

Joint Spring Meetings

at

Cornell College

Friday and Saturday

April 26–27, 1996

A Note from Cornell Hosts

Jim Freeman

Ann Cannon

We welcome you to the Cornell College campus for the Joint Spring meetings of the Iowa Chapter of the American Statistical Association, the Iowa Section of the Mathematical Association of America, the Iowa Mathematical Association of Two Year Colleges, and the Iowa/Missouri/Illinois Isolated Statisticians.

This promises to be a full weekend of invited and contributed talks as well as various business meetings. Between Friday and Saturday, there will be a total of 51 contributed papers, 25 from students and 26 from faculty. We hope that everyone will find something of interest. We are also excited about the three invited talks to be given by Martha Siegel of Towson State University and Joel Greenhouse of Carnegie Mellon University.

The registration desk in West Science will be staffed by Cornell students and will be open for essentially the entire time. If you have any questions or problems, these students will be there to help you. Also, our security people have been alerted to this conference and have been asked not to ticket cars parked in the faculty lots. Should you receive a ticket from Cornell during your stay, please drop it off at the registration desk and it will be taken care of.

Finally, we hope that your stay at Cornell is a pleasant one. If we can do anything to help you, please do not hesitate to ask.

Joint Meetings of the Iowa MAA, ASA, and IMATYC

Cornell College, Mount Vernon, Iowa

April 26 and 27, 1996

Friday, April 26

12:00 – 7:30	Registration and Book Exhibit	West Foyer/Science Library
1:30 – 3:00	Statistics Session I	West 118
1:30 – 3:05	Mathematics Student Papers I and II	West 213, 218
3:00 – 3:15	Break	West Foyer
3:15 – 4:30	Statistics Session II	West 118
	Mathematics Student Papers III	West 218
4:30 – 7:00	Films	West 118
5:00 – 7:00	Dinner on your own	
	Iowa ASA dinner and meeting reservations required	Hillcrest Country Club
7:30 – 8:30	MAA Keynote Lecture I: Martha Siegel , Towson State University <i>Probability as the Queen</i>	Armstrong Theatre
8:30 – 10:00	Reception	Orange Carpet, Commons

Saturday, April 27

8:00 – 4:15	Registration and Book Exhibit	West Foyer/Science Library
8:30 – 8:35	Welcome: Dean Dennis Damon-Moore	Armstrong Theatre
8:35 – 9:35	ASA Keynote Lecture: Joel Greenhouse , Carnegie Mellon University <i>Jet Lag, Baseball, and Depression: Statistical Models for Biological Rhythm Data</i>	Armstrong Theatre
9:35 – 9:50	Break	Armstrong Lobby
9:50 – 10:50	MAA Keynote Lecture II: Martha Siegel <i>Industrial Mathematics for Fun and Profit</i>	Armstrong Theatre
10:50 – 11:30	Iowa MAA business meeting	Armstrong Theatre
11:00 – 1:00	Isolated Statisticians meeting	Harlan, Commons
11:00 – 1:00	Films	Science Library
11:30 – 1:00	Lunch (on your own)	
	IMATYC Lunch and Business Meeting	Magee, Commons
1:00 – 2:00	Mathematics Technical Session I reservations required (max 12)	Cole Library, Training Room First Level
1:00 – 2:30	Statistics Session III	West 100
	Math Contributed Papers I, II and III	West 118, 213, 218
2:30 – 2:45	Break	West Foyer
2:45 – 4:00	Statistics Session IV	West 100
2:45 – 4:15	Math Contributed Papers IV, V, and VI	West 118, 213, 218
	Mathematics Technical Session II	Law 206

Friday Afternoon Session

West 118: Statistics Session I: 1:30 – 3:00

- 1:30 –1:45 D. L. Bruden and M. S. Kaiser, (student, ISU)
Effects of Aggregation in Bivariate Correlation
- 1:45 –2:00 K. W. Dodd, A. L. Carriquiry, and W. A. Fuller, (student, ISU)
Replicate Weighting Methods for Quantile Variance Estimation
- 2:00 –2:15 P. J. Abbitt, (student, ISU)
Sampling Approaches for Soil Survey Updates
- 2:15–2:30 H. M. Axelson, F. J. Breidt, and A. L. Carriquiry, (student, ISU)
Two-Phase Regression Estimation for Policy Analysis Using Computer Simulation Experiments
- 2:30–3:00 D. Cook, (faculty, ISU)
Through the Windshield in p -Dimensions

West 213: Mathematics Student Papers I: 1:30 – 3:05

- 1:50 –2:05 John Hamman, University of Northern Iowa
A Look at the Four-Vertex Theorem
- 2:10 –2:25 Terry Sargent, University of Iowa
On functions with intermediate value property that are not derivatives
- 2:30–2:45 Tom Oleson, University of Northern Iowa
What It Takes to Buy Commutativity with $(XY)^n = X^nY^n$
- 2:50–3:05 Alexander Samuel, University of Northern Iowa
Unsolvability of the Problem of Trisecting an Angle

West 218: Mathematics Student Papers II: 1:30 – 3:05

- 1:30 –1:45 Brian Olson, Luther College
Three Theorems on Nonstandard Dice
- 1:50 –2:05 Kartik C. Parija, Drake University
Examining the Inertia of Derogatory Matrices under the Stein Transformation
- 2:10 –2:25 Lee Vettleon, Drake University
Quantum Computations
- 2:30–2:45 Bao-jun Jiang, Grinnell College
On Right-Angle-Triangle Free Sets
- 2:50–3:05 Karen Ball, Grinnell College
On Packing Unequal Squares

West 118: Statistics Session II: 3:15 – 4:15

- 3:15 –3:30 H-C. Huang, and N. A. C. Cressie.
(student, ISU)
A Spatio-Temporal Kalman Filter
- 3:30 –3:45 A. Roy and W. A. Fuller. (student, ISU)
Estimator for the First Oder Vector Autoregressive Process
- 3:45 –4:15 G. Bril. (faculty, Luther College)
Tree Rings and Decorah Climate

West 218: Mathematics Student Papers III: 3:15 – 4:30

- 3:15 –3:30 Goran Krilov, Drake University
3-D Invariants of Polyhedral Structures
- 3:35 –3:50 Adam Sales, Grinnell College
Packing an Infinite Sequence of Circles
- 3:55 –4:10 Sol Bobst, Drake University
On Characterization of Helices
- 4:15–4:30 Paula Calkins, Drake University
On Full Decomposition of Graphs

Saturday Afternoon Session

West 100: Statistics Session III: 1:00 – 2:30

- 1:00 –1:30 H. S. Stern. (faculty, ISU)
Who's Hot and Who's Not?
- Runs of Success and Failure in Sports
- 1:30 –1:45 N-J. Hsu, and F. J. Breidt. (student, ISU)
Bayesian Approach to Long-Memory Stochastic Volatility Models
- 1:45 –2:00 P. Sarkar, and W. Q. Meeker. (student, ISU)
Bayesian On-Line Abrupt Change Detection Algorithms with Process Monitoring Applications
- 2:00 –2:15 D. Nettleton. (student, U of I)
Interval Mapping of Quantitative Trait Loci through Order Restricted Inference
- 2:15 –2:30 M. Haubrich, and M. Schwab. (student, ISU)
An Interactive Method for Ranking Cities

West 213: Mathematics Contributed Papers I: 1:00 – 2:30

- 1:00 –1:30 Charles Ashbacher, Decisionmark
Smarandache Function
- 1:30 –2:00 Steve Nimmo, Morningside College
The Use of Toolbook in Math Seminar
- 2:00 –2:30 John Price, Maharishi University of Management
The Absolute Number as a Mathematical Theory and Technology of Everything

West 218: Mathematics Contributed Papers II: 1:00 – 2:30

- 1:00 –1:30 Arnold Adelberg, Grinnell College
p-adic Analysis and Bernoulli Polynomials
- 1:30 –2:00 Charles Jepsen, Grinnell College
Dissecting a Polygon into Triangles of Equal Areas
- 2:00 –2:30 Alex Kleiner, Drake University
Summability of Unbounded Series

West 118: Mathematics Contributed Papers III: 1:00 – 2:30

- 1:00 –1:30 Cathy Gorini, Maharishi University of Management
Discovering Non-Euclidean Geometries
- 1:30 –2:00 Daniel Alexander, Drake University
Reform Real Analysis
- 2:00 –2:30 Ruth Berger, Luther College
Learning Abstract Algebra in a Computer Classroom

Cole Library, Training Room: Math Technical Session I: 1:00 – 2:30

This session is limited to the first 12 people who request this session.
Reservations will be taken on a first come first serve basis at
the registration desk.

- 1:00 –1:30 Al Hibbard, Central College
Accessing Mathematical Resources on the Internet

West 100: Statistics Session IV: 2:45 – 4:00

- 2:45 –3:00 H. Shierholz. (student, ISU)
*Sampling Approaches for Minnesota Fish Contamination
and Ecology Studies*
- 3:00 –3:30 R. V. Lenth. (faculty, U of I)
*Experimental Design for Process Settings in
Aircraft Manufacturing: A Case Study*
- 3:30 –4:00 M. S. Kaiser. (faculty, ISU)
Underdispersed Binary Trials in Toxicity Tests

West 213: Mathematics Contributed Papers IV: 2:45 – 4:15

- 2:45 –3:15 Elias S.W. Shiu, University of Iowa
Interest Rate Risk: A Calculus Solution
- 3:15 –3:45 John P. Lediaev, University of Iowa
*Creating Math Movies on the TI-85 and the TI-92 to Enhance
Calculus and Pre-Calculus Instruction*
- 3:45 –4:15 Murphy Waggoner - Simpson College
*Lies My Calculator Told Me (or Why I Still Need to Know
Math Even Though I've Got a Graphing Calculator)*

West 218: Mathematics Contributed Papers V: 2:45 – 4:15

- 2:45 –3:15 Luz M. DeAlba, Drake University
Superstable Matrices
- 3:15 –3:45 Stephen Willson, Iowa State
A New Envy-Free Allocation in the Fair Division Problem
- 3:45 –4:15 Milan Randić, Drake University
Higher Order Lucas Numbers

West 118: Mathematics Contributed Papers VI: 2:45 – 3:45

- 2:45 –3:15 Doug Swan, Morningside College
Phase Plot Labs in Ordinary Differential Equations
- 3:15 –3:45 Robin Pennington, Wartburg College
A Project-Oriented Differential Equations Course
- 3:45 –4:15 Jack Engstom, Maharishi University of Management
*New Symmetry from New Notation for Natural Number
Arithmetic*

Law 206: Mathematical Technical Session II: 2:45 – 4:15

- 2:45 –3:15 Al Hibbard, Central College
A First Look at Mathematica 3.0
- 3:15 –4:15 James Freeman, Cornell College
Creating Materials for the Web: Pros and Cons

Friday Afternoon

Mathematics			Statistics	
	West 213	West 218		West 118
1:30-1:45		Olson	1:30-1:45	Bruden
1:50-2:05	Hamman	Parija	1:45-2:00	Dodd
2:10-2:25	Sargent	Vettleson	2:00-2:15	Abbitt
2:30-2:45	Oleson	Jiang	2:15-2:30	Axelson
2:50-3:05	Samuel	Ball	2:30-3:00	Cook
3:15-3:30		Krilov	3:15-3:30	Huang
3:35-3:50		Sales	3:30-3:45	Roy
3:55-4:10		Bobst	3:45-4:15	Bril
4:15-4:30		Calkins		

Saturday Afternoon

Mathematics				Statistics	
	West 213	West 218	West 118		West 100
1:00-1:30	Ashbacher	Adelberg	Gorini	1:00-1:30	Stern
1:30-2:00	Nimmo	Jepsen	Alexander	1:30-1:45	Hsu
				1:45-2:00	Sarkar
2:00-2:30	Price	Kleiner	Berger	2:00-2:15	Nettleton
				2:15-2:30	Haubrich
2:45-3:15	Shiu	DeAlba	Swan	2:45-3:00	Shierholz
3:15-3:45	Lediaev	Willson	Pennington	3:00-3:30	Lenth
3:45-4:15	Waggoner	Randić	Engstrom	3:30-4:00	Kaiser

Mathematics Technical		
	Cole Library	Law 206
1:00-2:00	Hibbard	
2:45-3:15		Hibbard
3:15-4:15		Freeman

Keynote Lectures

Probability as the Queen

Martha Siegel, Towson State University

Exploration of classical and modern ideas in probability as gems of mathematics.

Industrial Mathematics for Fun and Profit

Martha Siegel, Towson State University

Preparing students and faculty for the challenge of applied mathematics.

Jet Lag, Baseball, and Depression: Statistical Models for Biological Rhythm Data

Joel B. Greenhouse, Carnegie Mellon University

After jetting across several time zones, you may feel out of sorts, have low energy, sleep and eat at the wrong times, and maybe even feel a little depressed. It has been argued that this collection of symptomatology, commonly known as jet lag, is brought on by the sudden disruption of the synchronicity between your internal biological clock and the external environment. Recently, it has been suggested that such disruptions of the internal biological clock could have profound effects on the performance of shift-workers and baseball players. Similarly, many psychiatrists believe that disruptions in biological rhythms, like the ones that cause jet lag, are intimately related to the affective illness known as major endogenous depression. In this talk, I discuss the application of statistical methods to the study of biological rhythm data, and see how these methods contribute to the understanding of the biology of depression.

Mathematics Student Papers

Mathematics Student Papers I

A Look at the Four-Vertex Theorem

John Hamman, University of Northern Iowa

The four-vertex theorem is a statement of differential geometry which states that all simple convex curves have at least four vertices. The traditional proof of this theorem relies on a proof by contradiction and is not at all geometrical in nature. I will discuss two different articles which not only give two distinct geometrical proofs but broaden the hypothesis to include Jordan curves which are curves that separate the plane into two disjoint, connected sets.

The presentation is based on two articles which appeared in the "American Mathematics Monthly." The first of these articles was written by Robert Osserman in which he finds a circumscribing circle about the curve (here the curve can be Jordan). By translating this circle until the curve touches the circle at a single point,