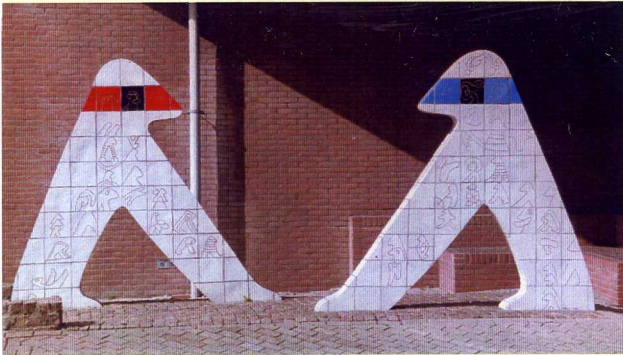




Centre for Mathematics and Computer Science

# FRONTIER RESEARCH FOR PRACTICAL APPLICATIONS



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## CWI

CWI is the national research institute for mathematics and computer science. Since its foundation in 1946, the institute has acquired a prominent position in the research world. CWI co-founded (1989) the European Research Consortium for Informatics and Mathematics ERCIM, and participates in the recently created national Telematics Institute.

## MISSION

- ◆ Frontier research in mathematics and computer science
- ◆ Knowledge transfer to society in general, and trade & industry in particular

## FINANCES

Total annual budget (1997) 25 million Hfl (11,4 million Euro):

- ◆ Basic subsidy from the Netherlands Organisation for Scientific Research NWO (70%)
- ◆ Participation in (inter)national research programmes and commissions from industry and government (30%)

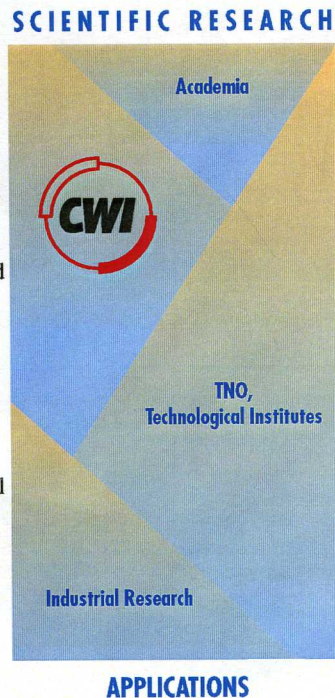
## STAFF

Total staff 185 fte:

- ◆ 135 fte researchers (18 full professors)
- ◆ 50 fte supporting staff

## POSITIONING

CWI performs fundamental research on themes derived from societal needs which are continuously renewed. There is close cooperation with universities and national graduate schools and, on the road to concrete applications, also with industry and large knowledge institutions, including Shell, Philips, the Netherlands Organisation of Applied Research TNO, the ministry of Public Works, Delft Hydraulics, the Dutch National Agency for Health and Environment RIVM, and the Royal Dutch Meteorological Institute KNMI. CWI does not develop applications itself, but is involved through small spin-off companies, for example Data Distilleries (datamining) and General Design (design of WWW-sites).



## SCIENTIFIC RESEARCH

CWI research is grouped into clusters of interdisciplinary themes.

### *Cluster*

#### ◆ *Theme*

#### Probability, Networks and Algorithms

- ◆ Networks and Logic -- Optimization & Programming
- ◆ Traffic and Communication -- Performance & Control
- ◆ Stochastics
- ◆ Signals and Images

#### Software Engineering

- ◆ Interactive Software Development and Renovation
- ◆ Specification and Analysis of Embedded Systems
- ◆ Coordination Languages
- ◆ Evolutionary Computation and Applied Algorithmics

#### Modelling, Analysis and Simulation

- ◆ Environmental Modelling and Porous Media Research
- ◆ Industrial Processes
- ◆ Mathematics of Finance

#### Information Systems

- ◆ Data Mining and Knowledge Discovery
- ◆ Multimedia and Human-Computer Interaction
- ◆ Interactive Information Engineering
- ◆ Quantum Computing and Advanced Systems Research

## SUPPORT

Supporting facilities for the researchers include a library of national importance, advanced computing facilities (max-impact graphics, ATM through glass fibre, compute-, database- and file-servers) and a publication service. In addition, support is provided regarding project management, acquisition, public relations and science information.

### *Some key functions*

Library

Computing infrastructure

Publication service

International and national programmes

Acquisition/PR

Science information

**Function****Telephone E-mail**

Name

(+31 20 592....) (...@cwi.nl)

*General Director*

G. van Oortmerssen 4178 G.van.Oortmerssen

*Cluster Leader  
Theme Leader*

A. Schrijver	4087	Lex.Schrijver
A.H.M. Gerards	4045	Bert.Gerards
J.H. van Schuppen	4085	J.H.van.Schuppen
M.S. Keane	4050	Mike.Keane
H.J.A.M. Heijmans	4057	Henk.Heijmans

J.W. de Bakker	4136	J.W.de.Bakker
P. Klint	4126	Paul.Klint
J.F. Groot	4232	JanFriso.Groot
J.J.M.M. Rutten	4116	Jan.Rutten
J.A. La Poutré	4082	Han.La.Poutre

C.J. van Duijn	4208	Hans.van.Duijn
J.G. Verwer	4095	Jan.Verwer
P.W. Hemker	4108	P.W.Hemker
J.M. Schumacher	4090	Hans.Schumacher

M.L. Kersten	4066	Martin.Kersten
A.P.J.M. Siebes	4139	Arno.Siebes
H.L. Hardman	4127	Lynda.Hardman
P.J.W. ten Hagen	4133	Paul.ten.Hagen
P.M.B. Vitányi	4124	Paul.Vitanyi



CWI in the Market Place

*Contact Person*

F.A. Roos	4034	F.A.Roos
F. Kuiper	4121	Frank.Kuiper
F.J.G. Goudsbloem	4018	F.J.G.Goudsbloem
F.A.M. Sniijders	4171	Frans.Sniijders
M.W. Brouwer	4253	Margriet.Brouwer
H.M. Nieland	4092	Henk.Nieland

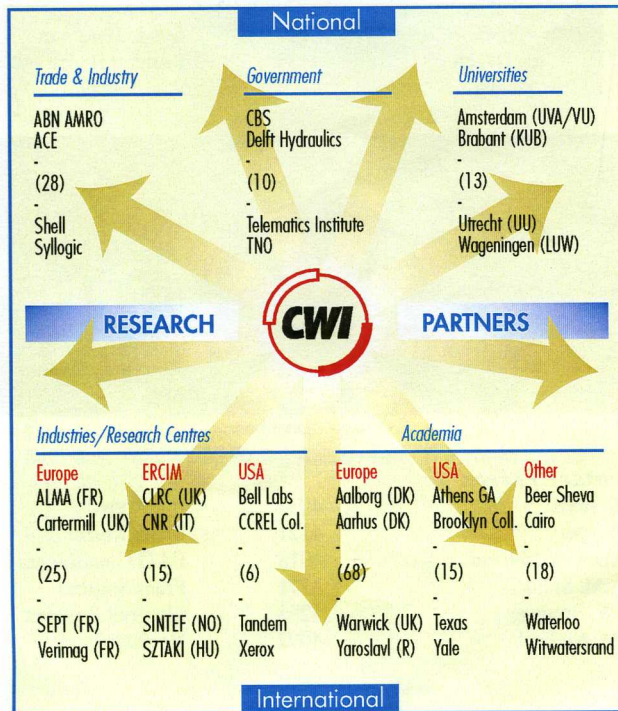
## COOPERATION AND KNOWLEDGE TRANSFER

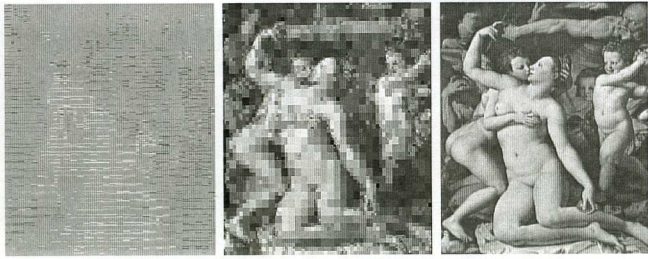
CWI maintains a broad spectrum of contacts with companies and institutions, usually through joint participation in a project. Besides there are direct commissions from industry and the government (Philips, Dutch Rail, ministry of Public Works, major banks, ...). CWI presents itself annually to the world of trade & industry on the first Friday in October (CWI in the Market-place).

CWI participates in some twenty European projects and is a partner in some thirty national projects managed by the NWO foundations for computer science (SION), mathematics (SWON), the technical sciences (STW) and computing facilities (NCF), and the HPCN programme of the ministry of Economic Affairs (EZ). In projects of STW and HPCN-EZ concrete industrial participation is compulsory, whereas large knowledge institutions such as Delft Hydraulics, KNMI and RIVM play an important role as well.

Academic partners are mainly found in projects of SION (computer science) and SWON (mathematics). In addition, CWI's active role in the ERCIM consortium, in which major research institutions from 15 European countries are represented, leads to cooperation with several European partners.

Last, but not least, CWI participates in the recently founded Telematics Institute. In this framework, CWI cooperates with the Telematics Research Centre TRC (now merged into the Telematics Institute), TNO, and the Universities of Twente and Delft.





Fractal image coding: decompression

## RECENT APPLICATIONS

- Dutch Rail: routing of rolling-stock, 21st century time-table
- Traffic network control
- Fractal image coding
- Software renovation: Y2000, Euro, OO-COBOL
- Interactive visualisation (computational steering)
- Software testing
- Evolutionary algorithms for management problems
- 3D models for air and water pollution
- Transport phenomena in the (porous) underground
- Factoring of large numbers (data security)
- Risk profiles for insurance and banking (datamining)
- Multimedia presentations on the Web
- Interactive books
- Digital libraries
- Animation of facial expressions
- Mathematical finance

