# V e r e n i g i n g   v o o r   O r d i n a t i e   e n   C l a s s i f i c a t i e

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VOC-home page: http://www.voc.ac

## VOC Najaarsbijeenkomst

## 3 November 2006

## Pieter de la Court gebouw, Leiden

| | |
|---|---|
| 10.00 | Welcome with coffee |
| 10.30 | Geert Verbeke: *Predicting renal graft failure using multivariate longitudinal profiles.* |
| 11.30 | Reinoud Stoel: *To be, or not to be (on the boundary of the parameter space)* |
| 12.05 | Lunch |
| 13.15 | Ellen Hamaker: *Time series analysis in psychological research* |
| 13.50 | Cees Elzinga: *Metric representations of categorical time series* |
| 14.25 | Mark de Rooij: *Gravitational models for the analysis of change* |
| 15.00 | Tea |
| 15.30 | Paul van Geert: *Dynamic systems approaches to long-term change and development: principles, models and analysis of data* |
| 16.30 | Drinks |

**In dit nummer**:

### Aanmelden voor de Najaarsbijeenkomst:

Een ieder is van harte welkom op de Najaarsbijeenkomst. We organiseren een gezamenlijke lunch in het Pieter de la Court gebouw. Deelname aan deze lunch kost 10 euro, contant te voldoen bij Paul Arents, de penningmeester, tijdens de bijeenkomst. Graag ontvang ik uw aanmelding voor de bijeenkomst en/of lunch uiterlijk maandag 30 oktober via m.e.timmerman@rug.nl.

Marieke Timmerman

## Van de voorzitter

Vanaf deze plek wil ik onze nieuwe bestuursleden Laurence Frank en Michel van de Velden van harte welkom heten in het bestuur. Laurence is onlangs in Leiden gepromoveerd op feature network modellen en is werkzaam bij de Disciplinegroep M&T aan de Universiteit Utrecht. Michel van de Velden heeft Stef van Buuren als webmaster van de VOC opgevolgd. Michel is econometrist met een sterke achtergrond in correspondentie analyse. Ik ben er blij mee deze twee actieve leden in ons bestuur te hebben. De VOC zal hier zeker van profiteren.

De volgende VOC bijeenkomst vindt plaats op vrijdag 3 november in Leiden met als thema 'Veranderingen over de tijd'. De keynote sprekers zijn Paul van Geert (Rijksuniversiteit Groningen) en Geert Verbeke (Katholieke Universiteit Leuven). De overige sprekers zijn Cees Elzinga (Vrije Universiteit), Ellen Hamaker (Universiteit Utrecht), Reinoud Stoel (Universiteit van Amsterdam) en Mark de Rooij (Universiteit Leiden). Het programma kun je elders in deze nieuwsbrief vinden. Het ziet er mooi uit en ik moedig elk VOC-lid aan om te komen. Tot 3 november a.s. in Leiden!

Patrick Groenen, voorzitter VOC.

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## Abstracts voor de Najaarsbijeenkomst van de VOC

**Geert Verbeke (Biostatistical Centre, K.U.Leuven): Predicting renal graft failure using multivariate longitudinal profiles.**

In many medical studies repeatedly measured biomarker information is gathered together with a time to an event, e.g. occurrence of a disease. In such situations, the biomarker information serves as a health indicator representing the progression of the disease, and can therefore be used to predict the event of interest. The application motivating this presentation considers patients who received a kidney transplant and who are intensively monitored during the years after the transplant. The time intervals between subsequent clinic visits are different within and between the patients. The event of interest is graft failure from chronic rejection or recurrent disease within 10 years after the transplantation. Markers used to predict failure are serum creatinine, urine proteinuria, mean of systolic and diastolic blood pressure, and blood haematocrit level. Our aim is to construct a model that allows prediction of graft failure based on all available information, i.e., all repeated measurements of all 4 markers. Furthermore, it is of interest to investigate how the multivariate information outperforms the information in each marker separately, when it comes to predicting the event of interest.

The proposed approach starts from a linear, a generalised linear or a nonlinear mixed model for each of the markers separately. These models are then joined into one multivariate longitudinal model by specifying a joint distribution for all random effects. Due to the high number of markers, a pairwise model fitting approach, where all possible pairs of bivariate mixed models are fitted, is used. Afterwards, the fitted models are used in Bayes rule to obtain, at each point in time, the prognosis for long-term success.

*Geert Verbeke is professor of biostatistics at the Biostatistical Centre of the Katholieke Universiteit Leuven in Belgium. His research interests are in various aspects of models for longitudinal data, with particular emphasis on mixed models. He is Past President of the Belgian Region of the International Biometric Society, served as International Program Chair for the International Biometric Conference in Montreal (2006), and is currently Joint Editor of the Journal of the Royal Statistical Society, Series A (2005-2008). He served as Associate Editor for various statistical journals, including Biometrics and Applied Statistics.*

**Reinoud Stoel (University of Amsterdam): To be, or not to be (on the boundary of the parameter space)**

In this presentation, I will illustrate how the use of inequality constraints on parameters in structural equation models may affect the distribution of the likelihood ratio test (Stoel et. al, in press). Inequality constraints are implicitly used in the testing of commonly applied longitudinal structual equation models, like the autoregressive model, and the latent growth curve model, although this is not commonly acknowledged. Such constraints are the result of the null hypothesis in which the parameter value(s) are on the boundary of the admissible parameter space. For instance, this occurs in testing whether the variance of a growth parameter is significantly different from zero. It will be shown that in these cases the asymptotic distribution of the likelihood ratio (i.e. a chisquare-difference) cannot be treated as that of a central chisquare-distributed random variable with degrees of freedom equal to the number of constraints. The correct distribution for testing one or a few parameters at a time will be inferred, and I will describe the subsequent steps that one should take in order to obtain this distribution. Using the correct distribution may lead to appreciable greater statistical power.

Stoel, R.D., Galindo-Garre, F., Dolan, C., & Van den Wittenboer, G. (in press). *On the Likelihood Ratio test in structural equation modeling when parameters are subject to boundary constraints.* To appear in Psychological Methods.

*Reinoud Stoel is an Assistant Professor Methodology and Statistics at the University of Amsterdam, department of Educational Sciences. His PhD thesis (2003) is titled "Issues in growth curve modeling".*

**Ellen Hamaker (University of Utrecht): Time series analysis in psychological research**

Time series analysis (TSA) is a class of techniques that allows us to determine the lawfulness underlying the variability within a system over time. In psychological research "system" can refer to a set of variables observed in a single individual, but also to variables observed in a dyad (e.g., mother and child, client and therapist, spouses), or even a family.

Although TSA has been recognized as a potentially powerful tool for studying psychological processes at their core (i.e., within or between individuals), the applications in psychology are sparse and often of a metaphoric nature. There are several reasons for this lack of quantitative applications. First, most psychological researchers are unfamiliar with these techniques as TSA is not taught as one of the basic tools in social sciences. Second, there are many diverse techniques developed in different areas, which makes it difficult to decide what technique is needed and to what extent the techniques overlap. Third, the software needed to implement these techniques is rarely part of the standard software packages used in the social sciences.

I discuss several empirical applications of TSA in psychology which illustrate the strength of TSA as a means to study psychological processes. From these examples it becomes clear that TSA allows us to test hypotheses that can not be investigated using our standard nomothetic techniques. In addition I discuss the possibility of using idiographic results obtained with TSA to build on nomothetic knowledge.

*Ellen Hamaker is an Assistant Professor Methodology and Statistics at the University of Utrecht. After having obtained her PhD degree (2004, "Time series analysis and the individual as the unit of psychological research") she worked as a Postdoc in Quantitative Psychology at the University of Virginia for a year. In 2005, she obtained a Veni grant of NWO.*

**Cees H. Elzinga (Free University): Metric representations of categorical time series**

This contribution considers sequence analysis as the problem of constructing metric representations of categorical time series. It is argued that the fundamental problem of sequence analysis is to construct metrics and similarity measures pertaining to attributes of pairs of sequences, such that these attributes are meaningful within the context of substantive social science theories. Four classes of alternatives to Optimal Matching are presented, algorithms are provided and pertaining geometries are discussed. These alternatives preserve attributes that are meaningful and relevant in a wide diversity of substantive applications. The classes of models are extended, and algorithms adapted, to handle duration in two different ways. Examples and illustrations will be taken from demography.

*Cees Elzinga obtained his Ph.D. in psychology at Radboud University Nijmegen. He published on color vision models and measurement theory during the eighties in Vision Research, Journal of Mathematical Psychology and the Journal of the Optical Society of America. From 1985 on, he held sales and general management positions in various international companies in quite different markets and returned to academia in 2002 as an assistant professor in the Dept. of Social Research Methods of the Faculty of Social Sciences of the Vrije Universiteit in Amsterdam. Since then, he published on representations of categorical time series and on latent Markov chains in Journal of Classification and in Sociological Methods & Research.*

**Mark de Rooij (Leiden University): Gravitational models for the analysis of change**

Newton's law of gravity states that the force between two objects in the universe is equal to the product of the masses of the two objects divided by the square of the distance between the two objects. It will be shown that this law is very well applicable to the analysis of longitudinal categorical data where the number of people changing their behavior/choice from one category to another is a measure of force and the goal is to obtain estimates of mass for the two categories and an estimate of the distance between them. In order to provide a better description of the data dynamic masses and dynamic positions will be introduced. After laying out the basic idea, relationships with other models, identification issues, generalizations to three time points and some problems will be discussed.

*Mark de Rooij is Assistant Professor at the Department of Methodology and Statistics for Psychological Research. The subject of his research is longitudinal categorical data analysis, in particular visualisation techniques for such data based on the multidimensional scaling family. For more information see www.leidenuniv.nl/fsw/mderooij.*

**Paul van Geert (University of Groningen): Dynamic systems approaches to long-term change and development: principles, models and analysis of data**

A dynamic system can be defined as 'a means of describing how one state develops into another state over the course of time' (Weisstein, 1999). Such a dynamic system must be studied as a process over time occurring in an "individual" (i.e. the unit of analysis, which includes individual persons, but also groups, as in group dynamics). The system can be described in the form of a characteristic equation, namely $y_{t+1} = f(y_t)$. If recursively applied, the system results in the description of a time evolution, namely a series of time steps at t, t+1, t+2 and so forth (in the limit also applying to infinitesimal steps). The function $f$ specifies the evolution rule or dynamic rule, as it applies to a particular "individual".

The goal of a dynamic systems approach to long-term change and development is to specify the form of *f*, given a set of available state data and a theory or conceptual frame suggesting an explanation for how one state develops into another one. In principle, the data should preferably be time-serial, but in some cases also cross-sectional data can provide qualitative indicators ("flags") for some underlying dynamics. In the context of human development or long-term behavioral change, as in clinical-psychological intervention, the study of dynamic systems poses particular problems. These problems are related to the complexity of the phenomena under study on the one hand and to the problems of data collection on the other hand. Data collection problems refer, among others, to the nature of the data. First, these data are the result of short-term dynamics, for instance the dynamics of test-administration, or the person-context dynamics during an observational study. Second, these data are often difficult to collect, and processes must thus be reconstructed on the basis of relatively small time-series, for instance.

Although I believe that, one day or another, social and behavioral scientists will have to complement their (multi-)variate approaches with a dynamic systems approach in order to attain satisfactory descriptive and explanatory adequacy, the problems with the application of a dynamic systems approach to development and long-term change are still gigantic. I will present some examples of research carried out in the Groningen Developmental Research Program in an attempt to demonstrate how the dynamic systems approach may be applied to the peculiar kind of data that is characteristic of many areas of developmental and change studies.

*Paul van Geert (1950) studied Psychology and Educational Sciences at the University of Ghent, Belgium, with a dissertation on "Language development in the light of cognition and perception" (1975). In 1976 he became lecturer at the University of Groningen and was appointed professor of developmental psychology in 1985. In 1978-1979 he was a fellow at NIAS, in a project group consisting, among others, of J. Bruner, M. Bowerman and D. Olson. In 1992-1993, he was awarded a fellowship at the Center for Advanced Studies in the Behavioral Sciences, Stanford, California. He has been visiting professor at the Universities of Paris and Turin and has a long-standing close collaboration with the Harvard Graduate School in Educational Sciences. In 1998-2000, he acted as scientific coordinator, with Jacques Lautrey and Bernard Mazoyer, of the Program on Invariants and Variability in the Cognitive Sciences, as part of the Action Concertée Cognitique, financed by the French Ministry of Scientific Research. Since 2002 he has been a lecturer at the Summer Institute on Mind, Brain and Education at Harvard University. Paul van Geert's major interest lies in the further elaboration of dynamic systems models of development in general. His current work encompasses three complementary approaches to the application of dynamic systems to development, namely mathematical model building, empirical research on developmental processes and the*

*development of statistical simulation methods. Van Geert's empirical research is focused on longitudinal studies in childhood and covers various fields: cognitive change, language and social and socio-cognitive development, with a special focus on (intra-)individual variability and its relation with the underlying dynamics of development. Although this research is primarily of a fundamental nature, there is a recent shift towards applied research settings, namely educational contexts, where the theoretical problems of understanding the dynamics are directly related to the practical and applied problems of managing and guiding these dynamics.*

## Boekbespreking

### All of Statistics: A Concise Course. L. Wasserman. Springer, 2004.

Of course, the title of this book can not be true, if only because the same author has published the book "All of Non-parametric Statistics" shortly after this one. But the goal is clear: to give a broad overview of modern statistics, including fashionable tools like wavelets, MCMC and support vector machines. It is remarkable how much material is covered. To achieve his goal, the author uses a terse style with short descriptions and many formulas. Discussion of the literature is limited to brief remarks at the end of each chapter, pointing mainly to other books. A few data sets are analyzed and the results are discussed only briefly. Each chapter ends with a number of exercises, without answers.

The author states as his goal to deliver a book that can be used in many disciplines to learn the essentials of modern statistics quickly. In my opinion this goal has been reached. The explanations are clear. A remarkably large number of modern subjects is being treated. I list them up to give the reader an impression: bootstrap, causal inference, graphical models, non-prametric curve estimation, wavelets, support vector machines, Bayesian inference with Monte Carlo Markov chains. See the table of contents on the website (ww.stat.cmu.edu/~larry/all-of-statistics). Data and scripts can also be obtained from the website. Unfortunately the scripts are undocumented. Some scripts are for R, others for S.

I'm rather sensitive to the appearance of a book: whether it looks nice and has an appealing typography. In that respect this book is disappointing. Typesetting was done in the by now old-fashioned Computer Modern fonts of LaTeX. Boxes in the text are drawn with very thick lines. The color of the cover is "shocking fuchsia". Apparently the author is very fond of this color: it also appears prominently on his website. Yet it seems that it could have been worse: on the same website the original design of the cover is shown, having the title in all colors of the rainbow. Some authors really have to be protected against themselves …

Anyway, this is as a book that I can recommend. I'm not alone, as can be seen from the following announcement (CMU): -- Statistics Professor Larry

Wasserman has won the 2006 DeGroot Prize for his textbook "All of Statistics." The prize is awarded every two years by the International Society for Bayesian Analysis for "textbooks or monographs concerned with fundamental issues of statistical inference, decision theory and/or statistical applications." Recipients are chosen "based on their novelty, thoroughness, timeliness and importance of their intellectual scope." --

Paul Eilers

**De VOC neemt afscheid van de volgende leden**

Teije Euverman

## Personalia

Op 2 november 2006 houdt **Cajo ter Braak** in de Wageningse aula zijn inaugurele rede als persoonlijk hoogleraar in de multivariate statistiek voor de levenswetenschappen. De titel van de rede luidt: De zoektocht van complexiteit naar eenvoud. Betere multivariate statistiek voor de levenswetenschappen.

**Hilde Tobi** is met ingang van 1/9/2006 benoemd als universitair hoofddocent bij de Research Methodology Group van Wageningen University & Research.

## Agenda

January 02 – 06. **Cochin, India**. Joint Statistical Meeting and International Conference on Statistics, Probability and Related Areas. www.stat.ohio-state.edu/~hnn/IISAConf2007.pdf

January 12 – 13. **Gainesville, Florida, USA**. University of Florida Ninth Annual Winter Workshop: Emerging Methods in Environmental Statistics. www.stat.ufl.edu/symposium

January 16 – 18. **Honolulu, Hawaii**. Hawaii International Conference on Statistics, Mathematics and Related Fields. www.hicstatistics.org

January 23 – 25. **Eilat, Israel**. The fourth meeting of the Eastern Mediterranean Region of the International Biometric Society (EMR-IBS). www.congress.co.il/emr-ibs2007

March 07 – 09. **Freiburg, Germany**. The 31st Annual Conference of the German Classification Society (GfKl) on Data Analysis, Machine Learning, and Applications. http://www.informatik.uni-freiburg.de/gfkl/

March 25 – 29. **Maresias, Brazil**. Third Brazilian Conference on Statistical Modelling in Insurance and Finance. http://www.ime.usp.br/~ubatuba/3rd/

March 27 – 30. **Bielefeld, Germany**. Statistik unter einem Dach / Statistics under one roof. www.statistik2007.de

April 26 – 28. **Minneapolis, Minnesota, USA**. 2007 SIAM International Conference on Data Mining. www.siam.org/meetings/sdm07/

May 17 – 19. **Columbus, Ohio, USA**. United States Conference on Teaching Statistics (USCOTS 07). causeweb.org/uscots

May 29 - June 01. **Chania, Crete, Greece**. 12th International Conference on Applied Stochastic Models and Data Analysis (ASMDA 2007). http://www.asmda.com

June 18 – 21. **Montréal, Québec, Canada**. The Third International Conference on Establishment Surveys (ICES-III). http://www.amstat.org/meetings/ices/2007

June 19 – 21. **Seattle, USA**. The International Environmetrics Society North American Regional Meeting. http://www.stat.washington.edu/peter/TIES%20NA07.html

June 25 – 27. **Rotterdam, The Netherlands**. CARME-2007: Correspondence Analysis and Related Methods. http://www.carme-n.org/carme2007/

July 09 – 11. **Vienna, Austria**. 5th International Conference on Multiple Comparison Procedures. www.mcp-conference.org

July 09 – 13. **Tokyo, Japan**. IMPS 2007, the 15th International and 72nd Annual Meeting of the Psychometric Society. http://www.ech.co.jp/imps2007/

July 12 – 14. **Johnson City, Tennessee, USA**. Sixth International Conference on Lattice Path Combinatorics and Applications. www.etsu.edu/math/godbole/lattice/index.htm

July 29 - August 02. **Alexandroupoli, Greece**. The 28th Annual Conference of the International Society for Clinical Biostatistics (ISCB 28). www.iscb2007.gr

July 29 - August 02. **Salt Lake City, Utah, USA**. 2007 Joint Statistical Meetings. www.amstat.org/meetings/

August 05 – 11. **Urbana-Champaign, Illinois, USA**. 32nd Conference on Stochastic Processes and their Applications. http://www.math.uiuc.edu/SPA07/

August 16 – 20. **Mikulov, Czech Republic**. The annual meeting of the International Environmetrics Society (TIES). http://www.math.muni.cz/ties2007/

August 22 – 29. **Lisboa, Portugal**. International Statistical Institute 56th Biennial Session in Lisboa. www.cbs.nl/isi/

August 30 - September 01. **Aveiro, Portugal**. International Conference on Statistics for Data Mining, Learning and Knowledge Extraction. http://www.iasc-isi.org, http://www.ua.pt/iasc2007 (forthcoming)

September 05 – 07. **Paris, France**. SFC 2007: XIVe Rencontre de la Société francophone de classification. http://www.enst.fr/SFC2007

October 31 - November 03. **Memphis, Tennessee, USA**. Design and Analysis of Experiments (DAE2007). http://www.msci.memphis.edu/DAE2007/

## Publicaties en rapporten

Bollaerts, K., Eilers, P.H.C., & Aerts, M. (2006). Quantile regression with monotonicity restrictions using P-splines and the L1-norm. *Statistical Modelling, 6,* 189-207.

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# Routebeschrijving

De VOC Najaarsbijeenkomst gaat door in Zaal CH05 van het tijdelijke gebouw dat "het chalet" wordt genoemd. Dit tijdelijke gebouw bereik je door uit het Pieter de la Court gebouw over het parkeerterrein te lopen.
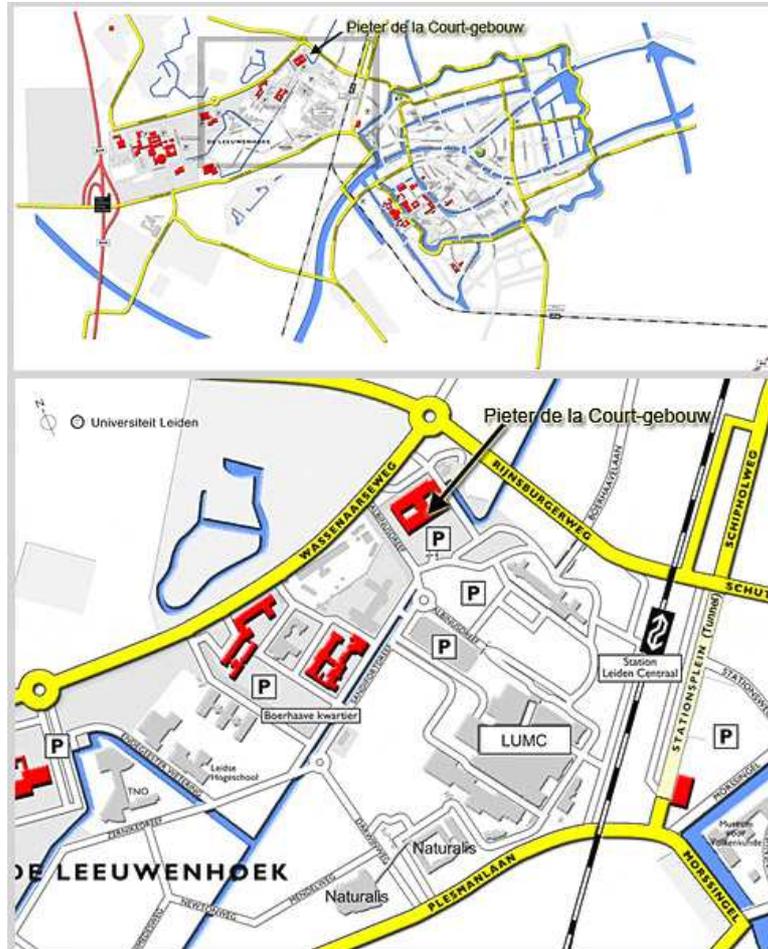


**Per auto**

1. Route vanaf de A44:
   U verlaat de A44 bij afslag 8 (deze afslag heet Leiden-Valkenburg-Katwijk-Noordwijk vanuit de richting Den Haag en vanuit de richting Amsterdam heet deze Leiden-Utrecht) en rijdt richting Leiden centrum/Naturalis over de Plesmanlaan.

2. Route vanaf de A4:
   U verlaat de A4 bij afslag 7 (Zoeterwoude dorp) en volgt dan de N206 richting Katwijk. Aangekomen bij de Plesmanlaan slaat u rechtsaf richting Leiden Centrum/Naturalis.

   Op de Plesmanlaan neemt u de eerste mogelijkheid om linksaf te slaan, u rijdt dan over de Einsteinweg. Deze volgt u tot aan de rotonde, waar u rechtsaf de Max Planckweg oprijdt. Deze volgt u tot aan de Wassenaarseweg, die u rechtsaf inslaat. Rij door tot het Pieter de la Court gebouw van de Faculteit der Sociale Wetenschappen (groot vierkant geel gebouw langs de Wassenaarseweg (postcode 2333 AK), vlak voor Restaurant De Posthof en de rotonde van de Rijnsburgerweg). De ingang tot het parkeerterrein vindt u rechtsom het gebouw.

**Per trein**
Kom je met de trein, dan moet je de achteruitgang van het centraal station nemen om op het terrein van het Academisch Ziekenhuis Leiden te komen. In de verte kun je het gele Pieter de la Court gebouw al zien liggen.