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The Leonard J. Savage Award

Peter Hoff, Assistant Professor of Statistics and a core faculty member of the Center for Statistics and the Social Sciences, was presented with the Leonard J. Savage Award for his doctoral dissertation “Constrained Nonparametric Estimation via Mixtures.”

The Leonard J. Savage Award is awarded each year to two outstanding doctoral dissertations in Bayesian econometrics and statistics. One award is given to the best thesis in Theory and Methods and the other award is given to the best thesis in Application Methodology. The award is accompanied by a prize of $750. Each year dissertation supervisors are invited to nominate the completed work of their students and an appointed committee chooses the winner. The award has been given since 1977 and is currently co-sponsored by the International Society for Bayesian Analysis, the NBER-NSF Seminar in Bayesian Inference in Econometrics and Statistics, and the ASA Section on Bayesian Statistical Sciences.

Harold Gosnell Prize

University of Washington scholar, Kevin M. Quinn, of the Department of Political Science and the Center for Statistics and the Social Sciences at the University of Washington recently was awarded the 2001 Harold Gosnell Prize, given annually for the best work in political methodology presented at any political science conference in the preceding year. Quinn’s work (co-authored with Andrew Martin of Washington University at St. Louis), entitled “Bayesian Learning about Ideal Points of U.S. Supreme Court Justices, 1953-1999”, investigates whether U.S. supreme court justices have evolving or fixed policy preferences. It is widely thought by many scholars and analysts that most jurists have fairly consistent voting patterns over the course of their careers. But more recently there is evidence of some evolution of judicial preferences over time. Does this represent learning on the part of the justices, or does it simply reflect a changing judicial agenda? What Martin and Quinn accomplish is a path breaking analysis of whether these judicial policy preferences, known as “ideal points” in the scholarly literature, change over time, or whether the broader set of issues that jurists confront are changing. Using innovative statistical approaches, Martin and Quinn allow both the ideal points and the portfolio of issues to be decided to change over time. What they show is that even allowing for the dynamics of issue creation in the lower courts, contemporary justices do show strong evidence of substantial change in their policy preferences over time. Practically, we can’t assume that U.S. Supreme Court justices have opinions that are totally fixed and unchanging. Supreme Court appointees who are chosen for their known preferences frequently change those preferences quite dramatically once in office. By challenging this assumption and creatively solving the problem of whether it is the changing environment or changing opinions, Martin and Quinn have made a path breaking discovery that will change the way the U.S. Supreme Court is not only understood but also is studied in the future.

(Note) Harold Gosnell, who died at the age of 100 in 1997, was the first political scientist to incorporate quantitative, statistical analysis in his scholarship. Working in the 1920s to analyze voting and nonvoting in Chicago elections, he drew a representative sample of nonvoters which were interviewed and their responses statistically analyzed. His two classic studies are: Non-voting: Causes and methods of control (with Charles Merriam, University of Chicago Press, 1924) and Getting out the vote: An experiment in the stimulation of voting (The University of Chicago Press, 1927).
CSSS BLALOCK FELLOWSHIP —

Congratulations to Susan Shortreed and Jason Thomas on receiving the CSSS – Blalock Fellowship for graduate study in statistics and the social sciences. Susan is a graduate student in Statistics while Jason is a graduate student in Sociology. Susan entered the UW this year, having graduated from the University of Michigan. While there she worked on statistical methods for ensuring confidentiality in social science data at the Institute of Survey Research with Professor Trivellore Raghunathan. Jason entered the sociology graduate program this year and is a UW alum. He hopes to focus on quantitative methodology.

The award honors Hubert M. Blalock, Jr., known as “Tad,” who was a professor of sociology and statistics at the University of Washington. He had served also on the faculties of the University of Michigan, Yale University and the University of North Carolina. At the University of Washington he was President of the Faculty Senate and played a key role in the establishment of the statistics department in 1979. He also served as President of the American Sociological Association.

Having majored in math and physics in college, Blalock entered sociology equipped with more mathematical training than most sociologists of his day. His first book, Social Statistics, drew on this early background and melded it with applications in major substantive areas within sociology. The book became the premier textbook for graduate training in social statistics during this lifetime. It established his reputation as one of the pioneering quantitative methodologists who led sociology’s quantitative evolutions in the 1960s. He died in 1991.

Jason and Susan will each receive $2,500.
JOHN COPAS LECTURE SERIES

July 2001

Professor John Copas from the University of Warwick presented “Five Seminars on Selection Bias.” This free series attracted an interdisciplinary group from across campus. The seminar sponsor was CSSS and co-sponsored by Biostatistics, Statistics, Comparative Law & Society Studies Center and the Center for American Politics and Public Policy. Videotapes of the first four sessions are available for viewing from the CSSS, and all notes can be checked out from the Math Research Library, C-306 Padelford Hall.
INAUGURAL HIKE

September 2001
The Inaugural CSSS/Statistics Hike took place on Saturday, September 29 when Statistics and CSSS staff, students, faculty, family and friends met up to scale Kendall’s Katwalk in the Central Cascade Mountains. It was a glorious day for a hike with crisp fall air bathed in warm sun. Twelve hikers made their way up the 10.5-mile path to the Katwalk on a ridge (see below). The views were spectacular. The success of the hike suggests it will become a fixture in future years.

Some of those at the hike: Marloes Maathuis, Avery Ke, Maina Meila, Ted Welser, Adrian Raftery, Oliver Will, Matthew Stephens, Mark Handcock
ANNUAL POLITICAL METHODOLOGY MEETING TO BE HELD AT UW IN JULY 2002

On August 31 the Society for Political Methodology announced that the University of Washington has been selected to host the 19th Annual Political Methodology Summer Meeting. The meeting will be held on the main campus from July 18th to July 20th, 2002.

The Political Methodology Summer Meeting is a small, highly focused conference that is designed as a forum for the presentation, discussion, and evaluation of work at the methodological frontier of political science. Since the first meeting in the summer of 1984, the summer meeting has served as a test bed for the overwhelming majority of major contributions to quantitative methodology in political science.

Highlights of the meeting include a small number (usually about 15) of extremely high quality paper presentations dealing with cutting edge work in political methodology, two to three special topics lectures geared toward graduate training, and a special invited lecture given by someone outside the field of political science. At the 2002 meeting, CSSS director and Professor of Statistics and Sociology Adrian Raftery will give the invited lecture.

Two unique aspects of the summer meeting are its small size (about 125 attendees) and roughly equal representation of senior faculty, junior faculty, and graduate students. This has helped to make the summer meetings among the most intellectually stimulating and professionally valuable conferences for both faculty and graduate students.

Professors Michael Ward and Kevin Quinn are coordinating the 2002 meeting. Questions regarding the meeting can be sent to them directly at mdw@u.washington.edu or kmq@u.washington.edu. As more information about the 2002 meeting becomes available it will be placed on a website linked off the CSSS website (http://www.csss.washington.edu).

We sincerely hope that the 2002 meeting will be one of the most interdisciplinary meetings the Society for Political Methodology has organized, and we urge all members of the University of Washington community to attend and contribute to the meeting.
NEW BOOKS —

**DIVERGENT PATHS** by Mark S. Handcock & Martina Morris

The promise of upward mobility the notion that everyone has the chance to get ahead is one of this country’s most cherished ideals, a hallmark of the American Dream. But in today’s volatile labor market, the tradition of upward mobility for all may be a thing of the past. In a competitive world of deregulated markets and demanding shareholders, many firms that once offered the opportunity for advancement to workers have remade themselves as leaner enterprises with more flexible work forces. Divergent Paths examines the prospects for upward mobility of workers in this changed economic landscape. Based on an innovative comparison of the fortunes of two generations of young, white men over the course of their careers, Divergent Paths documents the divide between the upwardly mobile and the growing numbers of workers caught in the low-wage trap.

While many commentators dismiss public anxieties about job insecurity as overblown, Divergent Paths carefully documents hidden trends in today’s job market which confirm many of the public’s fears. Despite the celebrated job market of recent years, the authors show that the old labor market of the 1960s and 1970s propelled more workers up the earnings ladder than does today’s labor market. Divergent Paths concludes with a discussion of policy strategies, such as regional partnerships linking corporate, union, government, and community resources, which may help repair the career paths that once made upward mobility a realistic ambition for all American workers.

Coauthors are Annette Bernhardt, a Senior Research Associate at the Center on Wisconsin Strategy, University of Wisconsin, Madison and Marc A. Scott, Assistant Professor of Educational Statistics at the School of Education, New York University.


**STATISTICS IN THE 21ST CENTURY**

by Adrian Raftery

Exactly what is the state of the art in statistics as we move forward into the 21st century? What promises, what trends does its future hold? Through the reflections of 70 of the world’s leading statistical methodologists, researchers, theorists, and practitioners, *Statistics in the 21st Century* answers those questions.

Originally published in the *Journal of the American Statistical Association*, this collection of vignettes examines our statistical past, comments on our present, and speculates on our future. Although the coverage is broad and the topics diverse, it reveals the essential intellectual unity of the field as we see the same themes recurring in different contexts. We see how the development of statistics has been driven by the unprecedented and still growing range of applications, by the explosion in computer technology, and by the new types of data that continue to emerge and advance the discipline.

The book is published by Chapman and Hall.
Modeling Preferences in Two-Sided Markets
by Peter Hoff

A two-sided matching market involves two distinct groups of individuals, in which each individual in a group attempts to pair with a member of the opposite group. Examples include marriage markets, labor markets, and college admissions markets, to name a few. One game-theoretic model for pair formation in such cases is the so-called “marriage model,” as studied in Roth and Sotomayor (1990): Simply put, individuals have preferences for forming pairs with one another, and act according to these preferences. Of interest to many social scientists is the extent to which certain characteristics of individuals influence their desirability to others. For example, in the context of a marriage market, one may be interested in how the education level of a man or a woman affects their desirability as a marriage partner.

Opportunities Depend on Choices of Others: Consider Figure 1, which gives a scatterplot of education levels of married couples in a small hypothetical population. In the context of a matching market, the data do not represent independent draws from a joint probability distribution of men’s and women’s characteristics, nor conditional draws from one sex’s characteristics given the other’s. Instead, the marginal distributions of male and female characteristics are considered as fixed, and the plotted points are thought of as being highly dependent on one another and the preferences of all individuals in the system: Let the plotted circles labeled 1|1, 2|2, and 3|3 represent education characteristics of men 1 through 3 with women 1 through 3, respectively. If, for example, woman 1 and man 2 were to decide they preferred each other over their current matches, a new point would form in the location that preserves their individual education levels, as indicated by the shaded circle marked 2|1. The circles labeled 1|1 and 2|2 would disappear, leaving man 1 and woman 2 unattached. The figure shows one possible resolution of this situation in which woman 2 prefers man 3 to being single, and man 3 prefers woman 2 to woman 3. In this case, woman 2 joins with man 3 to form circle 3|2, and man 1 and woman 3 are unattached and are moved to the axes, indicated by circles 1|– and –|3. In this way, we see how the marginal distributions of characteristics can be considered as fixed, while the joint distribution characteristics depends in a complicated way on the preferences of all individuals within the system.

Modeling Preferences: Modeling preferences would be straightforward if the researcher observed each individual’s match and each individual’s opportunity set, the set of matchings an individual could have made, but preferred less than their observed match. Unfortunately, data is typically only gathered on matches, and not the context in which they were made. Modeling of
Figure 2: Estimated mean utilities for age; fixed education levels. Solid lines indicate utilities of 35 year olds, dashed of 65 year olds.

preferences without data on opportunity sets requires somewhat complicated and computer-intensive statistical techniques. One of the first attempts to model preferences in such a context was by Logan (1996), who introduced a “two-sided logit” model for opportunity and choice for a fixed set of occupational categories. More recently, Logan, Hoff, and Newton (2001, http://www.csss.washington.edu/Papers/wp15.pdf) developed a model-fitting strategy for more general two-sided matching markets. As an example data analysis, we modeled male and female preferences for age and education levels as depending on a potential partner’s absolute characteristic as well as the squared difference in characteristics: For example, looking just at age, we modeled woman i’s utility for man j as

$$\alpha_1 \text{age}_{\text{man } j} + \alpha_2 (\text{age}_{\text{man } j} - \text{age}_{\text{woman } i})^2.$$  

Interestingly, the results of our model fitting (as shown in Figure 2) indicate that on average men prefer marrying women of roughly equal age, while women on average prefer marrying men many years their senior. The observed average age difference between married couples in the population is explained by a compromise between these preferences, as well as depending on the supply of available men and women of different ages.

Opportunity, Choice, and Information Networks: One of the assumptions used in the above model fitting is that the system is stable, a state in which every individual prefers his or her match to all those matches available in their opportunity set. In the context of a marriage market, stability means, for example, that a woman prefers her own match over pairing with any man who prefers her to his match. Therefore, stability here means the matches are mutually voluntarily maintained, and not necessarily unchanging over time.

Implicit in the stability assumption is that everyone in the population has information about all potential matches. In the real world, this assumption is not typically met. For example, job openings may be advertised only within a company, social group, or geographic location. Similarly, men and women typically choose marriage partners from members of a relatively small social network. A more realistic modeling assumption may be local stability, which assumes individuals prefer their match over all matches in their opportunity set for which they have information. I have recently been studying the modeling and computational issues involved in this relaxation of assumptions, thanks to the support of a CSSS seed grant. Additionally, other researchers, such as Professor Katherine Stovel in Sociology, have been studying the effects of non-system-wide stability on the dynamics and efficiency of job markets.

The cited references and related research can be found in CSSS Working Paper no. 15, available for download at http://www.csss.washington.edu/Papers.
GRANTS  MODELING SOCIAL NETWORKS AND HIV TRANSMISSION—

Martina Morris and Mark Handcock have recently received a $2.3 million dollar 5 year grant from NIH (NIDA) to develop better methods for the statistical modeling of networks.

Over the past two decades, the epidemic of HIV has challenged the epidemiological community to rethink its paradigms for understanding the risk of disease transmission, both at the individual level, and at the level of population transmission dynamics. One of the hallmarks of this research effort has been the rapid convergence of opinion that the concept of a transmission network must play an important role in the development of any new paradigm. In its simplest form, the network perspective recognizes that people acquire infections from their partners. Thus, it is not only a person’s own behavior that puts them at risk, but the behavior of their partners, and more generally, the persons to whom they are indirectly connected by virtue being connected to their partner. In short, individual risk of infection is determined by position in the overall transmission network. Individual behavior plays a primary role in establishing this position, but does not exclusively determine it. What has also become clear is that network structure plays a critical role in the population dynamics of transmission as well - channeling, amplifying or impeding the spread of an infection through a population. At both the individual and the population level then, our ability to quantify the risk of transmission for HIV or other sexually transmitted or blood-borne infections, depends on our ability to measure and summarize the transmission network.

The recognition that networks play a central role in defining transmission risks has led to a range of new research, from innovative network data collection efforts to simulation studies of network-mediated disease transmission. In general, however, data collection has outpaced the development of methodology for data analysis and modeling. As a result, we lack a systematic framework that would enable us to fully exploit the detailed studies of high-risk sex and drug networks that have been collected. Initial steps have been taken in this direction, but to date there has been no general framework for estimating the range of epidemiologically relevant structural parameters from network data and using these estimates to directly drive simulations of dynamic networks with a circulating disease. For this, a statistical model is needed to act as a bridge between the raw data and the simulation model.

Morris and Handcock will be developing a general framework for linking network data to the analysis of HIV transmission based on a class of statistical random graph models that has recently been developed for social networks. These models offer particularly strong promise for HIV network modeling because they rely on a technique for estimation – Markov Chain Monte Carlo - that can also serve as the algorithm for simulation. This will, for the first time, make it possible to directly reproduce networks (in the simulation phase) with features observed from empirical data (from the estimation phase). We will take advantage of two unique data sets that focus on HIV spread through contact networks defined by sexual partnerships and needle sharing to guide this research. These will provide the empirical base for developing statistical methods for population level network modeling, and identifying the key network structures that influence the population dynamics of transmission in high risk networks. The results will help to orient interventions towards identifying individuals at risk and making a network less vulnerable to spread, and will specify the data needed to inform such efforts.

This project has also attracted two post-doctoral researchers to the CSSS to work within the social network group here. Steven Goodreau received his A.B. in Anthropology from Harvard University, and his doctorate in Anthropology at the Pennsylvania State University. He has a postdoctoral fellowship at the University of Washington’s Center for AIDS and STD Research (CFAR). James Holland Jones received his B.A. from New College and his Ph.D in Anthropology from Harvard University. He has a postdoctoral fellowship at the University of Washington’s Center for AIDS and STD Research (CFAR).
Example Sexual Network from Colorado Springs, Colorado

(components of size 5 and larger only)
STATISTICAL AND COGNITIVE WEATHER UNCERTAINTY $5M PROJECT KICKS OFF

How uncertain is the weather forecast? We all face this question in a simple way, for example when we wonder how likely it is to rain so that we can decide whether to bring an umbrella.

Aircraft pilots and ship captains also confront this question, but in a more acute and complex way. For them it involves, not just rain at one location, but uncertainty about temperature, precipitation, pressure and so on at a range of locations, heights and times in the future. Current ways of assessing and communicating these complex uncertainties are not good enough.

An interdisciplinary team of faculty from the Statistics, Sociology, Atmospheric Sciences and Psychology departments and the Applied Physics Laboratory (APL) has won a five-year $5 million grant, submitted through CSSS, to develop better ways of doing this. The Principal Investigator is Adrian Raftery, Professor of Statistics and Sociology, and CSSS Director. The funding comes from the Multidisciplinary University Research Initiative (MURI) of the Department of Defense.

The project team will develop statistical methods for assessing uncertainty, based on the Bayesian melding approach, originally developed by Raftery for whale populations and for environmental risk assessment. “We will develop much faster ways of implementing Bayesian melding, using ideas from spatial statistics,” said co-investigator Tilmann Gneiting, assistant professor of Statistics.

But there are human factors as well as statistical ones at work here. “Weather forecasting is an interesting challenge for cognitive psychology,” said Psychology Professor Earl Hunt, another co-investigator. “We will address the problem of how best to communicate uncertainty in the simplest terms to an undertrained forecaster who is already overwhelmed by a large volume of information,” added co-investigator Susan Joslyn, lecturer in Psychology.

The MURI project is unusual in bringing together statisticians, social scientists, physical scientists, engineers, and actively interested users from outside campus. It helps to realize the potential of CSSS by developing interdisciplinary research that involves social science in unexpected ways. The MURI kick-off meeting was held in August and was highly successful, bringing together all these different groups and providing a basis for the current active collaboration.
Oct. 3    Judea Pearl (Departments of Computer Science and Statistics, 
          UCLA) “Assessing Causal Quantities from Experimental and 
          Non-experimental Data”

Oct. 10   Pedro Domingos (Department of Computer Science and 
          Engineering) “Mining Social Networks from the Internet”

Oct. 17   Hyojoong Kim (Department of Sociology) “Bridging 
          Quantitative and Qualitative Approaches in the Study of 
          Democracy” (with Chang-Jin Kim)

Oct. 24   Richard L. Scheaffer (President of the American Statistical 
          Association) “The Past, Embracing the Present, & Charting the 
          Future”

          Reception following – C 14 Padelford

Oct. 31   Katherine Stovel (Department of Sociology) “Hearing About A 
          Job: A Labor Market Simulation” (with Peter Hoff, Department 
          of Statistics and CSSS)

Nov. 7    James Jones (Center for AIDS and STD) “Rethinking Strategies 
          for Estimating Demographic Parameters from Incomplete Data: 
          Applications to Anthropological Demography and 
          Conservation Biology”

Nov. 14   Babette Brumback (Department of Biostatistics) “The Intensity- 
          Score Approach to Adjusting for Confounding”

Nov. 21   Mark Handcock (Departments of Statistics and Sociology and 
          CSSS) “A Latent Curve Model for Longitudinal Data with 
          Application to Wage Inequality”

Nov. 28   Elaina Rose (Department of Economics) “The Determinants of 
          Union Status and Partner Choice”

Dec. 5    Carter Butts (Department of Social and Decision Sciences, 
          Data, and Some Thoughts on What to Do About It.”
CS&SS 321 Social Statistics Case-Based I (5) Handcock
Introduction to statistical reasoning for social scientists. Built around cases representing in-depth investigations into the nature and content of statistical and social-science principles and practice. Hands-on approach: weekly data-analysis laboratory. Fundamental statistical topics: measurement, exploratory data analysis, probabilistic concepts, distributions, assessment of statistical evidence. Offered: jointly with SOC/STAT 321; W.

CS&SS 504 Applied Regression (4) Raferty

CS&SS 506 Computer Environments for the Social Sciences (1) Handcock
Familiarizes graduate students in the social sciences with modern environments for statistical computing. Provides an overview of available resources and a description of fundamental tools used in quantitative courses and doctoral research. Topics include interfaces to Web-based resources, UNIX-based computing, and major statistical packages (SAS, SPSS, SPLUS, and STATA).

CS&SS 526 Structural Equation Models for the Social Sciences (3) Matsueda
Structural equation models for the social sciences, including specification, estimation, and testing. Topics include path analysis, confirmatory factor analysis, linear models with latent variables, MIMIC models, non-recursive models, models for nested data. Emphasizes applications to substantive problems in the social sciences. Prerequisite: SOC 424, SOC 426. Offered: jointly with SOC 529.

CS&SS 544 Event History Analysis of Social and Spatial Change (5) Withers
Examines life course research using event-history analysis with applications to the substantive areas of household dynamics, family formation and dissolution, marriage, cohabitation, and divorce, migration histories, residential mobility, and housing careers. Examines continuous- and discrete-time longitudinal models during practical laboratory sessions. Offered: jointly with GEOG 544.

CS&SS 560 Hierarchical Modeling for the Social Sciences (4) Quinn
Explores ways in which data are hierarchically organized, such as voters nested within electoral districts that are in turn nested within states. Provides a basic theoretical understanding and practical knowledge of models for clustered data and a set of tools to help make accurate inferences. Offered: jointly with POLS/STAT 560.

CS&SS 590 CSSS Seminar (1, max. 20) Warren
The Center for Statistics and Social Sciences will hold its open house on November 16th from 2 to 5 P.M in room C-14 Padelford Hall. The remodel of C wing on the lower level of Padelford Hall was part of the UIF award and reflects the cutting edge image of progress in statistics and social sciences.
NEW ADDRESS -
C 14 PADELDORD HALL
LOCATED ON THE LOWER LEVEL (LL)