



**DUTCH NETWORK ON THE  
MATHEMATICS OF  
OPERATIONS RESEARCH  
(LNMB)**

**MASTER AND PhD PROGRAMME IN  
OPERATIONS RESEARCH**

**Information Guide 2011/2012**

**June 2011**

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## Preface

The education programme of the LNMB provides high quality teaching in the broad field of interest in the mathematics of operations research, including new interesting areas. The programme consists of 25 courses for Master and PhD students. This year seven Master courses and nine PhD courses are scheduled (the PhD courses have a cycle of two years). It is allowed that Master students attend PhD courses and, vice versa, that PhD students attend Master courses. The lectures are taught in the Uithof buildings of the Utrecht University.

The education programme for the academic year 2011/2012 consists of the following courses.

### *Master courses:*

Fall 2011:

- Introduction to Stochastic Processes;
- Continuous Optimization;
- Discrete Optimization;
- Heuristic Methods in Operations Research.

Spring 2012:

- Advanced linear programming;
- Scheduling;
- Queueing theory.

### *PhD courses:*

Trimester 1:

- Stochastic Models for Telecommunication Systems;
- Randomized Algorithms.
- Combinatorial Optimization 2a;

Trimester 2:

- Combinatorial Optimization 2b;
- Noncooperative games;
- Markov Decision Processes.

Trimester 3:

- Operations Research and Health Care;
- Advanced Queueing Theory;
- OR Games.

Besides information about the LNMB courses, this guide contains:

- Organizational and administrative affairs;
- Information about the operations research groups at the Dutch universities;
- Lists of members, PhD students and alumni.

The information is also available via the LNMB website [www.lnmb.nl](http://www.lnmb.nl)

In addition to the courses, the LNMB organizes the 37<sup>th</sup> Lunteren Conference on the Mathematics of Operations Research. This conference will be held 17 - 19<sup>th</sup> January 2012.

The LNMB gladly acknowledges the financial support by the universities. This enables the LNMB to continue its activities.

Johann Hurink,  
Scientific director LNMB  
June, 2011



## 1. Dutch Network on the Mathematics of Operations Research (LNMB)

The Dutch Network on the Mathematics of Operations Research (in Dutch: Landelijk Netwerk Mathematische Besliskunde; abbreviated LNMB) is an interuniversity co-operation in which all Dutch universities and the Centre for Mathematics and Computer Science (CWI) in Amsterdam participate. The LNMB has been established in July 1987. From 1987 until 2001 the University of Groningen was its administrator, from 2002 until 2006 the University of Maastricht, and from January 2007 the University of Twente acts as administrator of the LNMB.

The tasks of the LNMB are twofold. Firstly, the LNMB offers courses for PhD and Master students, and is responsible for the annual Lunteren Conference on the Mathematics of Operations Research. Secondly, the LNMB is an organization of full and associate professors in the field of Operations Research. The universities and the CWI are represented in the General Board out of whom an Executive Board is chosen.

The LNMB has 113 members and 165 PhD students. The LNMB courses are also accessible, on payment, to other interested people. An independent judgment by NWO (Netherlands Organization for Scientific Research) has proven that the LNMB graduate education programme is of a high international standard.

## 2. PhD courses and diploma requirements (general information)

The programme of the LNMB PhD courses consists of a biennial cycle and in each cycle 18 courses are offered. The subjects of the courses are in the following areas: Combinatorial Optimization, Stochastic Operations Research, Mathematical Programming, Game Theory and Applications of OR.

The programme is flexible in the sense that new PhD students can start with their programme at the beginning of any trimester. Furthermore, the individual programmes can vary; each student can choose his or her own parts of the education programme. In each trimester a combination of various subjects is taught. In general one can follow each of the courses without any prerequisites of the other courses. The courses take place on Monday in Utrecht.

The courses are intended for PhD students in Operations Research. However, Master students in mathematics, econometrics or computer science who acquired enough prerequisites are also welcome. Further information can be obtained from the director of the LNMB or from the lecturers of the courses. Furthermore, government and/or business employees who want to follow a course may participate. Participants are expected to make exercises (homework) during or at the end of the course to show that they have understood the contents of the course. The credits (including for the attendance of the course) for participants who have passed the exercises successfully have been set at 4 EC per course. In case the courses are only attended (or when the exercises are not passed successfully), the workload is set at 1 EC. At the end of each course the participants receive a certificate with the grade and the credits involved.

The following regulation holds for the course fee. Participants from the departments of the Dutch universities which finance the LNMB don't pay any course fee. Other participants pay for each course a fee of 500 euro. The director of the LNMB is authorized to grant a reduction of this fee at occurring situations.

Application to a LNMB PhD course can be done by filling in the online application form available at the website <http://www.lnmb.nl/pages/courses/>. PhD students who participate for the first time in LNMB courses, also have to fill in the form for New PhD Students, which also can be found on the mentioned website.

In addition to the courses, the PhD programme includes the Lunteren Conference on the Mathematics of Operations Research. During this conference prominent - usually foreign - researchers lecture on special topics or on recent research. PhD students can give a so-called PhD presentation. In such a presentation one can present his or her research results. Attendance in the Lunteren Conference is credited by 1 EC.

PhD students who have sufficiently participated in the LNMB PhD programme and have given a PhD presentation will receive a diploma. Here, 'sufficiently' means total credits of 25 EC. Under certain circumstances the supervisor may submit a motivated request to give the diploma to a PhD student although he or she did not meet the requirement of the PhD presentation. After consultation with the director, it is possible that credit points from a related PhD network also count as credit points for the LNMB diploma.

### 3. Master courses (general information)

From September 2004, the LNMB provides Master courses in Operations Research. These courses are intended for Master students in Mathematics or Econometrics who want to take one or more courses in Operations Research. Usually, the Master thesis adviser will propose or decide that a student will participate in LNMB Master courses.

Due to the small number of Master students in Operations Research at each individual university, a national concentration is efficient and can help to guarantee a qualitatively high education. This is the main purpose of the LNMB Master courses. An additional advantage for the students is the contact with professors and students from other universities. The LNMB Master courses are part of the Dutch Master Programme in Mathematics, which is a coordinated programme of the Departments of Mathematics of the Dutch universities.

In each semester (Fall and Spring) three or four LNMB Master courses are given. The subjects of the courses are taken from the following areas: Mathematical Programming, Combinatorial Optimization and Stochastic Operations Research. The programme is flexible in the sense that new Master students can start with their programme at the beginning of any semester. Furthermore, the individual programmes can vary; each student can choose his or her own courses. The courses take place on Monday in Utrecht.

Although the courses are intended for Master students, PhD students are also welcome. It is up to their thesis adviser to propose or decide that a PhD student will attend such a course. Further information can be obtained from the director of the LNMB.

The students are subjected to an examination that usually will consist of making exercises during the course and also a written or oral examination. The credits for participants who have passed the examination successfully have been set by the LNMB at **6 EC** per course. A final decision about the credits and the grade is formally up to the university of the student.

The organisational part of the Master courses is done by the Dutch Master's Degree Programme in Mathematics (Mastermath). Therefore, Master- as well as PhD-students have to register for the Master courses of the LNMB via the website of Mastermath (<http://www.mastermath.nl/>). Mastermath distributes the results of the Master students to the corresponding universities and the PhD students get a certificate via LNMB.



## 4. PhD courses 2011/2012

During the academic year 2011/2012 nine courses will be taught in three trimesters; each trimester has a duration of nine weeks.

Trimester 1 (September 12 – November 7):

- SMTS (Stochastic Models for Telecommunication Systems)
- RA (Randomized Algorithms)
- CO2a (Combinatorial Optimization 2a)\*

Trimester 2 (November 14 – December 12 & January 23 – February 13):

- CO2b (Combinatorial Optimization 2b)\*
- NCG (Noncooperative games)
- MDP (Markov Decision Processes)

Trimester 3 (February 20 – April 2, April 16 and 23):

- ORHC (Operations Research and Health Care)
- AQT (Advanced Queueing Theory)
- ORG (OR-Games)

\* The courses Combinatorial Optimization 2a and 2b can be followed without knowledge of the courses Combinatorial Optimization 1a and 1b.

The courses are given on Monday according to the following schedule:

	<i>Trimester 1</i>	<i>Trimester 2</i>	<i>Trimester 3</i>
10.15 - 11.00	Course SMTS	Course CO2b*	Course ORHC
11.15 - 12.00	Course SMTS	Course CO2b*	Course ORHC
12.00 - 13.00	Lunch break	Lunch break	Lunch break
13.00 - 13.45	Course RA*	Course NCG	Course AQT
14.00 - 14.45	Course RA*	Course NCG	Course AQT
15.00 - 15.45	Course CO2a*	Course MDP	Course ORG
16.00 - 16.45	Course CO2a*	Course MDP	Course ORG

\* = in cooperation with DIAMANT

### *Location*

The courses are given in the Uithof (buildings of the Utrecht University), in the Mathematical Building, Room 611AB, Budapestlaan, Utrecht.

### *Credits*

The credits (including for the attendance of the course) for participants who have passed the exercises successfully are **4 EC** per course. In case the courses are only attended (or when the exercises are not passed successfully), then the workload is set at **1 EC**. At the end of each course the participants receive a *certificate* with the grade and the credits involved.

### *Registration*

Anyone interested in these courses is invited to fill in the online registration form on the webpage of the LNMB (<http://www.lnmb.nl/pages/courses/phdcourses/>). For each of the three trimesters a separate form is given. If you are a new PhD student, please also fill in the 'Form for New PhD students' on that webpage.

## **Course SMTS: “Stochastic Models for Telecommunication Systems”**

*Time* : Monday 10.15 – 12.00 (September 12 – November 7).

*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturers*: Prof.dr. R.D. van der Mei (CWI & VU) and Prof.dr. M.R.H. Mandjes (UvA)

### *Course description:*

The course consists of two synergistic parts.

Part I: stochastic models for telecommunication systems at the packet/burst level

Part II: stochastic models for telecommunication systems at the call/flow level.

#### *Part I:*

At the packet/burst level performance aspects of telecommunication networks can be modeled well by using fluid systems - think of packet delays and loss in the buffers of an IP (Internet protocol) based network. Part I of the course treats these fluid models, focusing on single-node queues. The most

prominent subjects are: (1) the M/D/1 queue; (2) the /D/1 queue fed by periodic sources; (3) the Anick-Mitra-Sondhi model; (4) general Markov-fluid driven queues; (5) exponential decay of the overflow probability; (6) effective bandwidth; (7) reduction of fluid models to the call level, to enable the application of the results of Part II.

*Part II:*

Call/flow-level models are used for dimensioning and planning of communication networks. Performance measures of interest are e.g. call blocking probabilities, flow throughputs and file transfer- or document download times.

In part II the following subjects are treated:

- (1) traffic modelling at the call level, and traffic measurements in operational networks;
- (2) performance models for streaming traffic (speech, video), such as the Erlang and Engset models, multi-rate models, call admission policies like trunk reservation, loss networks, etc.;
- (3) performance models for elastic traffic (data), such as the processor-sharing queueing model;
- (4) flow level models for performance evaluation and optimization of Wireless LANs, UMTS/HSDPA and wireless ad-hoc networks;
- (5) "Quality-of-Service aware" dimensioning of data networks.

*Literature:*

Lecture notes will be provided.

*Prerequisites*

Basic knowledge of probability at the level: S.M. Ross, Introduction to probability models, 8th edition, Academic Press, 2003 (chapters 1-3).

*Examination:*

Take home problems.

*Addresses of the lecturers:*

Prof.dr. R.D. van der Mei  
CWI, P.O. Box 94079, 1090 GB Amsterdam.  
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Prof.dr. M.R.H. Mandjes  
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Phone: 0 20 - 5255164                      E-mail: [m.r.h.mandjes@uva.nl](mailto:m.r.h.mandjes@uva.nl)

## **Course RA: Randomized Algorithms**

*Time* : Monday 13.00 – 14.45 (September 12 – November 7).

*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturers*: Dr. R.A. Sitters (VU) and Prof.dr. L. Stougie (VU).

*Course description:*

The topics are:

- Randomized complexity classes; Yao's minimax principle; Application of probabilistic bounding techniques.
- The probabilistic method; Derandomization; Random walks; Randomized LP algorithms; On-line algorithms.
- Randomization in geometric problems

*Literature*

R. Motwani and P. Raghavan: Randomized Algorithms, Cambridge University Press, New York, 1995, ISBN 0-521-47465-5. The participants are assumed to have this book at their disposal by buying or lending (e.g. from the university library) the book.

*Prerequisites*

Elementary knowledge of probability theory.

*Examination:*

Take home problems.

*Address of the lecturers:*

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Phone: 020 - 5989391 E-mail: [lstougie@feweb.vu.nl](mailto:lstougie@feweb.vu.nl)

## Course CO2a: Combinatorial Optimization 2a

*Time* : Monday 15.00 – 16.45 (September 12 – November 7).  
*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).  
*Lecturer*: Prof.dr. G.J. Woeginger (TU/e)

### *Course description:*

Combinatorial optimization is the investigation of design and planning problems in which discrete decisions must be made. The field originated in the 1950s with the work of Dantzig et al and Gomory on integer linear programming formulations for routing, scheduling and cutting stock problems. Other applications occur, e.g. in facility location, network and circuit design, and biomolecular systems. The course gives an introduction into NP-hardness, and discusses approaches for dealing with NP-hard problems, like: approximation techniques; local search; probabilistic analysis; fixed parameterized tractability; exact algorithms.

### *Literature:*

- C.H. Papadimitriou, K. Steiglitz, Combinatorial Optimization: Algorithms and Complexity, Dover, 1998.
- In addition, some papers will be provided.

### *Prerequisites*

- Knowledge of basic linear algebra.
- Knowledge of network flow, linear programming and duality as, e.g., in V. Chvatal, Linear Programming, Freeman, 1983.

### *Examination:*

Take-home problems.

### *Address of the lecturer:*

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Dept. of Mathematics & Computer Science, Eindhoven University of Technology  
P.O. Box 513, 5600 MB Eindhoven  
Phone: 040 – 2472415 E-mail: [gwoegi@win.tue.nl](mailto:gwoegi@win.tue.nl) URL : [www.win.tue.nl/~gwoegi](http://www.win.tue.nl/~gwoegi)

## Course CO2b: “Combinatorial Optimization 2b”

*Time* : Monday 10.15 – 12.00 (November 14 – December 12 & January 23 – February 13).  
*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).  
*Lecturer*: Dr. F. Vallentin (TUD)

### *Course description:*

The vast majority of problems in combinatorial optimization can be formulated as an integer linear program (ILP): Maximize or minimize a linear objective function subject to linear constraints and the additional restriction that the decision variables can take only integer values (typically only 0/1). This makes ILPs a perfect tool for formulating problems in combinatorial optimization; many software packages are available for this. The drawback is that solving ILPs is generally a computationally demanding task; it is NP-hard. Nevertheless, in practice, also these problems have to be solved. In this part of the course we focus on techniques for solving ILPs.

The following topics will be treated:

- the expressive power of ILPs in combinatorial optimization
- geometry of integer linear programs: the interplay of polyhedra and lattices
- easy and difficult ILPs
- geometric techniques based on cutting planes
- algebraic techniques based on lattice basis reduction

### *Literature:*

- B. Korte, J. Vygen, Combinatorial Optimization, Theory and Algorithms, Springer 2008 (available online via springerlink)
- A. Schrijver, Theory of Linear and Integer Programming, J. Wiley and Sons Ltd., Chichester, 1986.

*Prerequisites*

- Knowledge of linear algebra.

*Examination:*

Take home problems.

*Address of the lecturer:*

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**Course NCG: “Noncooperative games”**

*Time* : Monday 13.00 – 14.45 (November 14 - December 12 & January 23 – February 13).

*Location:* Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturer:* Dr. F. Thuijsman (UM)

*Course description:*

The course will focus on noncooperative games, one-shot as well as dynamic, in the following order: matrix and bimatrix games, repeated games, specific models of stochastic (Markov) games, evolutionary games. We explore solution concepts like “value” and “optimal strategies” for zero sum games and “equilibrium” for non-zero sum games. In these noncooperative games the players are strategic decision makers, who cannot make binding agreements to achieve their goals. Instead, threats may be applied to establish stable outcomes. Besides, we explore the concepts of “evolutionary stable strategy” and “replicator dynamics” and their relations with models of population dynamics and with models of “learning”. Several examples will be taken from biological settings.

*Literature:*

Lecture notes will be provided.

*Prerequisites:*

Basic knowledge (bachelor level) of analysis and linear algebra.

*Examination:*

Take home problems.

*Address of the lecturer:*

Dr. F. Thuijsman

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P.O. Box 616, 6200 MD Maastricht

Phone : 043 – 3883489 E-mail : [f.thuijsman@maastrichtuniversity.nl](mailto:f.thuijsman@maastrichtuniversity.nl)

**Course MDP: “Markov Decision Processes”**

*Time* : Monday 15.00 – 16.45 (November 14 - December 12 & January 23 - February 13).

*Location:* Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturers:* Dr. S. Bhulai (VU) and Prof.dr. R. Núñez Queija (UvA)

*Course description:*

The theory of Markov decision processes (MDPs) - also known under the names sequential decision theory, stochastic control or stochastic dynamic programming - studies sequential optimization of stochastic systems by controlling their transition mechanism over time. Each control policy defines a stochastic process and values of objective functions associated with this process. The goal is to select a control policy that optimizes a function of the values generated by the utility functions.

In real life, decisions that are made usually have two types of impact. Firstly, they cost or save resources, such as money or time. Secondly, by influencing the dynamics of the system they have an impact on the future as well. Therefore, the decision with the largest immediate profit may not be good in view of future rewards in many situations. MDPs model this paradigm and can be used to model many important applications in practice. In this course we provide results on the structure and existence of good policies, on methods for the computation of optimal policies, and illustrate them by applications.

Contents of the lectures:

1. Model formulation, policies, optimality criteria, the finite horizon.
2. Average rewards: optimality equation and solution methods.

3. Discounted rewards: optimality equation and solution methods.
4. Structural properties.
5. Applications of MDPs.
6. Further topics in MDPs

*Literature:*

Lecture notes will be provided.

*Prerequisites:*

- Elementary knowledge of linear programming (e.g. K.G. Murty, Linear programming, Wiley, 1983).
- Elementary knowledge of probability theory (e.g. S.M. Ross, A first course in probability, Macmillan, New York, 1976).
- Elementary knowledge of (numerical) analysis (e.g. Banach space; contracting mappings; Newton's method; Laurent series).

*Examination:*

Take home problems.

*Addresses of the lecturers:*

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Department of Mathematics, VU University Amsterdam,  
De Boelelaan 1081a, 1081 HV Amsterdam

Phone: 020 – 5987679      E-mail: [sbhulai@few.vu.nl](mailto:sbhulai@few.vu.nl)      URL: [www.math.vu.nl/~sbhulai](http://www.math.vu.nl/~sbhulai)

Prof.dr. R. Núñez Queija,

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Valckenierstraat 65-67, 1018 XE Amsterdam

Phone: 020 - 5254378      E-mail: [nunezqueija@uva.nl](mailto:nunezqueija@uva.nl)

**Course ORHC: “Operations Research and Health Care”**

*Time* : Monday 10.15 – 12.00 (February 20 – April 2 & April 16 and 23).

*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturers*: Dr.ir. E.W. Hans (UT), Prof.dr.J.J. van de Klundert (EUR)

*Course description:*

Global and national developments cause the health of populations and individuals to pose new problems for societies and organizations. As expectations rise and populations age, the burden of health care cost becomes increasingly difficult to carry. Society is presented with tough decision problems regarding the efficient, effective and equitable use of scarce resources to improve our precious health. For many of these problems, operations research provides valuable solution methods.

In this course, we start by overviewing topics, methodology, models, and objectives for health care decision making. We subsequently provide an in depth and rigorous mathematical treatment of operations research applications in a variety of prominent domains. Partly, the material will be based on application of classical operations research methods e.g. from combinatorial optimization or queuing theory) to problems in the domain of health care. Another part of the course addresses health care specific problems and methods, which go beyond classical OR applications.

The course will be organized by topic:

- Health services research methodology
- Outpatient planning (Queuing, Scheduling)
- Resource Planning & Scheduling (Scheduling, Branch-and-Price, Stochastic Programming)
- Human resource planning (Rostering, Crew Scheduling)
- Health Chain Planning (Supply Chain Planning, Combinatorial Optimization, Queuing)
- Medical decision making (decision making under uncertainty, utility maximization)
- Epidemiological models (Markov decision models, sensitivity analysis)
- Optimization problems in Quality & Safety (Risk modeling, markets)
- Benchmarking (Data Envelopment Analysis, Stochastic Frontier Analysis)

*Literature:*

Papers/handouts

*Prerequisites:*

Understanding of queuing theory and combinatorial optimization at M.Sc. level.

*Examination:*

4 take home problems.

*Addresses of the lecturers:*

Dr. E.W. Hans

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## **Course AQT: “Advanced Queueing Theory”**

*Time* : Monday 13.00 – 14.45 (February 20 – April 2 & April 16 and 23).

*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturer*: Prof.dr.ir. S.C. Borst (TU/e), Prof. dr.ir. O.J. Boxma (TU/e)

*Course description:*

Complex stochastic systems, like communication systems, computer networks and manufacturing systems, may often be modeled as queueing networks with multiple nodes and/or multiple classes. The performance of these systems may thus be evaluated in terms of queue lengths, sojourn times or blocking probabilities in queueing networks.

Specific topics include (a selection from):

- Networks of queues: product-form distribution, reversibility, output theorem, tandem networks, partial balance, blocking, insensitivity, BCMP networks, mean-value analysis, Norton's theorem, sojourn times.
- Analytical-numerical techniques: transform methods, matrix-analytic method, compensation method.
- Polling systems: cycle times, queue lengths, waiting times, conservation laws, service policies, visit orders.
- Performance optimization: achievable delay performance, discriminatory scheduling, age-based scheduling, size-based scheduling, fairness.

*Literature*

Handouts and slides; useful background material may be found in

- F.P. Kelly, Reversibility and Stochastic Networks, Wiley, 1979.
- R. Nelson, Probability, Stochastic Processes and Queueing Theory, Springer, 1995.
- R.W. Wolff, Stochastic Modeling and the Theory of Queues, Prentice-Hall, 1989.

*Prerequisites:*

- The participants should have followed courses in probability theory, stochastic processes and queueing theory.

*Examination:*

Take home problems.

*Address of the lecturer:*

Prof.dr.ir. S.C. Borst

Dept. of Mathematics & Computer Science, Eindhoven University of Technology

P.O. Box 513, 5600 MB Eindhoven

Phone: 040-2475105      E-mail: [sem@win.tue.nl](mailto:sem@win.tue.nl)

Prof.dr.ir. O.J. Boxma

Dept. of Mathematics & Computer Science, Eindhoven University of Technology

P.O. Box 513, 5600 MB Eindhoven

Phone: 040-2472858/3130      E-mail: [o.j.boxma@tue.nl](mailto:o.j.boxma@tue.nl)

## **Course ORG: “OR-Games”**

*Time* : Monday 15.00 – 16.45 (February 20 – April 2 & April 16 and 23).

*Location*: Mathematical Building, Room 611AB, Budapestlaan, Utrecht (De Uithof).

*Lecturers*: Prof.dr. P.E.M. Borm (UvT) and Prof.dr. H.J.M. Hamers (UvT)

*Course description:*

The aim of this course is to provide a general overview of the possibilities of analyzing various OR-situations from a game theoretic perspective. A large part of the course is motivated by the idea that joint OR- problems in which various decision makers are involved not only have an optimization aspect in

generating e.g. minimal total joint costs but as an allocation aspect in dividing these costs back fairly to the individuals itself.

Global scheme:

- A global survey of relevant notions from both cooperative and non-cooperative game theory.
- Applications to bankruptcy, cost sharing, fixed and spanning tree, traveling salesman, Chinese postman, assignment, permutation, scheduling, lot sizing and inventory situations.

#### *Literature*

Course material:

- Handouts will be provided during the course.
- Further reading: Curiel, I. (1997). Cooperative game theory and applications. Kluwer Academic Publishers.

#### *Prerequisites*

The course is intended to be accessible without specific knowledge of game theory. For this aim the first part of the course will survey the game theoretical concepts that are needed.

#### *Examination:*

One final assignment to model and analyze a self-selected OR problem from a game theoretical perspective..

#### *Addresses of the lecturers:*

Prof. dr. P.E.M. Borm

CentER for Economic Research, Tilburg University,

P.O. Box 90153, 5000 LE Tilburg

Phone: 013 – 4663026 E-mail: [pemborm@uvt.nl](mailto:pemborm@uvt.nl)

URL: <http://center.uvt.nl/staff/borm>

Prof.dr. H.J.M. Hamers

CentER for Economic Research, Tilburg University,

P.O. Box 90153, 5000 LE Tilburg

Phone: 013 – 4662660 E-mail: [h.j.m.hamers@uvt.nl](mailto:h.j.m.hamers@uvt.nl)

URL: <http://center.uvt.nl/staff/hamers>

## 5. Master courses 2011/2012

During the academic year 2011/2012 seven courses will be taught in two semesters; each semester has a duration of 12 weeks. The courses are part of the Dutch Master Programme in Mathematics (<http://www.mastermath.nl>).

Fall 2011:

- ISP (Introduction to stochastic processes; September 5, 6, 12 and 13);
- CO (Continuous optimization; September 19, October 3, 17, 31, November 14, 28, December 5);
- DO (Discrete optimization; September 19, 26, October 10, 24, November 7, 21, December 5);
- HEU (Heuristic Methods in Operations Research; September 19 – December 5).

Spring 2012 (February 6 – April 2, April 16, 23, May 7):

- ALP (Advanced linear programming);
- SCH (Scheduling);
- QT (Queueing theory).

The courses are given on Monday according to the following schedule:

	<i>Fall 2011*</i>	<i>Spring 2012</i>
11.00 - 11.45	Course CO/DO**	Course ALP***
12.00 - 12.45	Course CO/DO	Course ALP***
12.45 - 13.15	Lunch break	Lunch break
13.15 - 14.00	Course CO/DO**	Course SCH
14.15 - 15.00	Course CO/DO	Course SCH
15.15 - 16.00	Course HEU	Course QT
16.15 - 17.00	Course HEU	Course QT

\* The course ISP is taught on September 5, 6, 12 and 13 (10.15 – 12.00 and 13.00 – 14.45 each day).

\*\*The course CO is taught on September 19 and December 5 from 11.00 – 12.45, and on October 3, 17, 31, November 14, 28 from 11.00 – 12.45 and 13.15 – 15.00.

The course DO is taught on September 19 and December 5 from 13.15 – 15.00, and on September 26, October 10, 24, November 7, 21 from 11.00 – 12.45 and 13.15 – 15.00.

\*\*\* In cooperation with DIAMANT

### *Location*

The courses are given in the Uithof (buildings of the Utrecht University). Detailed information on the location can be found on the website of the Dutch Master Programme in Mathematics (Masthermath): <http://www.mastermath.nl/locations>.

### *Credits*

The credits for students who have passed the exercises successfully are 6 EC per course, except the short course ISP (4 EC).

### *Detailed information about the courses*

The registration and administration of the master courses is done by the Dutch Master Programme in Mathematics.

Anyone interested in these courses is invited to register via <http://www.mastermath.nl>.

## Course ISP: “Introduction to Stochastic Processes”

*Time* : 10.15 – 12.00 and 13.00 – 14.45 (September 5, 6, 12 and 13).

*Location*: Utrecht (De Uithof).

*Lecturers*: Dr. N. Litvak (University of Twente) and Dr.ir. W.R.W. Scheinhardt (University of Twente).

### *Aim*:

To provide an introduction in the basic notions of stochastic processes as applied in stochastic operations research topics like queueing theory and Markov decision processes.

### *Description*:

The following subjects will be treated:

- Discrete time Markov chains, including classification of states and long run behaviour and branching processes;
- Exponential distribution and Poisson Processes;
- Generating functions and Laplace-Stieltjes transforms;
- Continuous time Markov chains and birth-and-death processes;
- Renewal theory, including renewal theorem, renewal reward processes and regenerative processes.



*Literature:*

S.M. Ross, 'Introduction to probability models', 10th edition, Academic Press, 2010.  
The 9th or 8th edition can also be used. Having the book is essential for the course.

*Examination:*

Written examination.

*Prerequisites:*

Knowledge of probability at the level: S.M. Ross, 'Introduction to probability models', 10th edition, Academic Press, 2010 (chapters 1-3).

*Addresses of the lecturers:*

Dr. W.R.W. Scheinhardt

Department of Applied Mathematics, University of Twente, P.O. Box 217, 7500 AE Enschede

Phone: 053-4893832 E-mail: [w.r.w.scheinhardt@utwente.nl](mailto:w.r.w.scheinhardt@utwente.nl) URL: [www.math.utwente.nl/~scheinhardtrw](http://www.math.utwente.nl/~scheinhardtrw)

Dr. N. Litvak

Department of Applied Mathematics, University of Twente, P.O. Box 217, 7500 AE Enschede

Phone: 053-4893388 E-mail: [n.litvak@utwente.nl](mailto:n.litvak@utwente.nl) URL: [www.math.utwente.nl/~litvakn](http://www.math.utwente.nl/~litvakn)

## **Course CO: "Continuous Optimization"**

*Time* : Monday 11.00 – 12.45 (September 19, December 5)  
Monday 11.00 – 12.45 and 13.15 – 15.00 (October 3, 17, 31, November 14, 28)

*Location:* Utrecht (De Uithof).

*Lecturer:* Dr. G.J. Still (University of Twente).

*Aim:*

The course aims to provide an advanced introduction into the basics and methods of nonlinear continuous optimisation (also called nonlinear programming).

*Course description:*

The course starts with some historical examples and an introduction into convex sets and convex functions.

Then, optimality conditions in unconstrained and constrained optimization are discussed with emphasis on convex problems. Duality in convex optimization is the next topic followed by an introduction into the basic algorithms for unconstrained and constrained problems. Finally as a special topic, LP-, Lagrange- and semidefinite-relaxations of integer programs are studied.

*Literature:*

- Lecture notes "Nonlinear Optimization", by E. de Klerk, C. Roos, T. Terlaky;
- Algorithmic Principles of Mathematical Programming" by U. Faigle, W. Kern and G. Still.

*Prerequisites:*

Basic knowledge of linear algebra and multivariate analysis.

*Examination:*

Written examination.

*Remark:*

More information and study material is to be found at

<http://wwwhome.math.utwente.nl/~stillgj/conopt/index.html>.

*Address of the lecturer:*

Dr. G.J. Still

Department of Applied Mathematics, University of Twente, P.O. Box 217, 7500 AE Enschede

Phone: 053-4893404 E-mail: [g.j.still@utwente.nl](mailto:g.j.still@utwente.nl) URL: <http://wwwhome.math.utwente.nl/~stillgj/>

## Course DO: “Discrete Optimization”

*Time* : Monday 13.15 – 15.00 (September 19, December 5)  
Monday 11.00 – 12.45 and 13.15 – 15.00 (September 26, October 10, 24, November 7, 21)  
*Location*: Utrecht (Uithof).  
*Lecturer*: Prof.dr. G. Schäfer (VU,CWI).

### *Aim:*

To provide a solid foundation in Discrete Optimization, with an eye on algorithm design and algorithm analysis, including the basics of computational complexity.

### *Course description:*

The aim of the course is to provide a solid foundation in Discrete Optimization. A particular focus will be given to the design and analysis of algorithms and to computational complexity. Discrete Optimization is about the problem of finding a best solution among a set of feasible solutions. The set of feasible solutions might be astronomically large but is assumed to be discrete (finite or countably infinite), which also constitutes the major difference to Continuous Optimization. A notorious example is the traveling salesman problem, where we are asked to find a shortest tour among all tours that visit every node of a given graph exactly once. Yet another example is linear programming, which can be interpreted as the problem of finding a best among a finite number of vertices of a polyhedron. The course introduces some of the most relevant problems from the area, as well as algorithms to solve them.

The following topics will (most probably) be treated

- Introduction to Algorithms & Analysis
- Shortest Path Algorithms
- Minimum Spanning Trees & Matroids
- Maximum Flows & Minimum Cuts
- Minimum Cost Flows
- P, NP, coNP, NP-completeness
- Integer Linear Programming & Total Unimodularity
- Approximation Algorithms
- Primal-Dual Algorithms
- Inapproximability & Approximation Schemes

### *Literature:*

We use a reader with selected chapters from several books listed below. The reader can be purchased in the first lecture. Occasionally additional copies will be distributed (if necessary).

- W.J. Cook, W.H. Cunningham, W.R. Pulleyblank and A. Schrijver, Combinatorial Optimization, Wiley, 1998. ISBN 0-471-55894-X
- C.H. Papadimitriou and K. Steiglitz, Combinatorial Optimization; Algorithms and Complexity, Prentice-Hall, 1982. ISBN 0-13-152462-3
- Ahuja, R. K., T. L. Magnanti, and J. B. Orlin, Network Flows, Prentice Hall, 1993. ISBN 0-13-617-549.
- T. Cormen, C. Leiserson, R. Rivest and C. Stein, Introduction to Algorithms, 2nd ed., MIT Press, 2001. ISBN10 0262531968
- B. Korte and J. Vygen, Combinatorial Optimization - Theory and Algorithms, 4th ed., Springer, 2008. ISBN10 3-540-25684-9.

### *Prerequisites:*

Knowledge of linear algebra and graph theory is advantageous.

### *Examination:*

Take home problems (40%) and a written exam (60%).

### *Address of the lecturer:*

Prof.dr. G. Schäfer

CWI, P.O. Box 94079, 1090 GB Amsterdam

Phone: 020 - 592 4165

E-mail: [G.Schaefer@cwi.nl](mailto:G.Schaefer@cwi.nl)

URL: <http://www.cwi.nl/~schaefer>

## Course HEU “Heuristic Methods in Operations Research”

*Time* : Monday 15.15 – 17.00 (September 19 – December 5).

*Location*: Utrecht (De Uithof).

*Lecturers*: Prof.dr. J.L. Hurink (University of Twente) and dr. J.M.J. Schutten (University of Twente).

*Aim*:

This course gives an overview of heuristic solution methods in combinatorial optimization.

*Description*:

Due to the computational complexity of most of the practical relevant optimization problems, heuristic methods form an important class of solution methods for such problems. In this course we give an overview of different classes of heuristic solution approaches and present examples of their application.

In detail, the following issues are treated:

- Sampling based heuristics;
- Restricted dynamic programming;
- Truncated branch and bound/beam search;
- Relaxations/lower bounds;
- Evaluation techniques;
- Local Search;
- Evolutionary methods;
- Hierarchical and decentralized approaches.

*Literature*:

Handouts.

*Examination*:

Oral or written examination and possibly take home problems.

*Prerequisites*:

Basic knowledge (bachelor level) of analysis, linear algebra and linear programming.

*Addresses of the lecturers*:

Prof.dr. J.L. Hurink

Department of Applied Mathematics, University of Twente, P.O. Box 217, 7500 AE Enschede

Phone: 053 – 4893447 E-mail: [j.l.hurink@utwente.nl](mailto:j.l.hurink@utwente.nl) URL: [www.math.utwente.nl/~hurinkjl](http://www.math.utwente.nl/~hurinkjl)

Dr.ir. J.M.J. Schutten

Department OMPL, University of Twente, P.O. Box 217, 7500 AE Enschede

Phone: 053 – 4894676 E-mail: [j.m.j.schutten@utwente.nl](mailto:j.m.j.schutten@utwente.nl) URL: [www.mb.utwente.nl/ompl/staff/Schutten/](http://www.mb.utwente.nl/ompl/staff/Schutten/)

## Course ALP: “Advanced Linear Programming”

*Time* : Monday 11.00 – 12.45 (February 6 – April 2, April 16, 23, May 7).

*Location*: Utrecht (De Uithof).

*Lecturers*: Prof.dr. L. Stougie (VU University Amsterdam) and Dr.ir. J.M. van den Akker (Utrecht University).

*Aim*:

To provide insight in theory and development of practical methods for basic and advanced linear programming.

*Course description*:

Part 1: Basic theory and algorithms of linear optimization:

- Linear optimization; polyhedra and polytopes; the simplex algorithm; duality; linear inequalities and Farkas’ lemma; sensitivity analysis.

Part 2: Advanced linear optimization methods:

- The revised simplex method and column generation; Dantzig-Wolfe- and Benders' decomposition; network flow problems; the ellipsoid method; an interior point method; integer programming formulations and solution methods.

*Literature*:

D. Bertsimas and J.N. Tsitsiklis: Introduction to linear optimisation, Athena Scientific, 1997.

*Prerequisites*:

Basic knowledge (bachelor level) of linear algebra and graph theory.

*Examination:*

Written examination.

*Addresses of the lecturers:*

Prof.dr. L. Stougie

Department of Econometrics and Operations Research

Faculty of Economics & Business Administration, VU University Amsterdam

De Boelelaan 1105, 1081 HV Amsterdam

Phone: 020 – 5989391 E-mail: [lstougie@feweb.vu.nl](mailto:lstougie@feweb.vu.nl)

Dr.ir. J.M. van den Akker

Departement Informatica, Utrecht University, P.O. Box 80089, 3508 TB Utrecht

Phone: 030-2533989 E-mail: [marjan@cs.uu.nl](mailto:marjan@cs.uu.nl) URL: <http://people.cs.uu.nl/marjan/>

## **Course SCH: “Scheduling”**

*Time* : Monday 13.15 – 15.00 (February 6 – April 2, April 16, 23, May 7).

*Location*: Utrecht (De Uithof).

*Lecturer*: Dr. T. Vredevelde (Maastricht University)

*Aim:*

This course gives an introduction into scheduling theory and its applications.

*Course description:*

The term scheduling represents the assignment of resources over time to perform tasks, jobs or activities. Feasible schedules are compared with respect to a given optimality criterion. Mostly, the optimization problem is combinatorial and very complex. From a computational point of view many of these problems are hard (NP-hard). In this course an overview on the most classical scheduling models is given and exact as well as some optimal and some heuristic solution methods are discussed for these models.

In detail, the following issues are treated:

- Classification of scheduling models
- Single-machine models
- Parallel-machines models
- Open shop, flow shop and job shop models
- Timetabling
- Transportation
- On-line models.

*Literature:*

- Handout for special subjects.

The following books can be used as background and further information, but do not have to be bought:

- Brucker, Peter: Scheduling Algorithms 4th ed., 2004, Springer Verlag Berlin, Hardcover, ISBN: 3-540-20524-1;
- Pinedo, Michael L: Scheduling: Theory, Algorithms, and Systems, 2<sup>nd</sup> ed., 2002, Prentice Hall, ISBN: 0-13-028138-7.

*Prerequisites:*

Basic knowledge (bachelor level) of analysis and linear algebra.

*Examination:*

Take home problems and an examination (oral or written).

*Address of the lecturer:*

Dr. T. Vredevelde

School of Business and Economics, Department of Quantitative Economics, Maastricht University

P.O. Box 616, 6200 MD Maastricht

Phone: 043-3883911 E-mail: [t.vredevelde@maastrichtuniversity.nl](mailto:t.vredevelde@maastrichtuniversity.nl)

URL: <http://www.personeel.unimaas.nl/t.vredevelde>

## Course QT: "Queueing Theory"

*Time* : Monday 15.15 – 17.00 (February 6 – April 2, April 16, 23, May 7).

*Location*: Utrecht (De Uithof).

*Lecturers*: Prof.dr.ir. I.J.B.F. Adan (Eindhoven University of Technology) and Dr. J.A.C. Resing (Eindhoven University of Technology).

*Aim*:

To provide insight in the theory of queueing models.

*Course description*:

The following subjects will be treated:

- Fundamental queueing relations (Little's law, PASTA property);
- Markovian queues (M/M/1 queue, M/M/c queue, M/E<sub>r</sub>/1 queue) ;
- M/G/1 queue and G/M/1 queue;
- Mean value technique;
- Priority queues;
- Variations of the M/G/1 queue;
- Insensitive queues (M/G/c/c queue and M/G/infinity queue).

*Literature*:

Lecture notes of the course "Queueing Theory" (free available:

<http://www.win.tue.nl/~iadan/queueing.pdf>).

*Prerequisites*:

Basic knowledge of probability at the level: S.M. Ross, Introduction to probability models, 9th edition, Academic Press, 2007 (chapters 1-3).

*Examination*:

Written examination.

*Address of the lecturer*:

Prof.dr.ir. I.J.B.F. Adan

Dept. of Mechanical Engineering, Eindhoven University of Technology

P.O. Box 513, 5600 MB Eindhoven

Phone: 040-2472932 E-mail: [iadan@tue.nl](mailto:iadan@tue.nl)

Dr. J.A.C. Resing

Dept. of Mathematics & Computer Science, Eindhoven University of Technology

P.O. Box 513, 5600 MB Eindhoven

Phone: 040-2472984 E-mail: [resing@win.tue.nl](mailto:resing@win.tue.nl)

## **6. Financial regulations**

### **LNMB**

The following arrangements hold.

1. Only PhD students who are preparing their thesis under supervision of a member of the LNMB (see the list in paragraph 12 of this booklet) are considered for financial aid.
2. The LNMB does not pay the PhD students directly; the payment will be done afterwards to the administration of the university of the PhD student. In order to receive the payment, a form has to be submitted. These forms are available at the LNMB secretary.
3. Reimbursements are intended for education activities such as courses and workshops.  
For participation in courses, 50% of the price of a second class train return ticket between the university location and Utrecht is reimbursed.  
For participation in the Lunteren conference there can be given a compensation for lodging with a maximum of 50 euro per conference or workshop.
4. The other expenses will be accounted to the PhD students or their universities.

### **NWO**

NWO provides grants for research. There are grants for working visits and for attending conferences. Information about these grants can be requested from NWO, phone: 070 - 3440624 (Grant Program Office).

### **NUFFIC**

The Netherlands has cultural accords with various countries, which include arrangements for scientific co-operation and exchange. Scientific staff can obtain, under special conditions, a grant for short visits to other countries. The money originates from the Ministry OCW (Education, Culture and Science). NUFFIC takes care of the formalities. See also [www.nuffic.nl/studie/beursopener.html](http://www.nuffic.nl/studie/beursopener.html)

### **OTHER GRANTS**

For information about other grants we refer to the administration of your own university. See also [www.vsnu.nl](http://www.vsnu.nl)

## 7. LNMB certificated persons (212)

J.M. van den Akker	M.E. Angün	A. Asadi
E.M. Bázsá	R. Bekker	S. Bhulai
M. Bijvank	H.M. le Blanc	J.M. Bloemhof–Ruwaard
C.A. Boer	K.M.J.de Bontridder	N.K. Boots
S.C. Borst	R.J. Boucherie	Y. Boulaksil
G.M. te Brake	R.C.M. Brekelmans	M.P.de Brito Peirera Maduro
J.J.J. van de Broek	J. Bruin	G. Budai
A. Bump	N.C. Büyükkaramikli	D. Chaerani
S.K. Cheung	T.J.M. Coenen	M.B. Combé
U. Corbacioglu	M. Cremers	F.C.A.M. Cruijssen
S. Dabia	Q. Deng	A.B. Dieker
E.B. Diks	A.M. Dobber	C. Dobre
M.K. Dogru	T. Dollevoet	A.B. Dragut
R. Egorova	C.A. van Eijl	E. Elabwabi
M. Elghami	I. Endrayanto	A. Estevez Fernandez
M. Firat	O. Gabali	S.M. Geervliet
J.R.G. van Gellekom	J.-W. Goossens	F.N. Gouweleeuw
R.M.P. Goverde	A. Grigoriev	E.A. Grigorieva
G. Gu	R. de Haan	A. Haesel
R. Haijema	C.J.H. Hendriksen	D. den Hertog
W. van den Heuvel	B. Heydenreich	K.M.R. Hoen
W.B. van den Hout	G.-J.J.A.N. van Houtum	D. Huisman
P.J.H. Hulshof	B.G.M. Huslage	L.J.J. van Iersel
V.C. Ivanescu	I.D. Ivanov	W. van Jaarsveld
B. Jansen	J.B. Jansen	M. Jansen
E. Janssen	F.B.S.L.P. Janssen	R.P. Kampstra
A.G. Karaarslan	F.J.P. Karsten	B. Kaynar
O.A. Kilic	B.-E. Klaus	M.J. Kleijn
J. Kleppe	E. de Klerk	F. Klijn
A.L. Kok	G.M. Koole	J. de Kort
N. Kortbeek	P. Korteweg	A.M.C.A. Koster
M. Koster	S. Kovaleva	A.F. van der Kraaij
M.G.C. van Krieken	B.H.M. Kuijpers	C.M.H. Kuijpers
R. Langestraat	T. Le Anh	T. Le Duc
R.L.M.J. van Leensel	H.L. Liem	P. Lieshout
O. Listes	J.A. Loeve	E.R.M.A. Lohmann
R.B. Lok	J.M.W. van Loon	F.J.W. Lutgens
M. Mainegra Hing	M.R.H. Mandjes	H. Mansouri
S. Marban	B. Marchal	N.A.A. Marquinie
P.J.M. Meersmans	M.A. Meertens	F.J.C. van Megen
R.D. van der Mei	W.J.M. Meuffels	G. Mincsovics
D.I. Miretskiy	M. Mnich	R. Nicolai
L. van Norden	R. Núñez Queija	N.J. Olieman
M. Oosten	D. van Ooteghem	G.J.M. Otten
P. Out	P. Ouwehand	Ö. Özdemir
U. Özen	K. Pak	O. Passchier
J.J. Paulus	L.W.P. Peeters	N. Piersma
P.C. Pop	E. Porras Musalem	S.A. Pot
D. Potthoff	M. Pourakbar	M. Quant
A.J. Quist	J.H. Reijnierse	G. Rennen

M. Retel Helrich  
A. Roubos  
J.H.G.C. Rutten  
B.P. Silalabi  
E. Smeitink  
S.R. Smits  
P.F. Spaans  
J.M. Spitter  
D. Tas  
M.J.G. van Uitert  
R.J.M. Vaessens  
H.J.J. Verheijen  
A.J. Vermeulen  
M. Vieira  
M.H. van der Vlerk  
J.P.A. van Vliet  
M.J.C.M. Vromans  
M. Wennink  
R. Wildeman  
Z. Yang  
C.M. Zwaneveld

D. Romero Morales  
D. Roubos  
B. Selçuk  
A. Sleptchenko  
J. Smeltink  
M. Sol  
F.C.R. Spijksma  
M.H. Streutker  
M. Tennekes  
A. Ule  
P.T. Vanberkel  
C. Verhoef  
A.M. Verweij  
I.F.A. Vis  
I. Vliegen  
Y. Volkovich  
M. van Vuuren  
W. van der Weij  
E.M.M. Winands  
T. Yuan  
A.P. Zwart

J.M.M. van Rooij  
J. Rutten  
A.Y.D. Siem  
M. Slikker  
M.A.J. Smith  
M.J. Soomer  
R. Spliet  
J.F. Sturm †  
R.H. Teunter  
N. Usotskaya  
S.G. Vanneste  
M. Verloop  
A.P.A. Vestjens  
M. Vlasiou  
A. van Vliet  
T. Vredeveld  
X. Wang  
A.C.C. van Wijk  
R. Yang  
M.E. Zonderland



## 8. Structuurschets interne organisatie LNMB (in Dutch)

### Vastgesteld in de algemene ledenvergadering van 16 januari 1991, aangepast in de algemene ledenvergaderingen van 16 januari 2007 en 18 januari 2011

#### 0. Preambule

De juridische structuur van het LNMB is nog niet vastgelegd, en dat gebeurt ook niet door onderstaande structuurschets. Op dit moment is het niet opportuun om de juridische aspecten volledig uit te werken, dat zal te zijner tijd gebeuren in samenhang met de uitwerking van de structurele financiering. Bovendien is het wenselijk om te wachten tot de discussie over "onderzoekscholen" verder gevorderd is. Wel is het op dit moment noodzakelijk om interne gedragsregels af te spreken, onder meer omdat de hoogleraar-directeur is aangesteld.

#### 1. Het Landelijk Netwerk Mathematische Besliskunde

Het LNMB is een organisatie die een landelijke tweede-fase onderzoekersopleiding in de mathematische besliskunde verzorgt. Door landelijke bundeling van internationaal erkende expertise en door inzet van vooraanstaande onderzoekers uit het buitenland wordt gestreefd naar een opleiding van hoge kwaliteit. Het LNMB streeft naar een goede afstemming van activiteiten met de universitaire instellingen en met andere tweede fase opleidingen.

#### 2. Leden

Lid van het LNMB kunnen zijn hoogleraren, UHD's en UD's (inclusief emeriti) van de Nederlandse universiteiten of medewerkers van het CWI die actief onderzoeker zijn op een van de deelgebieden van de mathematische besliskunde en betrokken zijn bij de begeleiding van promovendi. Over toelating van nieuwe leden beslist het Algemeen Bestuur.

#### 3. Algemeen Bestuur

Het Algemeen Bestuur bestaat uit tenminste  $n$  en ten hoogste  $n+m$  leden van het LNMB, waar  $n$  = het aantal instellingen waar leden werkzaam zijn en  $m$  = het aantal leden van het Dagelijks Bestuur. Het Algemeen Bestuur wordt gekozen door de Ledenvergadering zodanig dat van elk van de  $n$  instellingen tenminste één personeelslid lid van het Algemeen Bestuur is. Leden van het Dagelijks Bestuur zijn automatisch lid van het Algemeen Bestuur. De voorzitter wordt in functie gekozen. De Wetenschappelijk Directeur is secretaris. Het Algemeen Bestuur verdeelt onderling de overige functies. Leden van het Algemeen Bestuur die geen lid zijn van het Dagelijks Bestuur treden jaarlijks af, en zijn terstond herkiesbaar. Voor de overige leden van het Algemeen Bestuur geldt het rooster van bestuursmutaties van het Dagelijks Bestuur.

Het Algemeen Bestuur heeft tot taak:

- Het benoemen van nieuwe leden van het LNMB;
- Het benoemen van de Wetenschappelijk Directeur;
- Het toezien op de activiteiten van het Dagelijks Bestuur;
- Het jaarlijks vaststellen van het algemeen en financieel verslag, alsmede van de begroting voor het komende jaar;
- Alles te doen wat de doelstellingen van het LNMB kan bevorderen.

#### 4. Dagelijks Bestuur

Het Dagelijks Bestuur bestaat uit 5 of 6 leden van het LNMB. Het Dagelijks Bestuur wordt gekozen door de Ledenvergadering. Voorzitter en secretaris van het Algemeen Bestuur zijn tevens voorzitter en secretaris van het Dagelijks Bestuur. De zittingstermijn van de secretaris komt overeen met diens aanstelling als Wetenschappelijk Directeur. De voorzitter wordt in functie gekozen.

De leden van het Dagelijks Bestuur, m.u.v. de directeur, hebben een zittingstermijn van 4 jaar. Jaarlijks treedt tenminste één lid af. Aftredende leden zijn éénmaal herkiesbaar.

Het Dagelijks Bestuur heeft tot taak:

- Het vaststellen van het onderwijsprogramma van het LNMB, in het bijzonder de aanwijzing van de docenten;
- Het vaststellen van regels voor de beoordeling van de deelnemende aio's/oio's door de docenten en het vaststellen van slaagregels;
- Het vaststellen van cursusgelden, contributies, vergoedingen etc.;
- Het vaststellen van regelingen voor diploma's, en het afgeven van diploma's aan deelnemers die geslaagd zijn;
- Het jaarlijks uitbrengen van een begroting, ten behoeve van het Algemeen Bestuur;
- Het zorgdragen voor de continuïteit van de activiteiten van het LNMB; inhaken op actuele ontwikkelingen, het veilig stellen van structurele financiering etc.;
- Het adviseren van de Wetenschappelijk Directeur bij diens taakuitoefening;

h. Alles te doen wat de doelstellingen van het LNMB kan bevorderen.  
Het Dagelijks Bestuur is verantwoording verschuldigd aan het Algemeen Bestuur en aan de Ledenvergadering.

#### *5. Wetenschappelijk Directeur*

Het LNMB heeft een Wetenschappelijk Directeur. De functie van Wetenschappelijk Directeur wordt op hoogleraarniveau vervuld. De Wetenschappelijk Directeur wordt benoemd door het Algemeen Bestuur, in samenwerking met de penvoerende instelling. De termijn van de aanstelling wordt eveneens in overleg met de penvoerende instelling vastgelegd.

De Wetenschappelijk Directeur heeft tot taak:

- a. Het voorbereiden en doen uitvoeren van het onderwijsprogramma;
- b. Het beslissen omtrent toelating van deelnemers aan het onderwijsprogramma op grond van door het Dagelijks Bestuur vastgestelde regels;
- c. Het bijhouden van een administratie van deelnemers aan het onderwijsprogramma, en de door hen behaalde resultaten;
- d. Het toezicht houden op het financieel beheer dat namens het LNMB wordt gevoerd;
- e. Het voorbereiden van de vergaderingen van het Dagelijks Bestuur, het Algemeen Bestuur en de Ledenvergadering;
- f. Het opstellen van voorlichtingsmateriaal voor aio's/oio's en andere belangstellenden;
- g. Het verzorgen van goede contacten met de penvoerende instelling, met deelnemende aio's/oio's en hun promotoren, met docenten, met instellingen die bij het LNMB zijn betrokken, en met verwante netwerken.

De Wetenschappelijk Directeur is verantwoording verschuldigd aan het Dagelijks Bestuur.

#### *6. Ledenvergadering*

Ieder kalenderjaar, bij voorkeur tijdens de jaarlijkse Lunteren-conferentie, wordt een Ledenvergadering gehouden, waar onder meer aan de orde komen:

- a. Het algemeen verslag over het afgelopen kalenderjaar;
- b. De plannen voor het komende kalenderjaar.

De Ledenvergadering heeft verder tot taak:

- c. De benoeming van de leden van het Dagelijks Bestuur en van het Algemeen Bestuur;
- d. Het vaststellen van de gedrageregels die binnen het LNMB worden gehanteerd.

#### *7. Financiën*

Voor de periode 1989 - 1993 heeft de Minister van Onderwijs en Wetenschappen het LNMB een startsubsidie toegekend. Daarna hebben de instellingen via een jaarlijkse bijdrage gezorgd voor het voortbestaan van het LNMB. De gelden worden beheerd door de penvoerende instelling. Betalingen behoeven de goedkeuring van de Wetenschappelijk Directeur, die gehouden is aan regels die door het Dagelijks Bestuur zijn vastgelegd.

#### *8. Slot*

In alle gevallen waarin deze regels niet voorzien, beslist het Dagelijks Bestuur.

## 9. Operations Research Groups at Dutch Universities and CWI

<u>Nr.</u>	<u>Institution</u>	<u>Research Theme</u>	<u>Projectleader(s)</u>
1a.	CWI	Algorithms, Combinatorics and Optimization	Laurent
1b.	CWI	Communication and computer networks	Van der Mei
2.	EUR	Operations Research	Dekker
3.	WUR	Operations Research	Van der Vorst
4a.	UvT	Operations Research	Van Dam
4b.	UvT	Operations Research and game theory	Borm
5a.	UM	Combinatorial optimization	Van Hoesel
5b.	UM	Game theory and optimization	Thuijsman
6.	RUG	Operations Research	Van der Vlerk
7.	UL	Stochastic Operations Research	Kallenberg
8a.	TUD	Interior point methods	Roos
8b.	TUD	Optimization	Aardal
9.a	TU/e	Combinatorial optimization	Woeginger
9.b	TU/e	Stochastic Operations Research	Boxma
10.	UvA	Deterministic and Stochastic Operations Research	Van Dijk
11.	UT	Discrete Optimization and Stochastic OR	Boucherie/Uetz
12.	UU	Operations Research	Balder
13a.	VU	Combinatorial Optimization and Stochastic OR	Stougie/Tijms
13b.	VU	Optimization of business processes	Koole

### Project 1a. Centre for Mathematics and Computer Science (CWI)

#### Algorithms, Combinatorics and Optimization

*Leader* : Prof.dr. M. Laurent.  
*Address* : Centre for Mathematics and Computer Science, Science Park 123, 1098 XG Amsterdam.  
*Phone* : 020 - 5924105; 020 - 5924189 (secretary).  
*Research staff* : Prof.dr.ir. Karen Aardal, Prof.dr. Krzysztof Apt, Prof.dr. Aharon Ben-Tal, dr. Jan Draisma, Prof.dr.ir. Bert Gerards, dr. Dion Gijswijt, dr. Amy Greenwald, Gauthier van den Hove, dr. Tony Huynh, Bart de Keijzer, Prof.dr. Monique Laurent, Prof.dr. Jan Karel Lenstra, dr. Tobias Müller, Guus Regts, Prof.dr. Guido Schaefer, Prof.dr. Lex Schrijver, Floor Sietsma, dr. Sunil Simon, dr. Frank Vallentin, Antonios Varvitsiotis, dr. Stefan van Zwam

*Research themes:*

1. Combinatorics and optimization;
2. Algorithmic game theory.

### Project 1b. Centre for Mathematics and Computer Science (CWI)

#### Probability and Stochastic Networks

*Leader* : Prof.dr. R.D. van der Mei and Prof.dr. A.P. Zwart.  
*Address* : Centre for Mathematics and Computer Science, Science Park 123, 1098 XG Amsterdam  
*Phone* : 020 - 5924129; 020 - 5924199 (secretary)  
*Research staff* : Prof.dr. J. van den Berg (0.8), Drs. A.V. den Boer (1.0), Drs. J.W. Bosman (1.0), Drs. M. van Buuren (1.0), Drs. S. Ding (1.0), Drs. J.P. Dorsman (0.6), Dr. K. Dzhaparidze (1.0), Dr. A. Fey (0.5), Drs. M. Frolova (1.0), Ir. G.J. Hoekstra (0.2), Drs. D. Kiss (1.0), Dr. M.N.M. van Lieshout (1.0), Prof.dr. R.D. van der Mei (0.8), Prof.dr. R. Nunez-Queija (0.2), Drs. M. Onderwater (1.0), Dr. O. Perry (1.0), Dr. F. Simatos (1.0), Drs. K. Turkyilmaz (1.0), Prof.dr. A.P. Zwart (1.0).

*Research themes:*

1. Performance analysis of communication systems;
2. Spatial stochastics and stochastic processes;
3. Stochastic geometry.

### Project 2. Erasmus University Rotterdam

#### Operations Research

*Leader* : Prof.dr.ir. R. Dekker.  
*Address* : Econometric Institute, H11-33, Erasmus University Rotterdam,  
 Postbus 1738, 3000 DR Rotterdam  
*Phone* : 010 - 4081274; 010 - 4081264 (secretary).

*Research staff* : Dr. J. Brinkhuis, prof.dr.ir. R. Dekker, dr. W. van der Heuvel, dr. D. Huisman, dr. A. Gabor, prof. dr. ir. U. Kaymak, dr. D.K. Leegwater, dr. M. Mulder, C. Pince MSc, D. Potthoff MSc, M. Pourakbar MSc, M. Retel Helmrich MSc, R. Spliet MSc, W. van Jaarsveld MSc, prof.dr. A.P.M. Wagelmans.

*Research themes:*

1. Railway operations optimization (Budai, Dekker, Huisman, Potthoff, Wagelmans);
2. Maintenance and reliability analysis (Dekker, Budai, Frenk, Nicolai);
3. Revenue management (Dekker, Frenk, Pak);
4. Production planning and inventory control (Dekker, Van de Heuvel, Retel-Helmrich, Wagelmans);
5. Service Logistics (Dekker, Pince, Pourakbar);
6. Lotting strategies in Combinatorial Auctions (Dekker, Kaymak, Waltmans);
7. Container and intermodal logistics (van Asperen, Dekker, Pourakbar);
8. OR in Medical Decision Making (Dekker);
9. Reverse logistics (Dekker, van de Heuvel, Pince);
10. Location and network problems (Mulder).

### **Project 3. Wageningen University Operations Research and Logistics Group**

*Leader* : Prof.dr.ir. J.G.A.J. van der Vorst.

*Address* : Hollandseweg 1, 6706 KN Wageningen.

*Phone* : 0317 – 485645.

*Research staff* : A. Banaszewska MSc, X. Bing MSc, Dr. J.M. Bloemhof-Ruwaard, Ir. G.D.H. Claassen, Dr. F. Cruijssen, dr. R. Haijema, Dr. E.M.T. Hendrix, ir. J.C. van Lemmen-Gerdessen, drs. M. de Keizer, drs. K.G.J. Pauls-Worm, W. Rijkema MSc, dr. R. Rossi, M. Soysal MSc, J. Vljajic MSc and prof.dr.ir. J.G.A.J. van der Vorst.

*Research themes:*

1. Quality controlled logistics
  - using advanced product quality information in logistics decision making for improved customer service and less food spoilage
2. Sustainable logistics
  - socio-economic and environmental performance measures, trade-offs to improve overall sustainable performance in agrifood chains
3. Planning and Inventory Control
  - production and inventory models for perishable products
  - models and algorithms for valorisation and robust design

### **Project 4a. Tilburg University Operations Research**

*Leader* : Prof.dr.ir. E.R. van Dam

*Address* : Department of Econometrics and Operations Research, CentER for Economic Research, School of Economics and Management, Tilburg University, P.O. Box 90153, 5000 LE Tilburg.

*Phone* : 013 – 4662430

*Research staff* : Prof.dr. H.A. Akkermans, prof.dr.ir. J. Ashayeri, dr. B.W.M. Bettonvil, dr. J.P.C. Blanc, prof.dr. P.E.M. Borm, dr. R.C.M. Brekelmans, prof. dr.ir. E.R. van Dam, prof.dr.ir. H. Daniels, dr. F.M. De Oliveira Filho, prof. dr. A.M.B. De Waegenaere, prof.dr. F.A. van der Duyn Schouten, dr. J.C. Engwerda, prof.dr.ir. H.A. Fleuren, dr.ing. W.J.H. van Groenendaal, dr. Gul Gurkan, prof.dr.ir. W.H. Haemers, prof.dr. H.J.M. Hamers, prof.dr.ir. D. den Hertog, dr. K.J.M. Huisman, prof.dr. G. Kant, prof.dr. J.P.C. Kleijnen, prof. dr. E. de Klerk, prof.dr. P.M. Kort, prof.dr. M. Laurent, dr. M. Nagy, dr.ir. M.J.P. Peeters, dr. M. Quant, dr. J.H. Reijnierse, prof.dr. J.M. Schumacher, dr. R. Sotirov, prof.dr. A.J.J. Talman.

*Research themes:*

1. Stochastic Operations Research;
2. Deterministic Operations Research;
3. Simulation;
4. Combinatorial mathematics;
5. Cooperative game theory.

## **Project 4b. Tilburg University**

### **Operations Research and Game theory**

*Leaders* : Prof.dr. P.E.M. Borm.  
*Address* : Department of Econometrics and Operations Research, CentER for Economic Research, Tilburg School of Economics and Management, Tilburg University, P.O. Box 90153, 5000 LE Tilburg.  
*Phone* : 013 - 4663026; 013 - 4662340 (secretary)  
*Research staff* : Prof. dr. P.E.M. Borm, drs. M. Groote Schaarsberg, drs. S. Grundel, prof. dr. H.J.M. Hamers, dr. R. Hendrickx, drs. T. Huseynov, dr. J. Kleppe, drs. R. Lindelauf, drs. E. Lohmann, prof. dr. H.W. Norde, dr. M. Quant, dr. H. Reijnierse, drs. O. Selcuk, drs. T. Suzuki, prof. dr. A.J.J. Talman.

#### *Research themes:*

1. Cooperative game theory;
2. Non-cooperative game theory;
3. Mathematical economics;
4. Skill in games;
5. Overt and covert network analysis.

## **Project 5a. Maastricht University**

### **Combinatorial optimization**

*Leader* : Prof.dr.ir. C.P.M. van Hoesel.  
*Address* : Department of Quantitative Economics, Faculty of Economics, Maastricht University, P.O. Box 616, 6200 MD Maastricht.  
*Phone* : 043 - 3883727; 043 - 3883835 (secretary).  
*Research staff* : Dr. A. Berger, dr. A. Grigoriev, prof.dr.ir. S. van Hoesel, prof.dr. R. Müller, dr. H. Röglin and dr. T. Vredeveld.

#### *Research themes:*

1. Mechanism design, combinatorial auctions;
2. Network optimization;
3. Planning and scheduling;
4. Approximation;
5. Pricing, Revenue Management;
6. Supply Chain Management.

## **Project 5b. Maastricht University**

### **Game Theory and Optimization**

*Leader* : Dr. F. Thuijsman.  
*Address* : Department of Knowledge Engineering, Maastricht University, P.O. Box 616, 6200 MD Maastricht.  
*Phone* : 043 - 3883489; 043 - 3883496 (secretary).  
*Research staff* : I. Arcaya MSc, dr. P. Bonizzi, M. Cluitmans MSc, dr. P.J. Collins, dr. J.J.M. Derks, J. Heijman MSc, dr. M. Hoffmann, S. Jansen MSc, dr. J.M.H. Karel, dr. S.M. Kelk, dr.ir. J.Kuipers, prof.dr.ir. R.L.M. Peeters, dr. M. Petreczky, dr. G.M. Schoenmakers, dr. F. Thuijsman, P. Uyttendaele MSc and dr. R.L. Westra.

#### *Research themes:*

1. Strategic optimization in networks (network formation games, Markov games, gene networks, phylogenetic networks, evolutionary models)
2. Systems biology (signal processing, data mining, pattern recognition, computability).

## **Project 6. University of Groningen**

### **Operations Research**

*Leader* : Prof.dr. R.H. Teunter.  
*Address* : Faculty of Economics and Business, University of Groningen, P.O. Box 800, 9700 AV Groningen.  
*Phone* : 050 - 3638617; 050 - 3637491 (secretary).  
*Research staff* : Dr T. Bodea, drs. H. Bouma, drs. Serra Caner, Dr. B. Goldengorin, prof.dr. W.K. Klein Haneveld, D. Krushinsky MSc, prof. dr. K.-J. Roodbergen, prof. dr. G. Sierksma, drs. M.H. Streutker, drs. B.G. Talsma, prof.dr. R.H. Teunter, prof. dr. I. Vis, prof.dr. M.H. van der Vlerk and dr. X. Zhu.

*Research themes:*

1. Decision making under uncertainty and Stochastic programming (Klein Haneveld, Streutker, van der Vlerk).
2. Combinatorial optimization and quantitative logistics (Bouma, Goldengorin, Roodbergen, Schakel, Sierksma, Talsma, Teunter, Vis)
3. Reverse logistics, Inventory control, forecasting, pricing and revenue management (Bodea, Caner, Teunter, Zhu)

**Project 7. University of Leiden**  
**Stochastic Operations Research**

*Leader* : Dr. F.M. Spieksma.  
*Address* : Mathematical Institute, University of Leiden, P.O. Box 9512, 2300 RA Leiden.  
*Phone* : 071 – 5277128.  
*Research staff* : Drs H. Blok, dr. F.M. Spieksma.

*Research themes:*

1. Markov decision chains with applications in queueing networks;
2. Markov games;
3. Stability properties of parametrised collections of Markov chains with applications to queueing.

**Project 8a. Delft University of Technology**  
**Interior point methods**

*Leader* : Prof.dr.ir. C. Roos  
*Address* : Faculty of Electrical Engineering, Mathematics and Computer Science,  
Delft University of Technology, Mekelweg 4, 2628 CD Delft  
*Phone* : 015 - 2782530; 015 - 2787486 (secretary)  
*Research staff* : A. Asadi MSc., ir. H.N. Post, B.P. Silalahi MSc. and M. Zangiabadi MSc.  
*Research themes* :

1. Interior point methods for linear and non-linear optimization;
2. Randomized (approximation) algorithms;
3. Robust optimization.

**Project 8b. Delft University of Technology**  
**Interior point methods**

*Leader* : Prof.dr.ir. K.I. Aardal  
*Address* : Faculty of Electrical Engineering, Mathematics and Computer Science,  
Delft University of Technology, Mekelweg 4, 2628 CD Delft  
*Phone* : 015 - 2785093; 015 - 2784109 (secretary)  
*Research staff* : Prof.dr. K.I. Aardal, dr. F. Vallentin, dr. D. Gijswijt (per 1/9/2011), dr. E. Kim, E. DeCorte, F. von Heymann,, S. Li, H. Post

*Research themes* :

1. Integer and combinatorial optimization;
2. Semidefinite/convex optimization;
3. Harmonic analysis applied to optimization, lattices and optimization.

**Project 9a. Eindhoven University of Technology**  
**Combinatorial optimization**

*Leaders* : Prof.dr. G.J. Woeginger.  
*Address* : Department of Mathematics and Computer Science, Eindhoven University of  
Technology, P.O. Box 513, 5600 MB Eindhoven  
*Phone* : 040 - 2472412 (Woeginger); 040 - 2473130 (secretary)  
*Research staff* : Dr. N. Basal, drs. C.E.J. Eggermont, M. Firat MSc., dr.ir. C.A.J. Hurkens, dr. J.C.M. Keijsper, prof.dr. J.K. Lenstra, dr. R.A. Pendavingh, and prof.dr. G.J. Woeginger.

*Research themes* :

1. Combinatorial optimization;
  - 1.1. Graph and matroid structure theory;
  - 1.2. Complexity and approximation;
  - 1.3. Enumerative optimization;
  - 1.4. Optimization under uncertainty;

## **Project 9b. Eindhoven University of Technology**

### **Stochastic Operations Research**

*Leaders* : Prof.dr.ir. O.J. Boxma.  
*Address* : Department of Mathematics and Computer Science, Eindhoven University of Technology, P.O. Box 513, 5600 MB Eindhoven  
*Phone* : 040 - 2472858 (Boxma); 040 - 2473130 (secretary)  
*Research staff* : Prof.dr.ir. I.J.B.F. Adan, S. Badila, drs. R. Bierbooms, dr.ir. M.A.A. Boon, prof.dr.ir. S.C. Borst, ir. N. Bouman, prof.dr.ir. O.J. Boxma, drs. J.L. Dorsman, dr. J.S.H. van Leeuwen, dr. J.A.C. Resing, ir. P.M. van de Ven, E. Vatamidou, dr. M. Vlasiou, and ir. A.C.C. van Wijk.

#### *Research themes* :

1. Stochastic operations research;
  - 1.1. Random walks and queueing theory;
  - 1.2. Performance analysis of computer- and communication systems;
  - 1.3. Performance analysis in operations management and logistics;
2. The EURANDOM program on Queueing and Performance Analysis.

## **Project 10. University of Amsterdam**

### **Deterministic and Stochastic Operations Research**

*Leader* : Prof.dr. N.M. van Dijk.  
*Address* : Department of Econometrics, Faculty of Economics and Econometrics, University of Amsterdam, Roetersstraat 11, 1018 WB Amsterdam.  
*Phone* : 020 - 5254215; 020 - 5254217 (secretary)

*Research staff* : Drs. A. Al-Ibrahim, Prof.dr. N.M. van Dijk, dr. C.W. Duin, ir. J.A.M.Hontelez, drs. P. Joustra, dr. H.J.J. van der Sluis, dr. A. Volgenant and prof.dr.ir. J. van der Wal.

#### *Research themes*:

1. Markov decision theory (Al-Ibrahim, Haijema, van der Wal, van Dijk);
2. Performance analysis of service networks (van Dijk, van der Sluis);
3. Exact and bounding results for queueing networks (van Dijk);
4. Scheduling algorithms and complexity (Duin, van der Sluis);
5. Traveling salesman problem and variants (Volgenant);
6. Graph theory problems (Duin, Volgenant);
7. Polyhedral methods (Volgenant);
8. Inventory models (van der Sluis, van der Wal);
9. Transportation (Al-Ibrahim, Haijema, van Dijk, van der Wal);
10. Daily life applications of stochastic models (van Dijk, van der Sluis);
11. Healthcare (Haijema, Hontelez, van Dijk, van der Wal);
12. OR and simulation (van Dijk, van der Sluis, van der Wal);
13. OR and simulation (van Dijk, van der Sluis).

## **Project 11. University of Twente**

### **Discrete Optimization and Stochastic Operations Research**

*Leaders* : Prof.dr. R.J. Boucherie and prof.dr. M. Uetz.  
*Address* : Faculty of Electrical Engineering, Mathematics & Computer Science, University of Twente, P.O. Box 217, 7500 AE Enschede.  
*Phone* : 053- 4893433; 053- 4893434 (secretary).  
*Research staff* : F. Ahmed MSc, N. Baer MSc, ir. M.J. Bomhoff, M.G.C. Bosman MSc, H.C.M. Bossers MSc, prof.dr. R.J. Boucherie, A. Braaksma MSc, prof.dr.ir. H.J. Broersma, Y. Chen MSc, dr.ir. T.S.H. Driessen, ir. T. van Essen, Y. Feng MSc, dr.ir. J. Goseling, dr.ir. M. de Graaf, prof.dr. J.L. Hurink, dr. W. Kern, N. Kortbeek MSc, dr. N. Litvak, dr. B. Manthey, dr. J.C.W. van Ommeren, dr.ir. G. Post, X. Qiu MSc, D. Reijsbergen MSc., dr.ir. W.R.W. Scheinhardt, dr. G.J. Still, prof.dr. M. Uetz, dr. P. Vanberkel, dr. J.B. Vink-Timmer, J. Wu MSc, M. Zonderland MSc. and A. Zwartjes MSc

#### *Research themes*:

1. Discrete Mathematics, Mathematical Programming and Stochastic Operations Research:
  - Combinatorial optimization, approximation algorithms, online algorithms, continuous optimization, graph theory, scheduling, timetabling, routing, pricing.
2. Game Theory:
  - Cooperative game theory, noncooperative game theory, stochastic game theory, algorithmic game theory, mechanism design.

3. Stochastic Operations Research:
  - Telecommunication systems, queuing network analysis, large deviations, fluid models, pricing, wireless networks, IP networks.
4. Supply chain management:
  - Manufacturing, scheduling, logistics, inventory models, reliability, maintenance, spare parts planning and control.
5. Health care logistics.

### **Project 12. University of Utrecht Operations Research**

*Leader* : Prof.dr.ir. E.J. Balder  
*Address* : Department of Mathematics, University of Utrecht, Budapestlaan 6, 3508 TA Utrecht.  
*Phone* : 030 - 2531458; 030 - 2531420 (secretary)  
*Research staff* : Prof.dr.ir. E.J. Balder and dr. A. Gnedin.  
*Research themes:*

1. Generalized solutions in game theory, optimal control and mathematical economics;
2. Probabilistic methods in combinatorics;
3. Search and sorting algorithms.

### **Project 13a. VU University Amsterdam Combinatorial Optimization and Stochastic Operations Research**

*Leaders* : Prof.dr. L. Stougie  
*Address* : Department of Econometrics and OR, VU University Amsterdam,  
 De Boelelaan 1105, 1081 HV Amsterdam  
*Phone* : 020 - 5986013  
*Research staff* : Dr. G.J. Franx, prof.dr. J. Gromicho, dr. B. Heidergott, B. Kaynar MSc.,  
 dr. D.A. van der Laan, dr. R.D. Nobel, dr. A.A.N. Ridder, prof.dr. G. Schaefer, dr.ir. R.A.  
 Sitters, S.L. van der Ster, MSc, prof.dr. L. Stougie, prof.dr. G.T. Timmer and W. Wolk-  
 Makarewicz MSc.

*Research themes:*

1. Combinatorial Optimisation;
  - 1.1. Algorithms: complexity and approximation;
  - 1.2. Algorithmic game theory;
  - 1.3. On-line algorithms;
  - 1.4. Computational biology;
2. Stochastic Operations Research;
  - 2.1. Markov decision algorithms for controlled queuing systems;
  - 2.2. Analysis and simulation of probabilities for rare events;
  - 2.3. Perturbation analysis and simulation techniques;
  - 2.4. Numerical algorithms based on Taylor series expansion;
  - 2.5. Stochastic programming.

### **Project 13b. VU University Amsterdam Optimization of Business Processes**

*Leader* : Prof.dr. G.M. Koole  
*Address* : Department of Mathematics, VU University Amsterdam,  
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*Phone* : 020 - 4447755  
*Research staff* : Dr. R. Bekker, dr. S. Bhulai, M. Calinescu, A. Haensel, drs. P. Koeleman-Out, drs. G.J.  
 Kommer, prof.dr. R.D. van der Mei, ir. R. Meijer, drs. D. Moeke, drs. A. Roubos, and  
 prof.dr. A.P. Zwart.

*Research themes:*

1. Performance modeling of communication systems;
2. Theory and applications of controlled queueing systems.



## 10. List of PhD Students

1	Ahmed, Mr. Faizan	University of Twente Faculteit EWI
2	Alvarez, E.	University of Twente School of Management and Governance
3	Arcaya, Ignacia	Maastricht University Department of Knowledge Engineering
4	Arts, Ir. J.J.	Eindhoven University of Technology
5	Asadi, A.	Delft University of Technology EWI Room HB 07-160
6	Baer, Niek	Universiteit Twente Faculteit EWI
7	Banaszewska, MSc. A.	Wageningen University Dep. Logistics, Decision and Information Sciences
8	Behfard, Sina	University of Twente Management and Governance
9	Bierbooms, MSc. J.J.P.H.	Eindhoven University of Technology Dept. of Mathematics & Computer Science
10	Bing, Xiaoyun	Wageningen University Operational Research and Logistics
11	Bloem, MSc. J.W.H. van	University of Twente EWI
12	Boer, Drs. A.V. den	CWI Amsterdam
13	Bomhoff, Matthijs	University of Twente Dept. of Applied Mathematics
14	Bosman, Joost	CWI Amsterdam
15	Bossers, MSc. Harm	University of Twente EWI
16	Bouma, MSc. Harmen	University of Groningen
17	Bouman, N.	CWI Amsterdam
18	Bouman, MSc Niek	Technische Universiteit Eindhoven Fac. Wiskunde & Informatica
19	Büyükkaramikli, Cagdas	Eindhoven University of Technology Department of Technology Management
20	Calinescu, MSc. M.	Vrije Universiteit Amsterdam Business mathematics and informatics
21	Caner, Serra	University of Groningen Fac. of Economics & Business
22	Cetinay, MSc Hande	Tue IE&IS OPAC
23	Chen, MSc. Yanting	University of Twente Department of Applied Mathematics
24	Coenen, Ir. Tom	University of Twente Capitool E104
25	Corbacioglu, U. MSc.	RSM Erasmus University Rotterdam Decision and Information Science
26	Csapó, Gergely	Maastricht University School of Business and Economics Department of Quantitative Economics
27	Curseu, A. MSc.	Eindhoven University of Technology Dept. of Technology Management
28	Dabia, Ir. S.	Eindhoven University of Technology Department of Technology Management
29	de Groot, Msc Cindy	ORTEC B.V. ORTEC Consulting Group
30	DeCorte, Mr. Evan	TU Delft EWI
31	Dickinson, MSc. P.J.C.	University of Groningen, Johann Bernoulli Institute for Mathematics and Computer Science,

32	Dimitrova, MSc. D.	University of Twente EWI
33	Diris, MSc. B.	University of Maastricht Department Quantitative Economics
34	Dobre, C.	Tilburg University
35	Dollevoet, MSc. Twan	Erasmus University Rotterdam Econometric Institute
36	Dorsman, Jan-Pieter	Eindhoven University of Technology Eurandom
37	Eggermont, Drs. C.	Eindhoven University of Technology Department of Mathematics & Computer Science
38	El-Kebir, drs. ir. Mohammed	CWI Life Sciences
39	Ensinck, Hans Ir.	Maastricht University Quantitative Economics
40	Essen, Ir. Theresia van	University of Twente EWI
41	Evers, L. MSc.	Erasmus Universiteit
42	Fazi, M.A. Stefano	Technische Universiteit Eindhoven Industrial Engineering & Innovation Sciences
43	Feng, Yuan	Universiteit Twente EWI/DMMP
44	Filatova, MSc. T.	University of Twente
45	Firat, MSc. M.	Eindhoven University of Technology Mathematics and Computer Science
46	Frolkova, M.	CWI
47	Gaast, Drs Jelmer van der	Erasmus University Rotterdam, Rotterdam School of Management / Management of Technology and Innovation
48	Gharehgozli, Amir	Erasmus University Rotterdam School of Management
49	Gijben, MSc Luuk	Rijksuniversiteit Groningen Systems, Control and Applied Analysis
50	Glorie, MSc Kristiaan	Erasmus University Rotterdam
51	Gorissen, BSc. Bram	Tilburg University
52	Groot, Noortje	Delft University of Technology
53	Groote Schaarsberg, M. MSc.	Tilburg University Econometrie & Operations Research (EOR)
54	Haensel, Alwin	VU Amsterdam
55	Haneyah, Sameh	University of Twente Industrial Engineering & Management - Logistics
56	Hellings, Ton	CWI/UvA
57	Heuvel, MSc. F.P. van den	Eindhoven University of Technology Pav F10
58	Heymann, Frederik von	Delft University of Technology Faculty EEMCS
59	Hilbers, MSc. P.	Tilburg University Department EOR
60	Hoeksma, Ruben	Universiteit Twente EWI - DMMP
61	Hoen, MSc. Kristel	Eindhoven University of Technology Pav. F14
62	Hoorn, drs. J. van	VU Amsterdam FEWEB
63	Hulshof, Ir. Peter	University of Twente MB-OMPL
64	Hurk, Evelien van der	Erasmus University Rotterdam RSM

65	Ivanovs, MSc. I.	Eindhoven University of Technology Eurandom
66	Jaarsveld, W. van	Erasmus University Econometric Institute
67	Jalil, M.	RSM Erasmus University Rotterdam Dept. of Decision & Information Sciences
68	Jancura, P.	Radboud University Nijmegen Intelligent systems, FNWI
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70	Jansen, Ir. M.	Eindhoven University of Technology Faculty of Management Technology, Pav. E.14
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72	Karsten, F. MSc.	Eindhoven University of Technology Pav. F20
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74	Kecman, Pavle	TU Delft Transport&Planning
75	Keijzer, Bart de	CWI
76	Kemper, drs. B.P.H.	University of Amsterdam
77	Kilic, O.A.	University of Groningen Faculty of Economics and Business
78	Kinable, M.Sc. Joris	KU Leuven Computerwetenschappen Kulak
79	Koeleman-Out, MSc. MA Paulien	Vrije Universiteit Amsterdam Faculteit der Exacte Wetenschappen
80	Koochaki, J.	University of Groningen Faculty of Economics and Business
81	Korkmaz, E.	Erasmus University Rotterdam School of Management
82	Kortbeek, MSc. N.	University of Twente Faculty of El. Engineering, Math. & Comp. Sciences
83	Krushinsky, D.	University of Groningen Faculty of Economics and Business
84	Langestraat, R. MSc.	Tilburg University Departement Etrie
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87	Lee, J. MSc.	Maastricht University Dept. of Quantitative Economics
88	Li, Mr. Shanfei	Delft University of Technology Optimization and Systems Theory of Applied Mathematics
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92	Ma, N.	Tilburg University Operations Research & Management Science
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96	Marbán, MSc. S.	Maastricht University Fac. of Economics & BA
97	Marchal, ir. Bert	University of Maastricht Quantitive Economy

98	Mehdad, Ehsan MSc	Tilburg University
99	Meuffels, MSc. W.J.M.	University of Tilburg Department of Econometrics & OR, CentER Applied Research
100	Naeemi, MSc. S.H.	Maastricht University Department of Quantitative Economics
101	Nguyen Phan, B.S.	University of Groningen Fac. of Economics & Business
102	Nielsen, L.K. MSc.	RSM Erasmus University
103	Ohazulike, MSc Anthony	University of Twente EWI/Applied Mathematics, CTW/Civil Engineering
104	Pauls- Worm, Drs. Karin	Wageningen University Leerstoelgroep Operationele Research & Logistiek
105	Pieters, Angèle	Tilburg University
106	Pince, C.	Erasmus University Rotterdam Faculty of Economics
107	Planken, Ir. L.R.	Delft University of Technology Department EWI
108	Pourakbar, M. MSc.	Erasmus University ERIM
109	Qiu, Mr Xian	University of Twente Applied Mathematics/DMMP
110	Ramezani, Sara	CWI
111	Regts, MSc. G.	CWI
112	Reijnen Koens, Ir. I.C.	Eindhoven University of Technology Faculty Technology Management
113	Reijsbergen, Daniël	University of Twente
114	Retel Helmrich, MSc. M.	Erasmus University Rotterdam ERIM, Faculty of Economics
115	Rooij, MSc. J.M.M. van	Utrecht University Department of Information and Computing Sciences
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118	Schut, drs msc Hans	DHL supply chain consulting
119	Sever, Derya	Eindhoven University of Technology IE&IS
120	Sharypova, Kristina	Eindhoven University of Technology Department of Industrial Engineering & Innovation Sciences
121	Sietsma, MSc. F.	CWI Logic and Computer Science
122	Silalahi, Ir. B.P., M. Komp	Delft University of Technology Faculty of EEMCS
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125	Staiger, Christine	CWI
126	Streutker, Drs. M.H.	University of Groningen Faculty of Economics and Business
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130	Truetsch, Uwe	Tilburg University TiSEM

131	Udenio, Maximiliano	TU Eindhoven Industrial Engineering and Innovation Sciences / OPAC
132	Usotskaya, Natalya	Maastricht University School of Business and Economics
133	Uyttendaele, MSc. P.	Maastricht University Operation and Research
134	van Brink, Martijn	Maastricht University School of Business and Economics / Quantitative Economics
135	van der Ster, MSc Suzanne	Vrije Universiteit, Faculteit der Economische Wetenschappen en Bedrijfskunde / Afdeling Econometrie
136	van Elzakker, Martijn	Eindhoven University of Technology Scheikundige Technologie
137	van Oosterom, MSc Chiel	TU Eindhoven IE&IS / OPAC
138	van Zwieten, ir. Dirk	Eindhoven University of Technology Mechanical Engineering
139	Vanberkel, MSc. Peter	University of Twente
140	Varvitsiotis, Antonios	CWI
141	Vatamidou, MSc Eleni	TU/e Mathematics & Computer Science
142	Veelenturf, MSc. L.P.	RSM Erasmus University
143	Veen, MSc. Egbert van der	University of Twente TW
144	Ven, MSc. P. van de	Eindhoven University of Technology HG 9.05
145	Verhoef, C.	CWI
146	Vlajic, MSc. J.	Wageningen University Operations Research an Logistic Group
147	Volk-Makarewicz, W.	Vrije Universiteit Amsterdam FEWEB
148	Wallerlei, Ruth	Universiteit van Amsterdam Opereations research
149	Waltman, MSc. L.	Erasmus University Rotterdam Faculty of Economics
150	Weiss, Dipl.-Ing. Nicolas	TU Delft 3mE/DCSC
151	Wijk, MSc. A.C.C. van	Eindhoven University of Technology Dept. of Mathematics & CS
152	Wohlers, Inken	CWI
153	Wu, MSc. M.	CWI
154	Yang, Guangyuan	Tinbergen Institute
155	Yanikoglu, I.	Tilburg University Dept of Econometrics & OR
156	Ypsilantis, Panagiotis	EUR RSM/ Department of Decision and Information Sciences
157	Yüceoglu, Birol	Maastricht University Dept of Quantitative Economics
158	Zaerpour, N.	Erasmus University Rotterdam Rotterdam School of Management
159	Zangiabadi, M.	Delft University of Technology Faculty EWI
160	Zhang, Xiaoyan	University Twente EWI/DMMP
161	Zhou, S.	Erasmus University Rotterdam Rotterdam School of Management
162	Zhu, Qiushi	TU Eindhoven IE&IS/ OPAC
163	Zivkovic, Miroslav	University of Twente Faculty EEMCS

164	Zonderland, MSc. Maartje	University of Twente EWI-SOR Room Citadel H132
165	Zwaan, R. van der	Maastricht University

**(more detailed information available on <http://www.lnmb.nl/pages/people>)**

## **11. List Alumni LNMB**

1	Aarts, Dr.ir. H.F.M.	
2	Agatz, Dr.ir. N.A.H.	Erasmus University
3	Akker, Dr.ir. J.M. van den	Utrecht University
4	Al-Ibrahim, Drs. A.	Universiteit van Amsterdam
5	Angün, MSc. M.E.	Galatasaray University
6	Asadi, A.	
7	Baarsma, Ir. H.E.	Goudappel Coffeng

8	Batenburg, Dr. K.J.	University of Antwerp (CDE)
9	Bázsa, E.M.	
10	Beekhuizen, Ir. P.	EURANDOM
11	Bekker, Dr. R.	VU University
12	Bhulai, Dr. S.	VU University Amsterdam
13	Bijvank, M.	Université de Montréal
14	Bisschop, Prof.dr. J.J.	
15	Blanc, Dr. H.M. le	Philips Lightning
16	Blanc, H.M. le	
17	Blank, H. de	
18	Bloemhof-Ruwaard, Dr. J.M.	Wageningen University
19	Boef, Dr. E. den	Quintiq
20	Boer, C.A.	
21	Bomans MTD, A.J.	
22	Bontridder, Dr.ir. K.M.J. de	Mapscape
23	Boots, Dr. Nam Kyo	
24	Borst, Prof.dr.ir. S.C.	Eindhoven University of Technology
25	Boucherie, Prof.dr. R.J.	University of Twente
26	Boulaksil, Dr.ir. Y.	Al Akhawayn University
27	Brito, Dr. M.P. de	
28	Broek, Dr.ir. J.J.J. van den	Advitrae
29	Broens, Dr. D.F.	Beethanol BV / Agrologistiek BV
30	Brouns, Dr.ir. G.A.J.F.	
31	Bruin, Dr. Josine	Eindhoven University of Technology
32	Byrka, Dr. J.	EPFL SB IMA
33	Chaerani, Dr. D.	Padjadjaran University
34	Chen, Prof. dr. B.	University of Warwick
35	Cheung, Dr. S.K.	
36	Chodynietki, PDEng. D.	FocusFrame B.V. (Europe Headquarters)
37	Ciftci, Dr. B.B.	
38	Coelho de Pina, Dr. J.	Universidade de Sao Paulo
39	Combé, Dr.M.B.	AEGON Nederland NV
40	Cremers, Dr. M.L.A.G.	TNT Post
41	Crujsssen, Dr. F.C.A.M.	TNT Express
42	Damme, Prof.dr. E.E.C. van	Tilburg University
43	Dert, Prof. C.L.	ABN AMRO Pensionfund
44	Diecidue, Dr. E.	INSEAD
45	Dieker, Dr. A.B.	IBM TJ Watson Research Center
46	Diepen, Dr. G.	Paragon Decision Technology
47	Dogru, M.K.	Alcatel-Lucent Bell Labs
48	Douma, Dr.ir. A.M.	University of Twente,
49	Dragut, Dr. A.B.	Université Aix-Marseille II (I.U.T.)
50	Dreef, Dr. M.R.M.	Quintiq Applications BV
51	Eenige, Dr. M.J.A. van	National Aerospace Laboratory NLR
52	Egorova, Dr. R.	Cardano Risk Management
53	Eijs, Dr. M.J.G van	
54	Es-Saghouani, Dr. A.	Capgimini Nederland BV. te Utrecht
55	Estevez Fernandez, Dr. M.A.	VU University Amsterdam
56	Farenhorst-Yuan, Dr. T.	Vrije Universiteit van Amsterdam
57	Fischer, Dr. S.F.	
58	Fleischmann, Dr. M.	University of Mannheim
59	Flesch, Dr. J.	Maastricht University
60	Flinsenber, Dr. I.C.M.	Philips Research Laboratories

61	Gao, X	University of Groningen
62	Garbe, Dr. R.	Hochschule Bremerhaven
63	Ge, L.	Wageningen UniversityWageningen University
64	Gellekom, Dr. J.R.G. van	Centraal Beheer Achmea
65	Gijswijt, Dr. D.C.	CWI
66	Gong, Dr. Y.	23 Avenue Guy de Collongue
67	Goossens, Dr. J.W.	NATO C3 Agency
68	Gouweleeuw, Dr. F.N.	Mckinsey & Company
69	Goverde, Dr. R.M.P.	Delft University of Technology
70	Grigoriev, Dr. A.	Maastricht University
71	Grigorieva, Dr. E.A.	Statistics Netherlands
72	Gromicho, Dr. J.A.S.	ORTEC Consultants BV
73	Gu, Guoyong Dr.	Nanjing University
74	Gvozdencovic, Dr. N.	
75	Haan, Dr. R. de	
76	Hadianti, Dr. R.	Faculty of Mathematics and Natural Sciences
77	Haijema, Dr. R.	Wageningen Universiteit en Research centre
78	Hendrickx, R.L.P.	Tilburg University
79	Hendriks, Dr.ir. M.P.M.	Eindhoven University of Technology
80	Hertog, Prof.dr.ir. D. den	Tilburg University
81	Heule, Dr.ir. M.J.H.	Delft University of Technology
82	Heuvel, Dr. W. van den	Erasmus University Rotterdam
83	Heydenreich, B.	Maastricht University
84	Hout, Dr. W.B. van den	Leiden University Medical Center
85	Huisman, Dr. D.	Erasmus University RotterdamErasmus
86	Huitzing, Dr. H.A.	Applied Research Consultancy B.V.
87	Hunting, Dr.ir. M.M.G.	Paragon Decision Technology
88	Husslage, Dr. B.G.M.	Fontys University of Applied Sciences
89	Hutzschenreuter, A.	Eindhoven University of Technology
90	Iersel, Dr. L.J.J. van	University of Canterbury
91	Jackels, MSc. B.	RSM Erasmus University
92	Jansen, Dr. B.	Ministerie van Justitie
93	Janssen, Dr. E.	Tilburg University
94	Janssen, Dr. M.A.	Arizona State University
95	Joosten, Dr. R.A.M.G.	University of Twente
96	Karel, J.M.H.	Maastricht University
97	Kets, W.	Northwestern University
98	Kleppe, Dr. J.	Tilburg University
99	Klerk, Prof.dr. E. de	University of Tilburg
100	Klijjn, Dr. F.	Institut d'Anàlisi Econòmica, CSIC
101	Klundert, Prof.dr. J. van de	Erasmus University Rotterdam
102	Kock, Dr.ir. A.A.A.	Weir Minerals Netherlands
103	Kok, Dr.ir. A.L.	ORTEC Software Development
104	Kort, dr. J. de	Arthur D. Little
105	Korteweg, Dr. P.	APG
106	Koster, Dr. M.A.L.	University of Amsterdam
107	Koster, Prof. Dr. ir. A.M.C.A.	RWTH Aachen University
108	Kouwenberg, Dr. R.R.P.	
109	Kovaleva, Dr. S.	Maastricht University
110	Kuijpers, Dr. ir. C.M.H.	Tilburg University
111	Kuijpers, Dr. B.H.M.	APG All Pensions Group
112	Kuipers, Dr.ir. J.	Maastricht University
113	Lang, Ir. N.A.	Imtech ICT TS



114	Le Blanc - van Krieken, Dr.	De Lage Landen International B.V.
115	Maahu, H.	Vrije Universiteit Amsterdam
116	Leeuwaarden, Dr. J.S.H. van	Eindhoven University of Technology Eindhoven
117	Leeuwen, Dr. E.J. van	University of Beheren
118	Lennartz, Dr. P.	
119	Listes, Dr. O.L.	Paragon Decision Technology
120	Loeve, Dr. J.A.	Progress, Pensioenfonds van Unilever Nederland
121	Lok, Dr. R.B.	Statistics Netherlands (CBS)
122	Mainegra Hing, MSc. M.	
123	Mandjes, Prof.dr. M.R.H.	University of Amsterdam
124	Mansouri, Dr. H.	Shahrekord University
125	Marquinie, Drs. N.A.A.	ABN-AMRO Verzekeringen
126	Martinez, Dr. A.	CWI
127	Maus, S.	Maastricht University
128	Meertens, Dr. M.A.	REAAL
129	Mei, Prof.dr. R.D. van der	CWI/VU
130	Mes, Dr. M.R.K.	University of Twente
131	Mincsovcis, Dr. G.Z.	TomTom Eindhoven
132	Miretsky, D.I.	
133	Mnich, M.	Eindhoven University of Technology
134	Modelski, MSc. M.S.	Eindhoven University of Technology
135	Molenkamp, Drs. J.B.	
136	Moonen-Loon, Dr. J.M.W.	Mateum bv
137	Mostard, Drs. J.A.M.	VU University Amsterdam
138	Netjes, Ir. M.	Eindhoven University of Technology
139	Nicolai, Dr. R.	
140	Nouweland, Dr. A. van den	University of Oregon
141	Nunez Queija, Prof.dr. R.	Amsterdam University
142	Odijk, Drs. M.A.	
143	Olieman, Dr. N.J.	Eureko Holding
144	Oliveiro Filho, Dr. F.M. de	CWI
145	Ommeren, Dr. J.C.W. van	University of Twente
146	Oner, K.B.	Eindhoven University of Technology
147	Oord, MSc. A. van	Erasmus University Rotterdam
148	Oosten, Dr. M.	SAS Institute Inc
149	Ouwehand, dr. P.	Statistics Netherlands
150	Paepe, W. de	Capgemini
151	Paulus, Dr.ir. J.J.	Centre of Quantitive Methods
152	Peeters, Dr.ir. M.J.P.	Tilburg University Tilburg University
153	Peng, Dr. J.M.	University of Illinois at Urbana Champaign
154	Petrova, S.	Tinbergen Institute
155	Pham Do, Dr. K.H.	Massey University
156	Piersma, Dr. N.	Hogeschool van Amsterdam
157	Pot, Dr. S.A.	VU University Amsterdam
158	Potthoff, D.	Nederlandse Spoorwegen
159	Quist, Dr.ir. A.J.	OM Partners N.V.
160	Reijnierse, Dr. J.H.	Tilburg University
161	Rennen, Dr. G.	Quinity B.V.
162	Resing-Sassen, Dr. S.A.E.	Gemeente Venlo
163	Romeijn, Dr. H.E.	The University of Michigan
164	Romero Morales, Dr. M.D.	University of Oxford
165	Roodbergen, Prof.dr. K.J.	University of Groningen
166	Roubos, Dr. A.	

167	Roubos, MSc. D.	Vrije Universiteit Amsterdam
168	Rutten, Dr.ir. J.H.G.C.	ASML
169	Schakel, L.P.	E,til bv
170	Schoenmakers, Drs. G.M.	Maastricht University
171	Schotanus, Dr.ir. F.	University of Twente
172	Schutten, Dr.ir. J.M.J.	University of Twente
173	Siegmann, Dr. A.H.	Tinbergen
174	Siem, Dr.ir. A.Y.D.	ORTEC
175	Slikker, Dr. M.	Eindhoven University of Technology
176	Sluis, Dr. H.J. van der	University of Amsterdam
177	Smeltink, Dr. J.W.	National Aerospace Laboratory NLR
178	Smit, Prof.dr.ir. J.H.A. de	
179	Souza, L.V. de	European Commission
180	Spieksma, Prof.dr. F.C.R.	KU Leuven
181	Srour, Dr. F.J.	Erasmus University Rotterdam
182	Stee, Dr. R. van	Max-Planck-Institut für Informatik
183	Stehouwer, Dr.ir. H.P.	
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