, G.D. & **Froelich, A.G.** *Teaching and Assessment of Problem-solving Transfer in High School Mathematics*, Roy J. Carver Charitable Trust, (\$338,460). Funded from July 1, 2006 to June 30, 2009.

Froelich, A.G. & Larsen, M. *Examining student attitudes towards statistics in the introductory classes*, TEACH Grant, Center for Excellence in Learning and Teaching (CELT), Iowa State University, (\$1,500). Funded from January 1, 2007 to June 30, 2007.

Kliemann, W. & **Froelich, A.G.** *Iowa High School - College Information System for Mathematics and Statistics*, College of Liberal Arts & Sciences, (\$32,000). Funded from July 1, 2007 to June 30, 2008.

Jensen, H.H. & **Froelich, A.G.** *Exploring Technical Enhancements to Improve Food Security Measurement*, Economic Research Service Cooperative Agreement, United States Department of Agriculture, (\$65,000). Funded from October 1, 2007 to September 30, 2009.

Froelich, A.G. & Genschel, U. *Formative Assessments to Aid in Statistical Thinking, Literacy and Practice in Introductory Statistics*, Miller Faculty Fellowship, Iowa State University, (\$23,743). July 1, 2008 to June 30, 2009.

Current Projects

Using Formative Assessments in Introductory Statistics

Currently developing with Dr. Ulrike Genschel a new model of assessment in the introductory statistics courses that incorporates formative assessments using personal response systems (clickers) and quizzes through the course management system, WebCT.

Analysis of the Survey of Attitudes Toward Statistics (SATS)

Currently studying, in collaboration with its developer Dr. Candace Schau, Professor Emeritus, University of New Mexico, the psychometric properties of the Survey of Attitudes Toward Statistics (SATS). Survey data has been collected from all students enrolled in a selection of introductory statistics courses at Iowa State University. These data and data collected from other colleges and universities throughout the country will be used to further assess the properties of the SATS using methodology from Item Response Theory.

Using JMP Scripts in Teaching Introductory Statistics

Invited by Curt Hinrichs, Manager for JMP Academic Programs, to develop new JMP scripts and write lesson plans and activities based on these scripts to aid in teaching concepts in introductory statistics. Collaboration team includes Dr. William M. Duckworth, Creighton University, Mr. Wayne Levin and Mr. Brian McFarlane from Predictum Management Sciences, Inc. and Mr. Mark Bailey, SAS Institute. Beta versions of several scripts are now available on JMP website with lessons and activities to be written over the next six months.

Iowa High School - College Information System for Mathematics and Statistics

Currently in charge of developing, as a part of the Iowa Initiative for College Mathematics and Statistics Education (IICMASE), an information sharing system about student performance in mathematics and statistics at Iowa State University. This pilot project involves the creation of a database designed to provide reports to high school faculty and community college faculty about the performance of their students at ISU, provide information to faculty at ISU to assist in academic advising, and to determine significant

variables that are related to ultimate student success in obtaining a bachelor's degree in a STEM related field, or in any field. The goal is to extend this pilot project to the University of Iowa and the University of Northern Iowa in the next several years.

Teaching and Assessment of Problem-solving Transfer in High School Mathematics

Currently developing, with Dr. Gary Phye, Department of Curriculum and Instruction, College of Human Sciences, materials for use in the high school mathematics classroom to improve the problem solving transfer of students. During the 2007-2008 school year, materials developed for Algebra I and Geometry will be field tested in 20 high schools in central Iowa. During the 2008-2009 school year, these materials plus materials for Algebra II will be field tested in additional high schools (precise number yet to be determined) in central Iowa. Responsibilities include development of materials for Algebra I and Algebra II and overseeing materials development for Geometry, designing professional development meetings with high school teachers on the use of the materials, and assessment of the effectiveness of the materials in improving problem solving transfer of students.

Professional Practice and Consulting

Consulting

Psychology in Education Research Laboratory (PERL), Department of Curriculum and Instruction, College of Human Sciences, 2005 to present.

Consulted with Dr. Gary Phye and the staff at PERL on several projects, including "Enhancing Education Through Technology" and "Evaluating State Educational Technology Programs." Activities include using statistical/psychometric expertise to assist with choosing the best methods and statistical analyses to solve a variety of research problems.

The National Association of Industrial Technology Certification Examination, Department of Industrial Education and Technology, College of Education, 2001-2003.

Consulted with Dr. Dennis Field and graduate student Douglas McCue on the assessment of the National Association of Industrial Technology (NAIT) certification examination. Activities included training on methodology from both Item Response Theory and Classical Test Theory, training on the use of appropriate software in these areas, and assisting with the interpretation of results.

Improving Measurement of Food Security and Hunger, Departments of Statistics and Economics, College of Liberal Arts and Sciences, 2001-2002.

Consulted with Dr. Sarah Nusser and Dr. Jean Opsomer from Statistics and with Dr. Helen Jensen from Economics on the assessment of the current USDA Food Security and Hunger Index. Activities included analysis of existing project data using methodology from Item Response Theory and communication of results through meetings and a final project report.

Professional Practice

Article reviewer for *International Commission on Mathematical Instruction (ICMI) and the International Association for Statistical Education (IASE) Joint Study on Statistics Education in School Mathematics: Challenges for Teaching and Teacher Education*

Article reviewer for *Technology Innovations in Statistics Education*

Article reviewer for *The American Statistician*

Article reviewer for *Journal of Statistics Education*

Article reviewer for *Journal of the First-Year Experience and Students in Transition*

Service to Iowa State University and Profession

Department

Faculty Advisor for STAT-ers (statistics graduate student group), 2001-2003

Library Committee, 2002-2003

Departmental Program Outcomes and Assessment Semester Workshop, Fall 2003

Strategic Planning Committee, 2004-2006

Curriculum Committee, 2006-2009

Faculty Search Committee, 2008-2009

Student-Faculty Committee on Instruction, 2000-2009 (Co-Chair 2001-2009)

Undergraduate Committee, 2000-2009 (Chair 2007-2009)

College

LAS Undergraduate Advising Coordinator, 2006 to present

Dean's Committee on Improving Calculus Instruction at Iowa State University, 2006-2007

University

Mathematics Placement Examination Committee, 2006-2007

Departmental Representative to the Iowa Initiative for College Mathematics and Statistics Education (IICMASE), 2006 to present

Representative to the Math Transitions Congress, sponsored by the Board of Regents, State of Iowa, at the University of Northern Iowa, November 2007

Profession

Participant in the American Statistical Association Member Initiative Workshop on Graduate Programs in Statistics Education, Washington, D.C., October 2008.