

April 20, 2001

Colorado-Wyoming Chapter

[Previous](#) [Up](#) [Next](#)

Please see the bottom of this page for [Registration information!](#)

Spring Meeting

"Statistical Metrics; In Environmental Sciences, Industrial Processes, Bio-Medical Sciences, and Governmental Programs"

Location: The Main Seminar Room at the NCAR Mesa Labs ([Map to NCAR](#))

Meeting Sponsors: Ball Corporation, Broomfield, CO
Western EcoSystems Technology, Inc., Cheyenne, WY

Facility Sponsor: NCAR, Boulder, CO

Maurice Davies Awards: Cristina Giardino Colorado State University
Greg Boat Denver University
Jean M. Ethredge University of Colorado - Denver

SCHEDULE

(Updated 4/11/2001)

- 0830 - [Registration](#) and informal chats (coffee/tea/muffins/rolls)
- 0915 - Election of new officers, announcements and presentation of **Maurice Davies awards**.
- 0945 - [Dr. Dennis Helsel](#) : **Booster Shots for Applied Statistics**
- 1030 - [Dr. Karen Kafadar](#) : **A two-dimensional robust nonlinear smoother for environmental data**
- 1115 - [Mr. Anthony Gojanovic](#): **Simulating Survival Probabilities of a Lander Mission on Mars**
- 1200 - Break for lunch (The NCAR cafeteria is available. Other recommendations are "Ajuaa" in the shopping center at Table Mesa and Broadway. "Tsing Tao" Chinese, "Sweet Tomato" Pizza, "Quizno's" Subs, "Tandoori" Indian, and the "Cafe Sole" Coffee Shop are restaurants in the same vicinity)
- 1315 - Coffee/Tea in the NCAR foyer
- 1330 - [Dr. William Navidi](#) : **Case-Crossover Methods for Estimating Effects of Environmental Exposures**

1415 - [Mr. Rick Ditmars](#) : **Optimization of Pumping Rates at Municipal Supply Wells to Minimize Solute Concentrations**

1500 - [Dr. Snehalata Hurzurbazar](#): **Sampling to detect Bovine Viral Diarrhea Virus in Beef Herds**

1545 - Brief organizational meeting for Chapter officers

ABSTRACTS

Mr. Rick Ditmars

Sr. Geophysicist, Geomega, Boulder, CO

Optimization of pumping rates at municipal supply wells to minimize solute concentrations.

Methods are presented to analyze the relationship between pumping rate and solute concentration in four municipal supply wells (MSW). The solutes, sulfate and ammonia, result from historic industrial activities in the area that released a large volume of a Dense Aqueous Phase liquid (DAPL). Source areas of the solutes are believed to be remnants of the DAPL plume located in isolated bedrock depressions in the vicinity of the wells. The four MSW's are arranged in pairs and form two distinct capture zones with one well in each pair capturing the bulk of the impacted groundwater. Two methods are presented to analyze the association between pumping rate and concentration; cross-correlation of combined pumping rates with concentration using local regression, and polynomial surface fits of concentration as a function of pumping rates in the two wells of each pair. These analyses result in a series of concentration vs pumping rate curves to assist the operators of the water supply system in obtaining an adequate water supply for the community while minimizing the solute load requiring treatment. Also, the different responses in the two capture zones are used to constrain the location of possible source areas. This information is applied to groundwater flow and transport modeling and to plan additional assessment at the site.

Mr. Anthony Gojanovic

University of Colorado, Denver, CO

Simulating Survival Probabilities of a Lander Mission on Mars

Lockheed-Martin Company (LMCO) must design lander vehicles to survive their landings on the rock-strewn surface of the planet Mars. The failure of the Mars '98 lander, though for reasons other than the planet's surface, increased LMCO's attention to this problem. Given the basic structure of the lander and the characteristics of rocks that are likely to cover the planet's surface, what is the probability that the lander will survive its mission? Mathematics students during the Spring 2000 semester developed an algorithm to simulate this probability. We describe the components of this algorithm and propose a possible Monte Carlo Swindle to increase its efficiency.

Dr. Dennis Helsel

US Geological Survey, Englewood, CO

Booster Shots for Applied Statistics

Scientists who have taken one or two semesters of undergraduate statistics find themselves lost when, five to ten years later, they must remember how to effectively analyze their data. Basic questions such as "Have things changed?" or "Are these locations different?" are difficult to answer without a refresher course. I have taught successful refresher courses to environmental scientists for 14 years. I'll describe my approach, what has made these courses successful, and what that implies for undergraduate statistics education.

Dr. Snehalata Huzurbazar

University of Wyoming, Laramie, WY

Sampling to detect Bovine Viral Diarrhea Virus in Beef Herds

BVDV is a virus which affects cattle around the world. Vaccination against the virus makes detection of persistently infected animals problematic. In addition, only limited information can be obtained from beef herds, due to the nature of western ranching. Previous data are used to develop a predictive diagnostic classification rule and sample size requirements for classification of future observable herds are investigated.

Dr. Karen Kafadar

University of Colorado - Denver, Denver, CO

A two-dimensional robust nonlinear smoother for environmental data

We describe smoothing as an exploratory tool in data analysis, including an underlying model which motivates the need for smoothing, the goals and characteristics of good smoothers, and general classes of smoothers (linear and nonlinear). We also relate smoothing to the concepts of general fitting, parametric regression, and nonparametric regression, and focus on smoothing two-dimensional data sets such as those that occur with environmental data. To overcome the shortcomings in classical linear smoothers, we propose a nonlinear smoother and demonstrate its performance via simulation. Finally, we present an example using temperature trends at various monitoring stations across the United States.

Dr. William Navidi

Colorado School of Mines, Golden, CO

Case-Crossover Methods for Estimating Effects of Environmental Exposures

The case-crossover design is an epidemiologic study design in which only cases are sampled, and effects of exposure are estimated by comparing the exposure levels of the subjects at the times of their failures with levels at control times. The design provides considerable advantages, but in its classic form it has a weakness in that estimates can be confounded by time trends in exposure. This makes it difficult to apply to studies involving environmental exposures such as air pollutants, since these exposures typically exhibit strong time trends. We describe a case-crossover method in which exposures at failure are compared with exposures both before and after failure. This method produces risk estimates that are insensitive to time trends in exposure. By appropriately sampling control times, some control for unmeasured confounding can be achieved as well.

Registration

Colo-Wy 2001 Spring Meeting Registration

Name: _____

Affiliation: _____

Address: _____

Phone: _____

email: _____

Make checks payable to: Colo-Wyo Chapter of ASA

Pre-registration: (must be postmarked by **Monday, April 16th**)

\$7.00 for regular members

\$5.00 for students

Registration on the day of the meeting: \$8.00 for regular members and \$6.00 for students.

Send above information as well as payment to

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